San Bernardino County Flood Control District
Desert Knolls Wash Phase III
Flood Control Improvement Project –
Initial Study and Mitigated Negative Declaration

Prepared for:

San Bernardino County Flood Control District
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JANUARY 2017

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1 INTRODUCTION

1.1 Introduction

The San Bernardino County Flood Control District proposes to the construction, operation, and maintenance of channel improvements and an access road within an approximately 0.6-mile segment of Desert Knolls Wash. (collectively referred to as the "project"), located within the Town of Apple Valley in the County of San Bernardino. The purpose of the proposed project is to provide flood control protection to adjacent existing residential development. The County of San Bernardino (County) Department of Public Works, Environmental Management Division, will act as the lead agency under the California Environmental Quality Act (CEQA; California Public Resources Code 21000 et seq.) and will obtain all necessary regulatory permits.

1.2 CEQA Compliance

The County is the lead agency pursuant to CEQA, and is responsible for analyzing and approving the proposed project's CEQA documentation. The County has determined that a mitigated negative declaration (MND) is the appropriate environmental document to be prepared in compliance with CEQA. This finding is based on the initial study (IS)/environmental checklist (Section 4 of this MND). As provided for by CEQA Section 21064.5, a MND may be prepared for a project subject to CEQA when the project will not result in significant environmental impacts that cannot be mitigated to a level below significance.

This Draft IS/MND has been prepared by Dudek for the County in conformance with Section 15070, Subsection (a), of the CEQA Guidelines (14 CCR 15000 et seq.). The purpose of the IS/MND is to determine the potential significant impacts associated with construction, operation and maintenance of the proposed channel improvements within Desert Knolls Wash, and incorporate mitigation measures into the project design as necessary to reduce or eliminate any potentially significant effects of the project.

1.3 Content and Format of the IS/MND

This IS/MND includes the following:

Section 1 **Introduction:** Provides an introduction to the IS/MND.

Section 2 **Project Description:** Provides a detailed description of the proposed project evaluated in this IS/MND. This section also includes project location, project characteristics, and construction.

Section 3 **Findings:** Provides findings that the project will not have a significant effect on the environment and the rationale supporting this finding.

Section 4 **Initial Study Environmental Checklist/Discussion of Environmental Impacts:** Provides an analysis of the environmental issues and concerns surrounding the project.

Section 5 **Mitigation Monitoring and Reporting Program:** Provides a list of responsibility assignments for all mitigation measures. This section also describes timing considerations for each mitigation measure.

Section 6 **Report Preparers:** Provides a list of personnel responsible for report preparation.

Section 7 **References:** Provides citations for the references cited in the document.

1.4 Public Review Process

In accordance with CEQA, a good faith effort has been made during the preparation of this MND to contact affected agencies, organizations, and individuals who may have an interest in this project. In reviewing the IS/MND, affected public agencies and the interested public should focus on the sufficiency of the document in identifying and analyzing the possible impacts on the environment and ways in which the significant effects on the project area are proposed to be avoided or mitigated.

Comments may be made on the IS/MND in writing before the end of the comment period. Following the close of the public comment period, the County will consider this IS/MND and comments thereto in determining whether to certify the environmental document. Written comments on the IS/MND should be sent to the following address no later than March 3, 2017.

Nancy Sansonetti, AICP, Senior Planner
Nancy.Sansonetti@dpw.sbcounty.gov
San Bernardino County Flood Control District
825 East Third Street, Room 123
San Bernardino, California 92415
Phone: 909.387.7897
Fax: 909.387.7876

The County of San Bernardino Board of Supervisors will consider this document for approval and certification during a future public hearing.

2 PROJECT DESCRIPTION

2.1 Project Purpose and Background

The Desert Knolls Wash Phase III Flood Control Project (project) consists of the construction of wash improvements and an access road within an approximately 0.6-mile segment of Desert Knolls Wash, within the Town of Apple Valley in San Bernardino County. The area proposed for improvements extends from an existing concrete trapezoidal channel in Desert Knolls Wash (Phase II) and terminates at the confluence of the wash with the Mojave River. The purpose of the proposed project is to provide flood control protection to adjacent existing development.

2.2 Project Location

The proposed project is generally located east of the Interstate 15 Freeway and south of State Route 18, in the Town of Apple Valley, County of San Bernardino, California (Figure 1: Regional Location). Specifically, the project site is located approximately 500 feet south of State Route 18 and west of the intersection of Potomac Road and Quantico Road (Figure 2, Vicinity Map). The project site incorporates an approximately 0.6-mile segment of the Desert Knolls Wash alignment, between the confluence of Desert Knolls Wash with the Mojave River and the existing upstream concrete trapezoidal channel.

The project site is within Township 5 North, Range 4 West, Sections 11 and 12 of the Victorville, California U.S. Geological Survey (USGS) 7.5-minute Victorville quadrangle map (Desert Knolls Wash alignment, silting basin and access road) (Figure 3, Topographic Map).

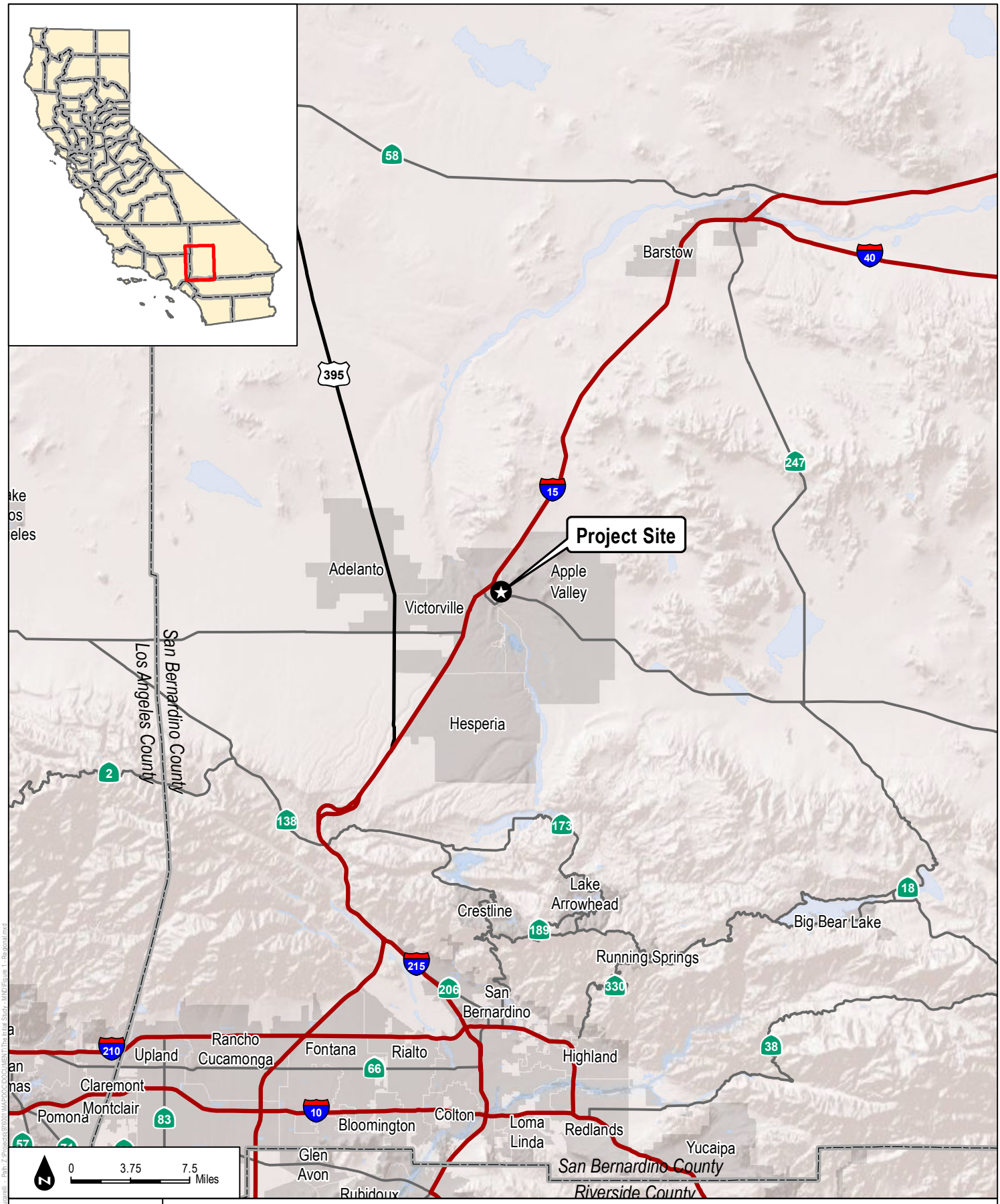
2.3 Project Description

The proposed project consists of bank and invert stabilization improvements along a 0.6-mile segment of Desert Knolls Wash (Figure 4, Desert Knolls Wash Phase III Flood Control Improvement Project Site Plan). The proposed improvements will follow the existing meandering footprint of the Wash, with stream base widths of 30 to 150 feet. The wash side slopes will be graded to a 2:1 slope and side slope protection consisting of grouted and ungrouted rock will be installed along both sides of the wash for the full length of the project. The wash invert will mainly be earthen with a series of grade stabilization structures constructed across the invert to prevent erosion during large storm events. The grade stabilization structures will be constructed from grouted and ungrouted, large diameter rock. Splash pads will be constructed downstream of each grade stabilization structure from ungrouted large diameter rock. A rock invert (wash bottom) is proposed at sections of the wash where higher erosion is expected to occur. The grouted rock side slope revetment and grade stabilization structures will extend below grade at the toe to below the anticipated scour depth.

The existing invert of the Desert Knolls Wash appears to be exposed bedrock for a 500-foot segment downstream of the existing concrete channel. Within this reach of the Wash, the side slopes may be revetted with grouted rock or concrete. A concrete invert may also be constructed over the exposed bedrock, or the exposed rock may be left in place as the invert surface. It is not anticipated that any excavation of the invert below the existing flow line would be conducted in this reach of the Wash, nor would the construction of invert stabilization structures be required.

A grouted rock stilling basin with an internal weir will be constructed downstream of the segment to be improved to mitigate potential erosion near the confluence of the Wash with the Mojave River. The basin embankment and weir will be revetted with large diameter grouted rock. The basin invert upstream of the internal weir will be lined with ungrouted and grouted large diameter rock and the basin invert downstream of the internal weir will be earthen. The rock of the existing hillside will be used as the northern basin slope to the extent possible. An apron consisting of large diameter ungrouted rock will be placed at the downstream side of the basin outlet.

A continuous access road will be constructed along the southerly side of the wash to facilitate access into the wash and future wash maintenance. The access road may be paved and fenced at specific locations to control access road erosion and public use of the road. An access road crossing over the wash from property owned by The Lewis Center to the east will be constructed through construction of a concrete box or arch culvert at one location in the northerly section of the wash. Concrete headwalls and wingwalls will also be constructed on either side of the crossing to wash the flow through the culvert. A safety barrier will be installed at the top of the crossing to ensure the safety of vehicles and maintenance staff using the crossing. An existing sewerline will be relocated from the bottom of the Wash to the proposed access road alignment.



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SOURCE: ArcGIS Online Basemap

FIGURE 1

Regional Location Map

Desert Knolls Wash Phase III Flood Control Improvement Project Site Plan

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SOURCE: SOURCE: USGS 7.5-Minute Series Victorville Quadrangle

FIGURE 2

Vicinity Map

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Desert Knolls Wash Phase III Flood Control Improvement Project Site Plan

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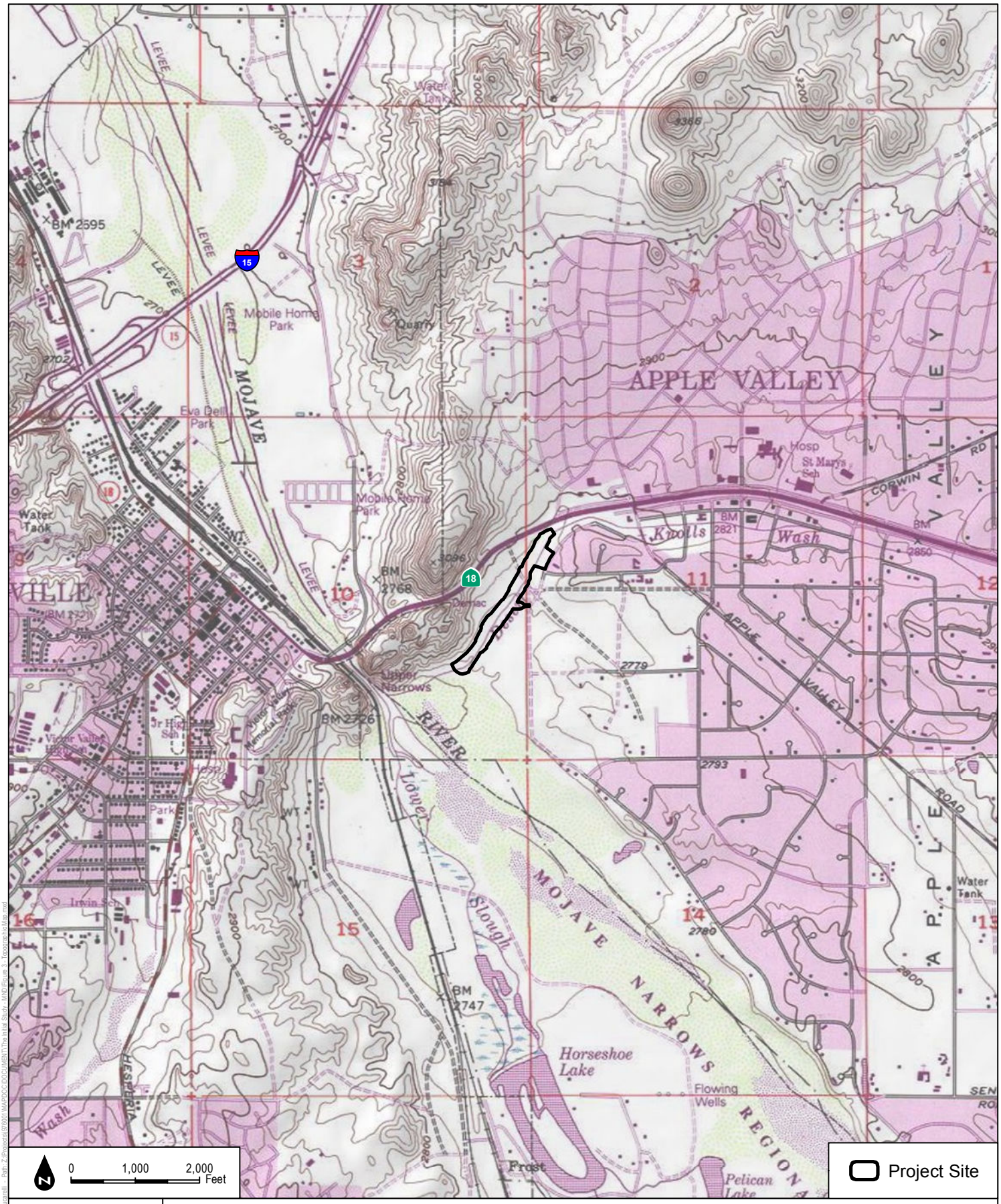

SOURCE: SOURCE: USGS 7.5-Minute Series Victorville Quadrangle

FIGURE 3

Topographic Map

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Desert Knolls Wash Phase III Flood Control Improvement Project Site Plan

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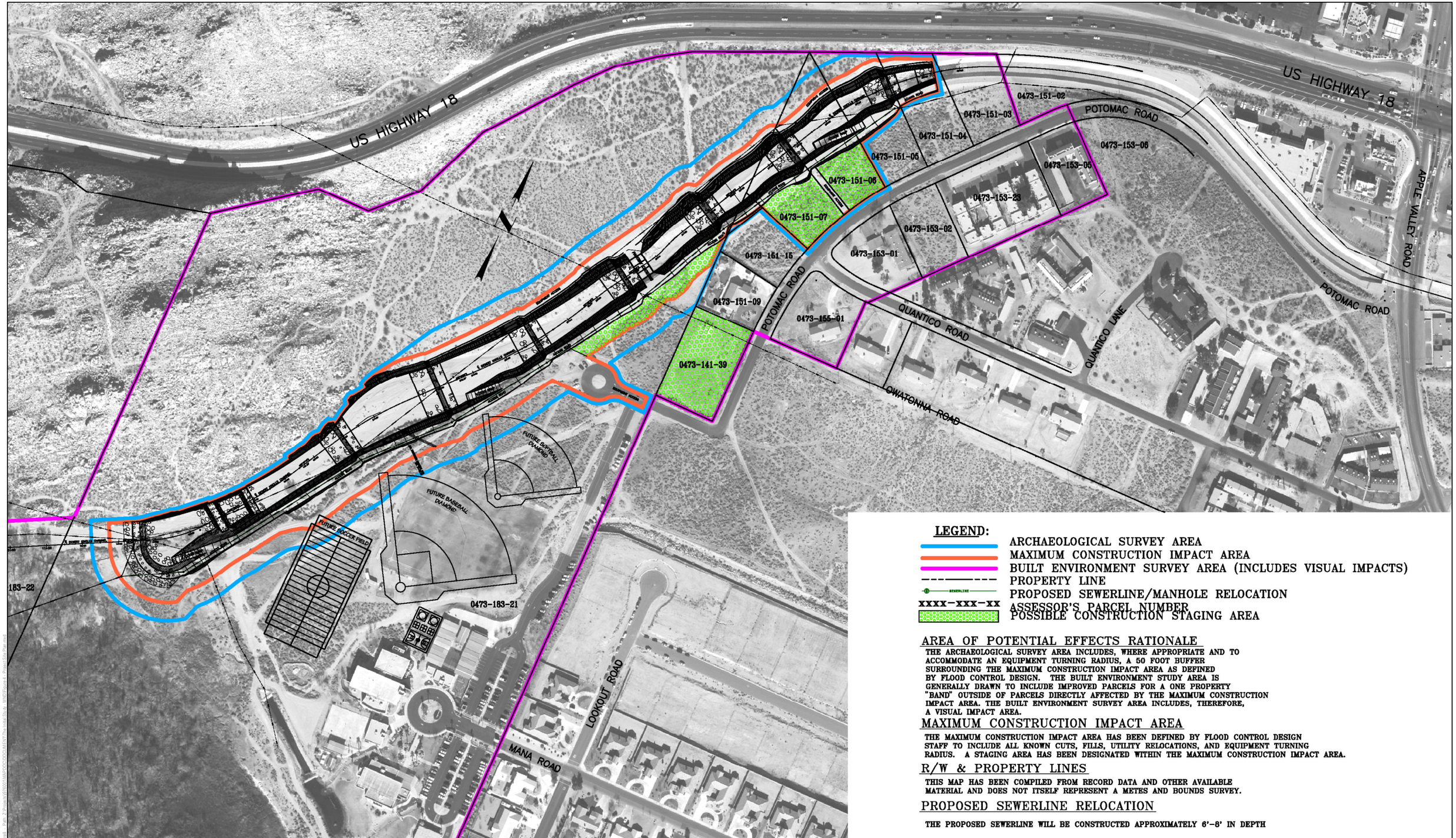

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SOURCE: San Bernardino County Flood Control District

FIGURE 4

Desert Knolls Wash Phase III Flood Control Improvement Project Site Plan

Desert Knolls Wash Phase III Flood Control Improvement Project

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Construction

Construction of the proposed project is anticipated to commence in July 2017 and would last approximately 9 months, ending in March 2018. The construction phases, timing, and equipment needs for construction of the proposed project are provided in Table 2-1 (duration of phases is estimated).

Table 2-1
Desert Knolls Wash Phase III Anticipated Construction Phasing, Equipment, and Schedule

Construction Phase	Equipment	Quantity
Site preparation Clearing and grubbing, tree removal, building demolition – 3 weeks (July 2017)	Bulldozer	1
	Chipper	1
	Grader	1
	Loader	1
	Water Trucks	1
	Chainsaw	1
Grading Excavation - 3 months (July 2017–October 2017)	Wheel scraper	2
	Loader	2
	Water Trucks	1
Grading Hauling 3 months (September 2017 – January 2017) Would occur over two separate periods	Bulldozer	1
	Dump Trucks	8
	Loader	2
	Water Trucks	2
Grading Rock slope protection – 4 Months (October 2017–March 2017) Would occur over two separate periods.	Excavators	1
	Loaders	1
	Haul Trucks	10
	Grout Pump	1
Grading Fill and re-compaction – 1.5 months (August 2017–November 2017) Would occur over two separate periods.	Loaders	1
	Dump Trucks	3
	Bulldozer	1
	Grader	1
	Sheepfoot roller-compactor	1
	Water Trucks	1
Paving Concrete Structure – 2 Weeks (September 2017)	Bulldozer	1
	Concrete Mixer	1
	Concrete Pump	1
Paving Street Improvements/Misc – 1 week (October 2017)	Paving Machine	1
	Compressor	1
	Water Truck	1
	Service Truck	2

Table 2-1
Desert Knolls Wash Phase III Anticipated Construction Phasing, Equipment, and Schedule

Construction Phase	Equipment	Quantity
	Grader	1
	Roller/Compactor	1
Trenching Sewer Relocation – 2 weeks (August 2017)	Tractor/loader/backhoe	1
	Water Truck	1
	Service Truck	1

The grading of Desert Knolls Wash is anticipated to involve net excavation of up to approximately 99,000 cubic yards and fill of up to approximately 32,000 cubic yards. Therefore, a total of approximately 67,000 cubic yards of soil would require offsite hauling and disposal.

Construction equipment and parking for construction workers would be staged in the designated lots southeasterly of the existing wash (Figure 4). No nighttime lighting of the site would be required because all construction activities would occur during the day.

Operation and Maintenance

Following construction of the proposed project, the County will conduct annual maintenance activities consisting of sediment and debris removal to ensure that wash capacity is retained. Only woody vegetation will be removed from the wash bottom during maintenance. Other native non-woody vegetation will remain in place. Desert Knolls Wash improvements maintenance would begin following completion of construction in 2018. The proposed project includes annual maintenance activity for the first 5 years following construction.

Each annual maintenance event would require approximately 3 months, or 60 working days, to complete. Equipment used during maintenance activities would include one loader (rubber-tired loader) and one bulldozer (crawler tractor, 410 HP) for 8 hours per day. A water truck would be used to control fugitive dust. The anticipated equipment and days needed to complete the annual maintenance activity are provided in Table 2-2.

Table 2-2
Annual Maintenance Equipment and Schedule

Equipment	Number	Hours/Day	Days
Loader	1	8	60
Dump trucks	3	8	60

Table 2-2
Annual Maintenance Equipment and Schedule

Equipment	Number	Hours/Day	Days
Bulldozer	1	8	60
Water trucks	1	8	60

2.4 Discretionary Actions

The following discretionary actions are required for the proposed project:

- Certification of this Initial Study / Mitigated Negative Declaration by the County Board of Supervisors
- Approval of the mitigation monitoring and reporting program by the County's Board of Supervisors

Other Agency Approvals

- U.S. Army Corps of Engineers Section 404 – Individual Permit
- Regional Water Quality Control Board (Lahontan Regional Board) – 401 Water Quality Certification
- Regional Water Quality Control Board – National Pollutant Discharge Elimination System General Permit for Stormwater Discharges
- California Department of Fish and Wildlife – Section 1602 Streambed Alteration Agreement
- Mojave Desert Air Quality Management District

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3 FINDINGS

The San Bernardino County Flood Control District finds that the project will not have a significant adverse effect on the environment based on the results of the initial study environmental checklist and discussion of environmental impacts (see Chapter 4, Initial Study Environmental Checklist/Discussion of Environmental Impacts). Some potentially significant effects have been identified, and mitigation measures have been incorporated into the project to ensure that these effects remain at less-than-significant levels. A mitigated negative declaration (MND) is therefore proposed to satisfy the requirements of the California Environmental Quality Act (CEQA) (California Public Resources Code, Section 21000 et seq.; 14 CCR 15000 et seq.). This conclusion is supported by the following:

1. **Aesthetics.** The project would result in a less than significant impact on scenic vistas and the visual character of the project site. The project would not result in impacts on scenic resources within a state scenic highway or create substantial new sources of light or glare. See Chapter 4, Responses 1a to 1d (Aesthetics), for additional information.
2. **Agricultural Resources.** As indicated by the California Department of Conservation Important Farmland Map 2010, impacts to agricultural resources would not occur. See Chapter 4, Responses 2a to 2e (Agriculture and Forestry Resources), for additional information.
3. **Air Quality.** The emissions calculated for the proposed project were below the significance thresholds for both construction and operational phases of the project. Impacts would be less than significant. See Chapter 4, Responses 3a to 3e (Air Quality), for additional information.
4. **Biological Resources.** The proposed project is located in an area where sensitive plant and wildlife species have the potential to occur. Additionally, the project would result in temporary and permanent impacts to state and federal jurisdictional waters. Mitigation measures have been incorporated to reduce potential impacts to a level below significance. Therefore, impacts to biological resources would be less than significant. See Chapter 4, Responses 4a to 4e (Biological Resources), for additional information.
5. **Cultural Resources.** The project site is located in an area where cultural resources have been recorded. A Memorandum of Understanding (MOU) was established in 2014 between the San Manuel Band of Mission Indians, the San Bernardino County Flood Control District, and the Lewis Center for Educational Research which establishes specific protocols for the treatment of Native American cultural resources, including human remains, and procedures for tribal participation during ground-disturbing activities. Additionally, the cultural resources report prepared by CRM Tech found that the Pleistocene-age sediments in the northern portion of the Desert Knolls Wash

have a high potential to contain paleontological resources. Mitigation measures have been incorporated, in accordance with the existing 2014 MOU and the recommendations set forth in the CRM Tech cultural resources report, to reduce potential impacts to a level below significance. Therefore, significant impacts to cultural resources would not result. See Chapter 4, Responses 5a to 5d (Cultural Resources), for additional information.

6. **Geology and Soils.** The proposed project would not expose people or structures to adverse risk associated with geologic or soil conditions. The bank and invert stabilization improvements would be designed in accordance with design and construction requirements of the California Building Code (CBC) and the County of San Bernardino County Flood Control District. Impacts would be less than significant. See Chapter 4, Responses 6a to 6e (Geology and Soils), for additional information.

7. **Greenhouse Gas Emissions.** The project would not result in a conflict with applicable regulations associated with reducing greenhouse gas emissions. Therefore, impacts would be less than significant. See Chapter 4, Responses 7a to 7b (Greenhouse Gas Emissions), for additional information.

8. **Hazards and Hazardous Materials.** The operation of the project would not introduce significant hazardous materials to people or the environment, and no previous hazardous reports have been listed for the project site. However, construction of the proposed project would involve use of potentially hazardous materials (fuels and motor oil). Mitigation measures have been incorporated to reduce potential impacts to a level below significance. Therefore, impacts associated with hazards and hazardous materials would be less than significant. See Chapter 4, Responses 8a to 8h (Hazards and Hazardous Materials), for additional information.

9. **Hydrology and Water Quality.** The proposed project involves more than 1 acre of ground disturbance; therefore, coverage under the State Water Resources Control Board General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit) is required. The Construction General Permit requires the development and implementation of a stormwater pollution prevention plan, which would contain a site map(s) that depicts the location of stockpiles, staging areas, and the type and location of best management practices (BMPs) such as silt fencing, sandbag berms, and general good housekeeping methods intended to prevent erosion and the off-site discharge of silt or debris in stormwater. The project is intended to provide flood protection for existing structures and residences in the project area. Impacts associated with water quality, flooding, and hydrology would be less than significant. See Chapter 4, Responses 9a to 9j (Hydrology and Water Quality), for more information.

10. **Land Use and Planning.** The project would be compatible with existing and planned land uses in the project vicinity. No change in land use designations is proposed. Impacts would be less than significant. See Chapter 4, Responses 10a to 10c (Land Use and Planning), for more information.
11. **Mineral Resources.** The project site does not contain important mineral deposits. Implementation of the proposed project would not preclude any plans for mineral recovery. Therefore, no impacts on mineral resources would occur. See Chapter 4, Responses 11a to 11c (Mineral Resources), for more information.
12. **Noise.** The construction and operational noise generated by the proposed project would comply with County of San Bernardino and Town of Apple Valley noise criteria. Mitigation measures have been incorporated to ensure that construction activities are restricted during the hours of 7:00 a.m. through 7:00 p.m. and that construction equipment is operated with required noise attenuation devices. Therefore, impacts would be less than significant. See Chapter 4, Responses 12a to 12f (Noise), for more information.
13. **Population and Housing.** The project would not affect local housing availability or generate additional population; therefore, impacts on population and housing would be less than significant. See Chapter 4, Responses 13a to 13c (Population and Housing), for more information.
14. **Public Services.** The proposed project would result in a less than significant increased demand for public services, and no significant impacts would occur. See Chapter 4, Responses 14a to 14e (Public Services), for more information.
15. **Recreation.** Implementation of the proposed project would not create additional demand for recreational facilities or increase the use of existing recreational facilities. No impacts to recreation would occur. See Chapter 4, Responses 15a and 15b (Recreation), for more information.
16. **Transportation and Traffic.** Implementation of the project would temporarily add trips to the local roadways during construction. During operation, minimal vehicle trips would be required for management and periodic maintenance of the facilities. Maintenance equipment is limited to a maximum of one bulldozer, one water truck, one loader, and three dump trucks used on an annual basis. Impacts to traffic would be less than significant. See Chapter 4, Responses 16a to 16f (Transportation/Traffic),for more information.
17. **Utilities and Service Systems.** The project itself would not necessitate the need for additional utilities and service systems. Impacts would be less than significant. See Chapter 4, Responses 17a to 17g (Utilities and Service Systems), for more information.

18. **Mandatory Findings of Significance.** No long-term significant impacts are associated with the project, and impacts would not be cumulatively considerable. See Chapter 4, Responses 18a to 18c (Mandatory Findings of Significance), for more information.

4 INITIAL STUDY ENVIRONMENTAL CHECKLIST

1. **Project Title:**

Desert Knolls Wash Phase III Flood Control Improvement Project

2. **Lead Agency Name and Address:**

San Bernardino County Flood Control District
Environmental Management Division
825 East Third Street, Room 123
San Bernardino, California 92415

3. **Contact Person, Phone Number, and Email:**

Nancy Sansonetti, AICP, Senior Planner
909.387.7897
Nancy.Sansonetti@dpw.sbcounty.gov

4. **Project Location:**

The proposed project is generally located east of the Interstate 15 Freeway and south of State Route 18, in the Town of Apple Valley, County of San Bernardino, California. Specifically, the project site is located approximately 500 feet south of State Route 18 and west of the intersection of Potomac Road and Quantico Road. The project site incorporates an approximately 0.6-mile segment of the Desert Knolls Wash alignment, between the confluence of Desert Knolls Wash with the Mojave River and the existing upstream concrete trapezoidal channel.

5. **Project Sponsor's Name and Address:**

San Bernardino County Flood Control District
Environmental Management Division
825 East Third Street, Room 123
San Bernardino, California 92415

6. **General Plan Designation:**

The project site is located within the Lewis Center Educational Research Specific Plan. The project site is designated in the Specific Plan as a Flood Zone.

7. **Zoning:**

Specific Plan (SP) Flood Zone

Description of Project:

See Section 2, Project Description.

8. **Existing Land Use and Setting:**

The project footprint is characterized by an undeveloped portion of developed land that is bordered to the north by State Route 18, to the east by existing residential development and The Lewis Center for Educational Research (Lewis Center) main campus area, to the west by an undeveloped portion of the Lewis Center campus and State Route 18, and to the south by undeveloped land and the confluence with the Mojave River.

9. **Surrounding Land Uses and Setting (Briefly describe the project's surroundings):**

- North – Existing concrete trapezoidal channel segment of Desert Knolls Wash (Phase II), State Route 18
- South – confluence with Mojave River and undeveloped land.
- East – Residential development and The Lewis Center for Educational Research campus
- West – Undeveloped land, State Route 18

10. **Other Public Agencies Whose Approval Is Anticipated to Be Required (i.e., permits, financial approval, or participation agreement):**

a. U.S. Army Corps of Engineers (ACOE) Section 404 – Individual Permit

b. Regional Water Quality Control Board (RWQCB – Lahontan Region) – 401 Water Quality Certification

c. California Department of Fish and Wildlife – Section 1602 Streambed Alteration Agreement

d. Mojave Desert Air Quality Management District (MDAQMD) – Consistency with Rule 403.2 (Fugitive Dust Control for the Mojave Desert Planning Area) during construction and maintenance activities.

11. **Other Environmental Reviews Referenced in this Review:** None

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "potentially significant impact," as indicated by the checklist that follows.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☐ Air Quality
☒ Biological Resources	☒ Cultural Resources	☐ Geology/Soils
☐ Greenhouse Gas Emissions	☒ Hazards and Hazardous Materials	☐ Hydrology/Water Quality
☐ Land Use/Planning	☐ Mineral Resources	☐ Noise
☐ Population/Housing	☐ Public Services	☐ Recreation
☐ Transportation/Traffic	☐ Utilities/Service Systems	☐ Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation, which reflects the independent judgment of the San Bernardino County Flood Control District , it is recommended that:

San Bernardino County Flood Control District finds that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared. ☐

San Bernardino County Flood Control District finds that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared. ☒

San Bernardino County Flood Control District finds that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required. ☐

San Bernardino County Flood Control District finds that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed. ☐

San Bernardino County Flood Control District finds that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required. ☐

Signature: Harold Zamora Date 1/24/2017
Harold Zamora, P.E., Chief

EVALUATION OF ENVIRONMENTAL IMPACTS

1. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a lead agency cites following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved *(i.e., the project falls outside a fault rupture zone).* A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards *(i.e., the project will not expose sensitive receptors to pollutants, based on a project-specific screening analysis).*

2. All answers must take account of the whole action involved, including off-site as well as on-site, cumulative as well as project-level, indirect as well as direct, and construction as well as operational impacts.

3. Once the lead agency has determined that a particular physical impact may occur, then the checklist answers must indicate whether the impact is potentially significant, less than significant with mitigation, or less than significant. "Potentially Significant Impact" is appropriate if there is substantial evidence that an effect may be significant. If there are one or more "Potentially Significant Impact" entries when the determination is made, an EIR is required.

4. "Negative Declaration: Less Than Significant with Mitigation Incorporated" applies where the incorporation of mitigation measures has reduced an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." The lead agency must describe the mitigation measures, and briefly explain how they reduce the effect to a less than significant level (mitigation measures from Section XVII, "Earlier Analyses," may be cross-referenced).

5. Earlier analyses may be used where, pursuant to the tiering, program EIR, or other CEQA process, an effect has been adequately analyzed in an earlier EIR or negative declaration. Section 15063(c)(3)(D). Earlier analyses are discussed below.

    a. Earlier Analysis Used. Identify and state where they are available for review.

    b. Impacts Adequately Addressed. Identify which effects from the above checklist were within the scope of and adequately analyzed in an earlier document pursuant to applicable legal standards, and state whether such effects were addressed by mitigation measures based on the earlier analysis.

    c. Mitigation Measures. For effects that are "Less Than Significant with Mitigation Measures Incorporated," describe the mitigation measures which were incorporated

or refined from the earlier document and the extent to which they address site-specific conditions for the project.

6. Lead agencies are encouraged to incorporate into the checklist references to information sources for potential impacts (*e.g., general plans, zoning ordinances*). Reference to a previously prepared or outside document should, where appropriate, include a reference to the page or pages where the statement is substantiated. A source list should be attached and other sources used or individuals contacted should be cited in the discussion.

7. Supporting Information Sources: A source list should be attached, and other sources used or individuals contacted should be cited in the discussion.

8. This is only a suggested form, and lead agencies are free to use different formats; however, lead agencies should normally address the questions from this checklist that are relevant to a project's environmental effects in whatever format is selected.

9. The explanation of each issue should identify:

   a. the significance criteria or threshold, if any, used to evaluate each question: and

   b. the mitigation measure identified, if any, to reduce the impact to less than significance.

4.1 Environmental Evaluation

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
I. AESTHETICS – Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐

1a. Response (Sources: Town of Apple Valley 2009)

Less Than Significant Impact. The Desert Knolls Wash site (proposed project) is located in within the high desert residential community of Apple Valley. The visual character of the high desert is formed by sweeping views of the desert floor, which is sparsely vegetated with desert species, especially Joshua trees (*Yucca brevifolia*), against a backdrop of local mountain ranges.

The proposed project site is an undeveloped portion of an existing education center, relatively flat property bisected by an existing desert wash and is vegetated with desert species, including one Joshua tree adjacent to the project footprint. The State Route 18 extends along the northern site boundary. Implementation of the proposed project will change the views of the site from adjacent properties and roadways from an undeveloped wash to one with intermittent rock stabilization structures and a graded access road along the easterly wash boundary. The structures will be placed below existing grade in the wash bottom and on the constructed 2:1 sideslopes, which will reduce visibility.

Prominent rock outcroppings are located along State Route 18 to the west and north of the project site. This area is referred to as the "Narrows" and is considered a local landmark, although it is not formally designated as a scenic resource. The project footprint does not extend into the rock outcroppings and implementation of the proposed bank and invert stabilization project will not significantly change the character of this area.

The project site is not designated as a scenic vista and the alteration of existing views will be minimal. Therefore, implementation of the proposed project will result in a **less than significant impact** to scenic vistas.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒

1b. Response (Source: Caltrans 2016)

No Impact. The California Department of Transportation (Caltrans) designates official and eligible scenic highways within the state. There are no designated or proposed state scenic highways within the vicinity of the project site. The nearest highway to the proposed project sites is State Route 18, which is not listed as a designated or eligible scenic highway.

As discussed above in Item 1a, an area of rock outcroppings known as the "Narrows" exists along State Route 18 to the north and west of the project site. Implementation of the proposed project will not result in any impacts to these outcroppings, nor will construction of the proposed bank and invert stabilization project result in significant changes the character of this area or views from State Route 18. Therefore, implementation of the proposed project would result in **no impact** related to scenic resources within a state scenic highway.

c. Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐

1c. Response: (Sources: Town of Apple Valley 2009, SBCFCD 2013)

Less Than Significant Impact. The proposed project site is an undeveloped portion of an existing education center relatively flat property bisected by an existing desert wash and is vegetated with low growing desert species. State Route 18 extends along the northern site boundary and existing residential development and The Lewis Center for Educational Research campus are located to the east. There is undeveloped land with State Route 18 beyond it to the west. The confluence of Desert Knolls Wash and the Mojave River is located to the south.

The State Route 18 extends along the northern site boundary. Implementation of the proposed project will change the views of the site from adjacent properties and roadways from an undeveloped wash to a soft bottom wash with rock sideslopes intermittent rock stabilization structures and a graded access road along the easterly wash boundary. During construction, debris, grading, and construction equipment may temporarily affect the aesthetic quality of the immediate area. The construction equipment will be stored and screened within a designated project staging area, located adjacent to the eastern slope of the proposed bank and invert stabilization project. However, the proposed project site is not designated as scenic vistas, nor do

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
they contain significant scenic resources. Construction impacts will be short term and will cease upon construction completion. Once construction is complete the easterly wash slope will be visible from surrounding properties and drivers on State Route 18. The bank and invert stabilization project will include manufactured, 2:1 slopes, which will extend from the existing concrete trapezoidal channel segment at the northern terminus of the Wash. The visual character of the project site would change from vacant land and a natural wash to a wash with bank and invert stabilization. Non-woody desert vegetation would be allowed to revegetate the earthen areas of the wash and the intermittent rock structures in the wash will be placed below existing grade in the wash bottom and on the constructed 2:1 wash slopes, which will reduce visibility. Therefore, impacts to changes in the visual character of the proposed project site and the surroundings are not expected to be significant and impacts are considered to be **less than significant.**				
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒
1d. Response (Source: SBCFCD 2013) **No Impact.** The proposed project consists of the construction and maintenance of bank and invert stabilization within Desert Knolls Wash. Construction activities would be limited to daytime hours and would not require lighting. Future maintenance of the wash would be performed during daylight hours and subsequently would not produce any new sources of light and glare. Therefore, **no impact** related to light and glare is anticipated.				
II. AGRICULTURE AND FORESTRY RESOURCES – In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
2a. Response (California Department of Conservation 2014) **No Impact.** As depicted on the California Department of Conservation San Bernardino County Important Farmland 2014 map, the proposed project site is located entirely within areas designated as Non-irrigated Farmland. Non-irrigated Farmland is not considered Prime or Unique Farmland, or Farmland of Statewide Importance; therefore, **no impact** related to the conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland) to non-farmland uses through implementation of the proposed project would occur.				
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
2b. Response (LCER Specific Plan, California Department of Conservation 2016) **No Impact.** The proposed project footprint is located on undeveloped property zoned for Specific Plan (SP) and designated in the Lewis Center Educational Research Specific Plan as a Flood Zone. As depicted in the 2016 Williamson Act Map produced by the California Department of Conservation for San Bernardino County, there are no Williamson Act contracts in effect within the Town of Apple Valley. Therefore, **no impact** associated with a conflict with existing zone for agricultural use or a Williamson Act contract would occur through implementation of the proposed project.				
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
2c. Response (LCER Specific Plan) **No Impact.** The proposed project footprint is located on desert lands zoned for Specific Plan (SP) and designated in the Lewis Center Educational Research Specific Plan as a Flood Zone. No part of the project site or the surrounding area is zoned as forest land or timberland. Therefore, there would be **no impact** related to conflicts with forest land or timberland zoning as a result of the proposed project.				
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
2d. Response *(*Town of Apple Valley 2009*)* **No Impact.** As discussed is response 2(c), the project site is located within the desert community of the Town of Apple Valley. The project site occurs within an existing desert wash and does not support any forest or timberland, nor does forest or timberland exist in the surrounding area. Therefore, the project would result in **no impact** associated with the loss of forest land or conversion of forest land to non-forest use.				
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒
2e. Response (Town of Apple Valley 2009) **No Impact.** As stated in Responses 2b, c, and d, there is no existing agriculture, forest land, or timberland uses on, or within the vicinity of the project site. The proposed project involves the construction, operation, and maintenance of wash improvements intended to provide flood protection for the local area. Therefore, implementation of the proposed project would have **no impact** on Farmland, forest resources, or timberland and would not result in the conversion of these resource lands to non-agricultural or non-forest use.				
III. AIR QUALITY – Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
3a. Response (Source: MDAQMD 2008) **Less Than Significant Impact.** The proposed project is located within the Mojave Desert Air Basin (MDAB), which includes portions of San Bernardino County, Kern County, Riverside County, and Los Angeles County. The project is located within the boundaries of the San Bernardino County portion of the MDAB. The MDAQMD has jurisdiction over the desert portion of San Bernardino, Los Angles, Kern and Riverside Counties. The project is also located within the Western Mojave Desert ozone nonattainment area portion of the MDAQMD. The U.S. Environmental Protection Agency (EPA) has designated the Western Mojave Desert nonattainment area as nonattainment for the 8-hour ozone National Ambient Air Quality Standard (NAAQS). All of San Bernardino County within the MDAB has been designated as				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

moderate nonattainment for the 24-hour NAAQS for particulate matter with a diameter less than or equal to 10 microns (PM_{10}; coarse particulate matter). The MDAQMD has adopted state and federal attainment plans for the region within its jurisdiction. The most recent plan approved by EPA is the MDAQMD 2004 Ozone Attainment Plan adopted in 2004 (MDAQMD 2004), which was subsequently updated in 2008 as the Federal 8-Hour Ozone Attainment Plan (Western Mojave Desert Non-Attainment Area) (MDAQMD 2008). The 2008 plan has been approved by the California Air Resources Board (CARB), but it is being reviewed by the EPA. In addition to the federal attainment plans, the most recently adopted state plan is the 1996 Triennial Revision to the 1991 Air Quality Attainment Plan (MDAQMD 1996). The portion of the MDAQMD designated as a federal 8-hour ozone nonattainment area, which includes the communities of Phelan, Hesperia, Adelanto, Victorville, Apple Valley, Barstow, Joshua Tree, Yucca Valley, and Twentynine Palms (the southwestern portion of the MDAQMD), is projected to be in attainment of the 8-hour NAAQS for ozone by 2021.

A project is non-conforming if it conflicts with or delays implementation of any applicable attainment or maintenance plan. A project is conforming if it complies with all applicable MDAQMD rules and regulations, complies with all proposed control measures that are not yet adopted from the applicable plan(s), and is consistent with the growth forecasts in the applicable plan(s) (or is directly included in the applicable plan) (MDAQMD 2011).

Construction of the proposed project would comply with the following MDAQMD rules and regulations that would apply to the project:

a. Rule 401 (Visible Emissions)
b. Rule 403.2 (Fugitive Dust Control for the Mojave Desert Planning Area)
c. Rule 431 (Sulfur Content of Fuels)
d. Rule 1103 (Cutback and Emulsified Asphalt)

The construction of the proposed project will incorporate best management practices (BMPs) to minimize fugitive dust and visible emissions. Ultra-low sulfur diesel fuel will be used in all off-road diesel equipment and on-road vehicles.

The Town of Apple Valley General Plan land use designation for the proposed project

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
footprint is under the Lewis Center Educational Research Specific plan. The project area under the LCER Specific Plan is zoned as a Flood Zone. The proposed construction and flooding improvements would align with this land use and, would not be incompatible with surrounding uses or designations, and would not interrupt existing or planned development. The project would not conflict with or propose to change existing land uses or applicable policies as designated in the Town of Apple Valley General Plan and would not result in changes to the growth forecasts; as such, the project would not conflict with the applicable air quality plan. In addition, the project would not result in a long-term increase in the number of trips or increase the overall vehicle miles traveled in the project area. Haul truck, vendor truck, and worker vehicle trips would be generated during project construction and maintenance, but they would cease after construction is completed, and maintenance activities would be intermittent. The proposed construction of the wash improvements would neither increase population nor require additional long-term employment. The proposed project would not conflict with or delay the implementation of the MDAQMD Federal 8-Hour Ozone Attainment Plan. Based on these considerations, the proposed project would result in a **less than significant impact**.				
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐

3b. Response (Source: MDAQMD 2011)

Less Than Significant Impact. Project-generated construction emissions would be less than the MDAQMD annual and daily significance thresholds. The proposed wash and bank stabilization project would generate operational air pollutant emissions during debris cleanup and maintenance following construction; however, the project would not generate long-term operational emissions with the exception of limited maintenance, as needed. Annual emissions associated with operational maintenance activities would also be less than the MDAQMD significance thresholds.

MDAB Attainment Designation. An area is designated as in attainment when it is in compliance with the NAAQS and/or the California Ambient Air Quality Standards (CAAQS). These standards are set by the EPA and CARB, respectively, for the maximum level of a given air pollutant that can exist in the outdoor air without unacceptable effects on human health or public welfare. The criteria pollutants of primary concern that are considered in this air quality assessment include ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

(SO_2), PM_{10}, and particulate matter with a diameter less than or equal to 2.5 microns ($PM_{2.5}$; fine particulate matter). Although there are no ambient standards for volatile organic compounds (VOCs) or oxides of nitrogen (NO_x), they are important as precursors to O_3.

The MDAQMD portion of the MDAB is designated as a nonattainment area for the state O_3 standards (the portion of MDAQMD outside the Western Mojave Desert ozone nonattainment area is unclassified/attainment for the federal O_3 standard). The federal NO_2 standard was revised in 2010, and all areas of California have been designated unclassifiable/attainment. The MDAB is designated as an attainment/unclassified area for the state NO_2 standards. The MDAB is designated as an attainment area for federal and state CO and attainment/unclassified area for federal and state SO_2 standards. The MDAB is designated as a nonattainment area for the federal PM_{10} standard (Moderate nonattainment) and state PM_{10} standards. The MDAB is designated as an attainment/unclassified area for federal $PM_{2.5}$ standard but as a nonattainment area for the state $PM_{2.5}$ standard.

MDAQMD Thresholds. Construction of the proposed project would result in emissions of criteria air pollutants for which CARB and the EPA have adopted ambient air quality standards (i.e., the NAAQS and CAAQS). Projects that emit these pollutants have the potential to cause or contribute to violations of these standards. The MDAQMD has adopted significance thresholds, which, if exceeded, would indicate the potential to contribute to violations of the NAAQS or CAAQS.

The MDAQMD CEQA Air and Federal Conformity Guidelines (MDAQMD 2011) set forth quantitative emission significance thresholds for criteria air pollutants below which a project would not have a significant impact on ambient air quality. Project-related air quality impacts estimated in this environmental analysis would be considered significant if any of the applicable significance thresholds presented in Table 4-1, MDAQMD Air Quality Significance Thresholds, are exceeded.

Table 4-1
MDAQMD Air Quality Significance Thresholds

Pollutant	Designation/Classification	
	Federal Standards	*State Standards*
One-hour Ozone	No federal standard[1]	Nonattainment/Moderate
Ozone -8 hour – WMDONA	Expected Nonattainment	Nonattainment/Moderate

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

Table 4-1
MDAQMD Air Quality Significance Thresholds

Pollutant	Designation/Classification	
	Federal Standards	*State Standards*
Ozone (O_3) – 8 hour -Remainder or of MDAB	Expected Nonattainment	Nonattainment/Moderate
Nitrogen dioxide (NO_2)	Unclassifiable/attainment	Unclassifiable/attainment
Carbon monoxide (CO)	Unclassifiable/attainment	Unclassifiable/attainment
Sulfur dioxide (SO_2)	Attainment/Unclassified	Attainment/Unclassified
Respirable particulate matter (PM_{10})	Nonattainment/Moderate	Nonattainment
Fine particulate matter ($PM_{2.5}$) – WMDONA	Unclassifiable/attainment	Nonattainment
Fine particulate matter ($PM_{2.5}$) - Remainder of MDAB	Unclassifiable/attainment	Unclassified/attainment
Lead (Pb)[2]	Unclassifiable/attainment	Unclassifiable/attainment
Sulfates (SO_4)	No federal standard	Attainment
Hydrogen sulfide (H_2S)	No federal standard	Unclassified (Searles Valley Planning Area is nonattainment)
Vinyl chloride	No federal standard	No designation
Visibility-reducing particles	No federal standard	Unclassified

Sources: MDAQMD 2016
1 Standard has been revoked, historical classification was severe-17 for the WMDONA

The emission-based thresholds for O_3 precursors are intended to serve as a surrogate for an "ozone significance threshold" (i.e., the potential for adverse O_3 impacts to occur) because O_3 itself is not emitted directly, and the effects of an individual project's emissions of O_3 precursors (VOC and NO_x) on O_3 levels in ambient air cannot be determined through air quality models or other quantitative methods.

MDAQMD recommends that its quantitative air pollution thresholds be used to determine the significance of project emissions. The MDAQMD has both annual and daily significance thresholds as shown in table 4-2 MDAQMD Air Quality Significance Thresholds.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

Table 4-2
MDAQMD Air Quality Significance Thresholds

Pollutant	Annual Threshold (tons per year)	Daily Threshold (Pounds Per Day)
VOCs	25	137
NO_x	25	137
CO	100	548
SO_x	25	137
PM_{10}	15	82
$PM_{2.5}$	15	65
Hydrogen Sulfide[a]	10	54
Lead[a]	0.6	54

Source: MDAQMD 2016

[a] The proposed action includes typical construction equipment and on-road vehicles, which result in negligible (if any) emissions of hydrogen sulfide and lead. Therefore, these pollutants are not discussed in this analysis.

Construction Emissions. Construction of the proposed project would result in a temporary addition of pollutants to the local airshed caused by soil disturbance, dust emissions, and combustion pollutants from on-site construction equipment, as well as from employee vehicles and off-site trucks hauling construction materials. Construction emissions can vary substantially from day to day, depending on the level of activity, the specific type of operation, and for dust, the prevailing weather conditions. Therefore, such emission levels can only be approximately estimated with a corresponding uncertainty in precise ambient air quality impacts.

Pollutant emissions associated with temporary construction activity were quantified using the California Emissions Estimator Model (CalEEMod), Version 2013.2.1, available online (www.caleemod.com). Construction phasing, major construction equipment and soil hauling parameters were provided by County engineering staff. Default values provided by CalEEMod were used where detailed project information was not available.

The construction schedule for the proposed project is based on information provided by the County's engineering staff. It is anticipated that construction of the proposed project would commence in July 2017 and would last approximately 9 months, ending in March 2018. Three construction phases listed below are non-continuous; Hauling, Rock Slope Protection, and Fill and Re-compaction. See Appendix B for details. The

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

estimated construction emissions are based on the following assumptions (duration of phases is approximate):

- Site preparation (clearing and grubbing, tree removal, building demolition) – 3 weeks (July 2017)
- Grading (excavation) – 3 months (July 2017–October 2017)
- Grading (Hauling) – 3 months (September 2017 – January 2017). Would occur over two separate periods
- Grading (Fill and re-compaction) – 1.5 months (August 2017–November 2017).Would occur over two separate periods.
- Trenching (Sewer relocation) – 2 weeks (August 2017)
- Paving (Concrete Structure) – 2 Weeks (September 2017))
- Paving (Parkway Improvements/Misc.) – 1 week (October 2017)
- Grading (rock slope protection) – 4 Months (October 2017–March 2017). Would occur over two separate periods.

The anticipated construction equipment mix for the proposed project is shown in Table 4-3, Desert Knolls Anticipated Construction Equipment. The equipment mix anticipated for construction activity is based on the County engineering staff's input and typical construction practices. The equipment mix is meant to represent a reasonably conservative estimate of construction activity. For most of the equipment, it was assumed that a "typical" equipment fleet (as implemented by CalEEMod) would be used for construction. In some cases, where "typical" or default CalEEMod values were not available County engineering staff provided specific equipment makes and models. For the analysis, it is generally assumed that heavy construction equipment would operate at the site for approximately 8 hours per day, 5 days per week (22 days per month).

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

Table 4-3
Desert Knolls Anticipated Construction Equipment

Construction Phase	Equipment	Quantity
Site preparation	Bulldozer (Rubber-tired dozer)	1
	Chipper (crushing/processing equipment)	1
	Grader	1
	Loader (tractor/loader/backhoe)	1
	WaterTrucks (Vendor Trucks)	1
	Chainsaw (concrete/Industrial saw)	1
Grading (excavation)	Wheel scraper (scraper)	2
	Loader (tractor/loader/backhoe)	2
	Water Trucks (Vendor trucks)	1
Grading (Hauling)	Bulldozer (Rubber-tired dozer)	1
	Dump Trucks (Vendor trucks)	8
	Loader (Tractor/loader/backhoe)	2
	Water Trucks (Vendor trucks)	2
Grading (Rock Slope Protection)	Excavators	1
	Loaders (Tractors/loaders/backhoes)	1
	Haul Trucks	10
	Grout Pump (Pump)	1
Grading (Fill and re-compaction)	Loaders (Tractors/loaders/backhoes)	1
	Dump Trucks (Vendor trucks)	3
	Bulldozer (Rubber-tired dozer)	1
	Grader	1
	Sheepfoot roller-compactor (Roller)	1
	Water Trucks (Vendor trucks)	1
Paving (Concrete Structure)	Bulldozer (Rubber-tired dozer)	1
	Concrete Mixer	1
	Concrete Pump (Pump)	1

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

Table 4-3
Desert Knolls Anticipated Construction Equipment

Construction Phase	Equipment	Quantity
Paving (Street Improvements/Misc)	Paving Machine	1
	Compressor	1
	Water Truck (Vendor trucks)	1
	Service Truck (Vendor trucks)	2
	Grader	1
	Roller/Compactor (Roller)	1
Trenching (Sewer Relocation)	Tractor/loader/backhoe	1
	Water Truck (Vendor Truck)	1
	Service Truck (Vendor Truck)	1

The project would be required to comply with MDAQMD Rule 403.2 to control fugitive dust emissions generated during excavation, land clearing, and other grading activities. Standard construction practices that would be employed to reduce fugitive dust emissions include watering of the active sites approximately three times daily, depending on weather conditions

Table 4-4, Desert Knolls Estimated Annual Construction Emissions, shows the estimated maximum unmitigated daily construction emissions associated with the construction of the proposed project in 2017. Emissions estimates presented in Table 4-4 include emissions from on-site sources (off-road equipment) and off-site sources (hauling and vendor trucks and worker vehicles).

Table 4-4
Desert Knolls Estimated Annual and Daily Construction Emissions (unmitigated)

	VOCs	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
2017 Annual Construction Emissions	0.48	4.51	4.91	0.00	0.59	0.36
2018 Annual Construction Emissions	0.10	1.00	0.85	0.00	0.20	0.12
MDAQMD Annual threshold	*25*	*25*	*100*	*25*	*15*	*15*
Threshold exceeded?	No	No	No	No	No	No
2017 Daily Construction Emissions	12.66	106.17	157.88	0.23	14.36	8.75
2018 Daily Construction Emissions	7.97	70.86	80.35	0.11	16.91	7.92
MAQMD Daily Threshold	*137*	*137*	*548*	*137*	82	65
Threshold exceeded?	No	No	No	No	No	No

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

Sources: MDAQMD 2016; see Appendix B for detailed results.
Notes: VOCs = volatile organic compounds; NO_x = oxides of nitrogen; CO = carbon monoxide; SO_x = sulfur oxides; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; PM = particulate matter; NA = not applicable.
These estimates reflect control of fugitive dust required by MDAQMD Rule 403.2.

As shown in Tables 4-4, annual construction emissions would not exceed the MDAQMD annual significance thresholds for VOCs, NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$ during construction. Neither, would daily construction emissions would exceed the MDAQMD daily significance thresholds for the same pollutants. Furthermore, construction-generated emissions would not represent a long-term source of criteria air pollutant emissions.

***Operational (Maintenance) Emissions*.** Maintenance activities would include cleanup of debris and exporting debris off site. Desert Knolls maintenance would begin following completion of construction in 2018.

Maintenance operations are still in the planning stages. However, to conservatively estimate emissions, assumptions from other larger county projects were used to estimate potential emissions related to maintenance of the project. Maintenance would last approximately 3 months, or 60 working days, per year over the 5-year period. Equipment used during maintenance activities would include operation of one loader (rubber-tired loader) and one bulldozer (crawler tractor, 410 HP) for 8 hours per day. A water truck would also be used to control fugitive dust. Haul trucks would export an estimated 16,200 cubic yards of debris over the 3-month period. During the 5-year period, the maximum annual greenhouse gas (GHG) emissions would occur in the first year; emissions in future years would likely be lower due to turnover in the vehicle and equipment fleets and implementation of more stringent air emissions regulations. Maximum daily maintenance emissions for Desert Knolls are presented in Table 4-5, Maximum annual maintenance emissions for Desert Knolls are presented in Table 4-6.

Table 4-5
Desert Knolls Estimated Maximum Daily Maintenance Emissions
(lbs/day unmitigated)

	VOCs	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Maintenance (2018)	2.54	23.40	20.70	0.03	3.88	2.85
MDAQMD threshold	*100*	*135*	*100*	*25*	*15*	*15*
Threshold exceeded?	No	No	No	No	No	No

Source: MDAQMD 2011; see Appendix B for detailed results.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

As shown in Tables 4-5, daily emissions from debris clean up and maintenance would not exceed the MDAQMD daily thresholds for VOCs, NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$. As such, the proposed project would result in a **less than significant impact** during operational maintenance activities.

Table 4-6
Desert Knolls Estimated Maximum Annual Maintenance Emissions
(tons/year unmitigated)

	VOCs	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Maintenance (2018)	0.68	0.70	0.60	0.00	0.24	0.13
MDAQMD threshold	*25*	*25*	*100*	*25*	*15*	*15*
Threshold exceeded?	No	No	No	No	No	No

Source: MDAQMD 2011; see Appendix B for detailed results.

As shown in Tables 4-6, annual emissions from debris clean up and maintenance would not exceed the MDAQMD annual thresholds for VOCs, NO_x, CO, SO_x, PM_{10}, or $PM_{2.5}$. As such, the proposed project would result in a **less than significant impact** during operational maintenance activities.

c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐

3c. Response (Source: MDAQMD 2011)

Less Than Significant Impact. The MDAB is a nonattainment area for O_3, NO_2, PM_{10}, and $PM_{2.5}$ under the NAAQS and/or CAAQS. The poor air quality in the MDAB is the result of cumulative emissions from motor vehicles, off-road equipment, commercial and industrial facilities, and other emission sources. Projects that emit these pollutants or their precursors (e.g., VOCs and NO_x for O_3) potentially contribute to poor air quality. As indicated in Tables 4-3 and 4-4, the construction emissions from the proposed project would not exceed MDAQMD annual significance thresholds. The proposed project is not anticipated to generate a long-term increase in operational emissions, but it could generate emissions during debris cleanup and maintenance activities for 5 years following construction completion. As shown in Tables 4-5, however, proposed maintenance would not exceed MDAQMD annual significance thresholds. Furthermore, the project would not conflict with the MDAQMD 2004 or 2008 Ozone Attainment

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Plans, which address the cumulative emissions in the MDAB and account for emissions associated with construction activity in the MDAB. Accordingly, the proposed project would not result in a cumulatively considerable increase in emissions of nonattainment pollutants. Thus, the project would result in a **less than significant impact.**				
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
3d. Response (Source: MDAQMD 2011) **Less Than Significant Impact.** The MDAQMD considers residences, schools, daycare centers, playgrounds, and medical facilities to be sensitive receptor land uses (MDAQMD 2011). Land uses surrounding Desert Knolls Wash consist of State Route 18 located to the north; The Lewis Center for Educational Research campus to the east; single and multi-family residences to the east; and the Mojave River to the south. The nearest sensitive receptors located within the project vicinity include the Lewis Center for Educational Research campus and residences located to the east of the Desert Knolls Wash. The proposed project is not anticipated to generate substantial concentrations of air pollutants or toxic air contaminants that would expose sensitive receptors near the construction site. Construction of the proposed project would generate emissions associated with on-site equipment operation and off-site trucks and worker vehicles; however, emissions would be below the annual MDAQMD thresholds and would not be a result in substantial air pollutant emissions. After the proposed bank and invert stablization improvements are constructed, they would provide additional flood protection for existing downstream structures and for public safety in general and would not be a source of substantial operational emissions. Therefore, although low-density residential land uses and educational facilities are located in the vicinity of the project area, the project would not expose residents or students and teachers at the Lewis Center to long-term substantial air pollutant concentrations. Accordingly, the project would result in a **less than significant impact**.				
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐
3e. Response (Source: Dudek 2016) **Less Than Significant Impact.** Potential sources that may emit odors during construction activities include diesel equipment and gasoline fumes. Odorous compounds, such as				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
concentrations of unburned hydrocarbons from tailpipes of construction equipment, would be emitted at the highest levels near the source and would quickly dissipate off site. Such odors are temporary and generally occur at magnitudes that would not affect substantial numbers of people, as the odors would be localized and generally confined to the project site. Sensitive receptors located within the project vicinity, including residential land uses located to the east of Desert Knolls Wash, are not anticipated to be affected by construction odors; furthermore, the release of potential odor-causing compounds would tend to be during the workday, when many residents would not be home. In addition, construction of the proposed project would use typical construction techniques in compliance with MDAQMD rules. The project would be required to comply with MDAQMD Rule 402, which states that a person shall not discharge from any source whatsoever such quantities of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, that endanger the comfort, repose, health, or safety of any such persons or the public, or that cause, or have a natural tendency to cause, injury or damage to business or property. Any odors associated with construction activities would be temporary and would cease upon project completion; therefore, impacts associated with odors during construction would be **less than significant**. The proposed project is within the vicinity of an educational institution, several multi-family and single-family residences. Land uses and industrial operations that are typically associated with odor complaints include agricultural uses, wastewater treatment plants, food-processing plants, chemical plants, composting, refineries, landfills, dairies, and fiberglass molding facilities. The proposed project does not include any of these types of typical odor-producing uses or facilities. The project involves the construction of bank and invert stabilization improvements that would be designed to prevent erosion during flood events. Accordingly, the proposed project would not retain water for a prolonged period of time and would not generate odors potentially associated with stagnant water. In addition, the wash would be properly maintained on an annual basis, further reducing the potential for the wash to generate odors. As the proposed project would not result in the creation of a land use that is commonly associated with objectionable odors, potential impacts associated with long-term odors would be **less than significant**.				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES – Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐

4a. Response (Source: Dudek 2016a)

Less Than Significant with Mitigation Incorporated. In July 2016, Dudek conducted a biological resources survey within the proposed project footprint and a 300-foot buffer (study area), which is included with this IS/MND as Appendices C (Biological Technical Report). The survey included vegetation mapping and an assessment for special status plants and wildlife species. A summary of the potential direct and indirect impacts to special status plant and wildlife species based upon the results of the biological resources survey is provided below.

Special-Status Plants

Four non-listed special-status plant species (all designated as California Rare Plant Rank (CRPR) 1B.2 species) have a moderate potential to occur within the project site, including San Bernardino aster (*Symphyotrichum defoliatum*), desert cymopterus (*Cymopterus deserticola*), Mojave monkeyflower (*Mimulus mohavensis*), and Beaver Dam breadroot (*Pediomelum castoreum*). None of these species are state or federal endangered or threatened species, nor are they state or federal species of special concern. Impacts to special-status plants are considered potentially significant without appropriate mitigation. **Implementation of MM-BIO-1 would reduce impacts to less than significant by avoiding or mitigating for direct impacts to any special status plant species that are detected within the project footprint prior to construction.**

Special-Status Wildlife

The project site is within the known range of the desert tortoise and contains suitable habitat (desert wash with saltbush scrub and creosote bush scrub), including soils, for desert tortoise. The nearest occurrence of desert tortoise is documented in 2005 approximately 1.1 miles north of the project site (CDFW 2016). The next nearest occurrence was documented in 2005, located approximately 1.6 miles northeast of the project site. The project site is separated from the contiguous habitat area where these tortoises were recorded by State Route 18, which is

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
expected to hinder movement onto the project site. Additionally, the project site and other undeveloped areas south of State Route 18 are limited in extent and increasingly fragmented with existing development. Focused surveys with negative findings for desert tortoise were conducted for the project region in May 2002 (MBA), April 2008 (John Wear), and in 2007 as part of the biological technical report prepared for the Lewis Center for Educational Research Specific Plan. Overall, the desert tortoise has a low potential to occur; however, focused surveys are required prior to construction to ensure no permanent and temporary direct impacts to occupied desert tortoise habitat. Potential harm to desert tortoise as a result of project implementation would be considered a significant impact without appropriate mitigation. **Implementation of MM-BIO-2 would reduce impacts to less than significant by avoiding direct impacts to any desert tortoise that are identified prior to construction and mitigating for any occupied desert tortoise habitat within the project footprint.** Burrowing owl focused surveys with negative results were conducted in May 2002 by MBA and in 2008 by John Wear within a region upstream of the proposed project. Though there are no documented occurrences of this species within the project area, the area has suitable habitat and their potential to occur is moderate. Potential harm to burrowing owl as a result of project implementation would be considered a significant impact without appropriate mitigation. **Implementation of MM-BIO-3 would reduce impacts to less than significant through avoidance of direct take of burrowing owl and mitigation for any occupied burrows detected prior to construction, in accordance with the CDFW Staff Report on Burrowing Owl Mitigation (CDFG 2012),** The loggerhead shrike is a California species of special concern. The saltbush scrub and creosote bush scrub provide suitable nesting habitat for this species on the project site. There is moderate potential to find this species within the project area. Loggerhead shrike nests could be present on the project site and are protected by the Migratory Bird Treaty Act and California Fish and Game Code. Potential impacts to loggerhead shrike nests and other bird nests would be a violation of the Migratory Bird Treaty Act and California Fish and Game Code and considered significant without appropriate mitigation. **Implementation of MM-BIO-4 would reduce impacts to less than significant through avoidance of direct impacts to any active nest, eggs, or nesting bird observed during preconstruction nest surveys.**				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Least Bell's vireo and southwestern willow flycatcher are state and federally listed as endangered species. The dense riparian thickets found within the Mojave River portion of the project buffer area are suitable nesting and foraging habitat for these species. There are documented occurrences of these species within 5 miles of the project area. Least Bell's vireo was also confirmed present during the 2016 site visit; however, the individual was approximately 150 feet outside of the project buffer. Focused surveys for southwestern willow flycatcher conducted in May 2002 were negative. There is moderate potential for least bell's vireo and low potential for southwestern willow flycatcher to occur within the project buffer area. There is no potential for these species to occur within the project site and there are no direct impacts expected to occur to these species. However, potential indirect effects, such as construction noise above baseline and human presence/motion, could result in indirect impacts to nesting individuals and would be considered significant without appropriate mitigation. **Implementation of MM-BIO-5 would reduce potential indirect impacts to nesting least Bell's vireo and southwestern willow flycatcher to less than significant by restricting construction to the period outside of the nesting season or establishing a construction buffer to avoid disturbance to any nesting individuals of these species.** Yellow warbler, yellow-breasted chat, and summer tanager are California species of special concern that have potential to occur within the riparian vegetation of the Mojave River within the project buffer area. There is no potential for find these species within the project site. There are no direct impacts expected for these species. However, potential indirect effects, such as construction noise above baseline and human presence/motion, could result in indirect impacts to nesting individuals and would be considered significant without appropriate mitigation. **Implementation of MM-BIO-5 would reduce potential indirect impacts to nesting yellow warbler, yellow-breasted chat, and summer tanager to less than significant by restricting construction to the period outside of the nesting season or establishing a construction buffer to avoid disturbance to any nesting individuals of these species.** The Mohave River vole is a California species of special concern. The project buffer is within the known range of this species and contains herbaceous scrub suitable for this species. In addition, there are documented occurrences of this species within 5 miles of the project area (CDFW 2016). In conclusion, there is moderate potential for finding this species within the project buffer area. There is no potential for find this species within the project site. No portion				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

of the Mojave River is expected to be impacted with the proposed project; **therefore, impacts to Mohave River vole will not occur with project implementation**.

The Townsend's big-eared bat is a California species of special concern; however, it is currently under review by CDFW and is a candidate for listing under CESA. Within the project area, Townsend's big-eared bat has a moderate foraging potential within the Mojave River portion of the project buffer, but is not expected to roost. There are several buildings in the project area that could provide roosting potential; however, during the 2016 site visit, no bat sign was observed associated with these structures, which occur adjacent to State Route 18, residential homes, and a school. This species is not expected to roost in an area subject to such a high degree of disturbance. There are no documented occurrences of this species within 5 miles of the project area (CDFW 2016). **Project impacts to this species are considered less than significant** due to the presence of high-quality foraging habitat in the surrounding areas associated with the Mojave River.

Golden eagles are listed as Fully Protected in California and are protected by BGEPA (16 U.S.C. 668 et seq.).Within the project area, there is low potential for golden eagle foraging. While there is open habitat in the form of saltbush and creosote bush that could support foraging, these areas are surrounded by development. The project area does not contain any cliff faces or high trees that would be suitable nesting habitat for golden eagles. There is only one historic occurrence from 1927 of this species within 5 miles of the project area (CDFW 2016). Due to the low potential of the habitat being used by golden eagle and lack of recorded nests in the area, **this impact is considered less than significant**.

Project construction activities have the potential to significantly impact downstream special status biological resources such as wetlands, riparian areas, and associated species through release of chemical pollutants from fuels, oil, lubricants, or other substances. **Implementation of MM-BIO-6 would reduce impacts to less than significant through the use of construction best management practices that control dust, invasive plant species, release of chemicals in construction materials, and disposal of construction debris and trash.**

Long-term indirect impacts include potential downstream effects on Mohave river vole and riparian bird (least Bell's vireo, southwestern willow flycatcher, summer tanager, yellow warbler, and yellow-breasted chat) habitat as a result of hydrologic differences from the change in stream flow. The hydrology report prepared by Rivertech Inc. and URS determined that average velocity as a

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

result of project implementation would be lower than baseline (Rivertech Inc. and URS 2011). Therefore, it is assumed that project implementation is not expected to reduce the quantity of suitable habitat for these species, and **impacts are considered less than significant.**

Mitigation Measures

MM-BIO-1 Special-Status Plants and Sensitive Vegetation

Surveys shall be conducted for special-status plant species the season prior to construction. Surveys shall occur at the appropriate time to capture the characteristics necessary to identify the taxon. Surveys shall be conducted consistent with CDFW protocols and by a qualified botanist knowledgeable of the local flora. If special-status plants are not observed during focused surveys, no additional mitigation is required.

If a special-status plant species is detected, the outer extent of each occurrence shall be flagged at the time of the survey and the following avoidance measures implemented:

1. **Establish Environmentally Sensitive Areas (ESAs)**. Prior to the start of any ground- or vegetation-disturbing activities, a qualified biologist shall establish ESAs to protect and avoid special-status plants that occur outside of the project disturbance areas and within 100 feet of project disturbance areas. The locations of ESAs shall be clearly depicted on construction drawings, which shall also include all avoidance and minimization measures on the margins of the construction plans. ESAs shall be clearly delineated in the field with temporary construction fencing to ensure that avoided plants are not inadvertently harmed during construction.
2. **Monitoring.** A qualified biologist shall conduct weekly monitoring of the ESAs that protect special-status plant occurrences. The monitor shall have the authority to stop construction activities in the vicinity (within 100 feet) of an ESA if it is determined as a result of monitoring that corrective actions are necessary to avoid and protect the ESA.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

For direct permanent impacts, the loss of the occurrence shall be assessed in the context of the regional population for that species. If the loss of the occurrence would result in a greater than 10% loss of the population, mitigation shall be implemented for direct impacts to special-status plants through one or a combination of the following strategies.

1. **Off-site compensation**. Compensation lands with occupied habitat at a 1:1 ratio for any habitat occupied by special-status plants. Occupied habitat will be calculated on the project site and on the compensation lands as including each special-status plant occurrence and a surrounding 100-foot buffer area.
2. **Salvage**. The County shall consult with the Rancho Santa Ana Botanic Gardens or another qualified entity, to develop an appropriate experimental salvage and relocation strategy, based on the life history of the species permanently impacted. The plan shall include at minimum: (a) collection/salvage measures for plants or seed banks, to retain intact soil conditions and maximize success likelihood; (b) details regarding storage of plants or seed banks; (c) location of the proposed recipient site, and detailed site preparation and plant introduction techniques details for top soil storage, as applicable; (d) time of year that the salvage and replanting or seeding will occur and the methodology of the replanting; (e) a description of the irrigation, if used; (f) success criteria; and (g) a detailed monitoring program, commensurate with the plan's goals.

MM-BIO-2 Desert Tortoise

A preconstruction desert tortoise survey shall be conducted in accordance with current USFWS protocol. If the survey is negative, no additional mitigation is required. If the survey is positive, an incidental take permit (ITP) shall be obtained from the USFWS and CDFW. Occupied habitat shall be mitigated at a minimum 1:1 ratio or as specified in the ITP. Avoidance and minimization measures shall be implemented in accordance with provisions of the ITP and shall include, at a minimum:

1. Environmental awareness training for all construction personnel to educate them on desert tortoise, protective status, and avoidance measures to be

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

implemented by all personnel, including looking under vehicles and equipment prior to moving;

2. Presence of a qualified biological monitor during initial grading activities and as needed to document compliance with the conditions of the ITP, the biological monitor will have the authority to stop work as needed to avoid direct impact to desert tortoise;
3. Should a desert tortoise be found during construction activities, activities shall cease until either the tortoise moves out of harm's way or a qualified biologist authorized under the project's ITP ("authorized biologist") relocates the tortoise.

MM-BIO-3 Burrowing Owl

A preconstruction survey shall be conducted in accordance with the latest CDFW guidelines. If the survey is negative, no additional mitigation is required. If the survey is positive, a burrowing owl management plan will be prepared that describes the nature and significance of the impact and then sets mitigation goals as described in the CDFW Staff Report on Burrowing Owl Mitigation (CDFG 2012). The burrowing owl management plan would be approved by CDFW. At a minimum, the burrowing owl management plan would include on-site measures to avoid harm to burrowing owls, as well as burrow creation and habitat enhancement.

MM-BIO-4 Loggerhead Shrike and other Nesting Bird Species

Ground-disturbance activities shall be avoided during nesting bird season, from approximately February 1 through August 31. If ground-disturbing activities cannot be completed outside the nesting bird season, the following measures shall be implemented:

Surveys shall be conducted within 300 feet of disturbance areas (500 feet for raptors, least Bell's vireo, and southwestern willow flycatcher) no earlier than 3 days prior to the commencement of disturbance. If ground-disturbance activities are delayed, then additional pre-disturbance surveys shall be conducted such that no more than 3 days

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
will have elapsed between the survey and ground-disturbance activities. If active nests are found, clearing and construction shall be postponed or halted within a buffer area established by the qualified biologist that is suitable to the particular bird species and location of the nest until the nest is vacated and juveniles have fledged, as determined by the qualified biologist. The construction avoidance area shall be clearly demarcated in the field with highly visible construction fencing or flagging, and construction personnel shall be instructed on the sensitivity of nest areas. A qualified biologist shall serve as a construction monitor during those periods if construction activities must occur within active nest buffer area to ensure that no inadvertent impacts on these nests occur. The results of the survey, including graphics showing the locations of any active nests detected, and documentation of any recommended avoidance measures, shall be submitted to the County within 24 hours. **MM-BIO-5 Least Bell's Vireo and other Special-Status Riparian Bird Species** Ground-disturbance activities shall be avoided during the riparian bird nesting season, from approximately April 1 through August 15. If ground-disturbing activities cannot be completed outside the nesting bird season, the following measures shall be implemented: If construction activities begin between March 15 and September 15, two preconstruction surveys shall be conducted within riparian habitat found within 500 feet of the disturbance areas. One survey shall occur no earlier than 7 days prior to the commencement of activity, with the second occurring within 3 days of activity commencement. If ground-disturbance activities are delayed, then additional pre-disturbance surveys shall be conducted such that no more than 3 days will have elapsed between the last survey and ground-disturbance activities. The survey shall be completed by a biologist who holds a USFWS permit for southwestern willow flycatcher. If active nests of least Bell's vireo, southwestern willow flycatcher, yellow-breasted chat, summer tanager, or yellow warbler are found, the qualified biologist would				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
monitor and determine if construction noise levels or motion are potential sources for nest failure, and avoidance buffers would be established accordingly. Additional follow-up weekly visits by the qualified biologist would be required if active nests occur within 300 feet of the project construction activities. **MM-BIO-6 Indirect Impacts to Special-Status Species** Best management practices shall be implemented to minimize indirect impacts to special-status species. 1. **Minimize construction impacts.** The construction limits shall be flagged prior to ground-disturbance activities and all construction activities, including equipment staging and maintenance, shall be conducted within the flagged disturbance limits. 2. **Avoid Toxic Substances on Road Surfaces.** Soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants. 3. **Avoid Wildlife Entrapment:** a. ***Backfill trenches.*** At the end of each workday, check that all potential wildlife pitfalls (trenches, bores, and other excavations) have been backfilled, covered, or sloped to allow wildlife egress. Should wildlife become trapped, a qualified biologist shall remove and relocate it. b. ***Avoid entrapment of nesting or migratory birds.*** All pipes or other construction materials or supplies will be covered or capped in storage or laydown areas at the end of each workday. No pipes or tubing of sizes or inside diameters ranging from 1 to 10 inches will be left open either temporarily or permanently. 4. **Minimize Spills of Hazardous Materials.** All vehicles and equipment shall be maintained in proper condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. Hazardous spills shall be immediately cleaned up, and the contaminated soil shall be properly handled or disposed of at a licensed facility. Servicing of construction equipment shall take place only at a				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
designated staging area. 5. **Worker Guidelines.** All trash and food-related waste shall be placed in self-closing containers and removed regularly from the site to prevent overflow. Workers shall not feed wildlife or bring pets to the project site. 6. **Invasive Weeds.** The spread of invasive weeds shall be minimized through removal of non-native weed species and remedial measures as determined during routine monitoring. 7. **Dust Minimization**. The spread of dust shall be minimized through periodic watering of actively disturbed soils or previously disturbed soils.				
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐

4b. Response (Source: Dudek 2016a)

Less Than Significant with Mitigation Incorporated. Native vegetation communities mapped within the project footprint include allscale scrub alliance, creosote bush scrub alliance, Fremont cottonwood forest alliance, Joshua tree woodland alliance, and red willow thickets alliance. The non-native vegetation communities and unvegetated land cover types occurring within the project site include developed, disturbed, non-vegetated floodplain, parks and ornamental, and rock outcrop.

A small area of red willow thickets, totaling 0.08 acre, is located in the upstream portion of the Desert Knolls Wash project area. Allscale scrub is mapped throughout the Desert Knolls Wash project area, totaling 9.84 acres. Creosote Bush Scrub occurs north of Desert Knolls Wash, totaling 1.30 acres. Also north of the wash is 0.37 acre of Joshua tree woodland. Lastly, a very small area of Fremont cottonwood forest is mapped in the south westernmost part of the project area, totaling 0.04 acre. Permanent and temporary impacts to vegetation communities associated with the proposed project are presented in Table 4-7.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

Table 4-7
Permanent and Temporary Impacts to Vegetation Communities within the Project Site

Vegetation Community/ Land Cover Type	Permanent Impacts Acreage (acres)	Temporary Impacts Acreage (acres)
Allscale Scrub	2.05	1.91
Creosote Bush Scrub	<0.01	0
Red Willow Thickets*	0.03	0.05
Non-vegetated Floodplain	1.84	2.33
Rock Outcrop	0.02	0
Disturbed	3.43	1.65
Developed	0.02	0.60
Total**	**7.40**	**6.55**

Notes:
* Sensitive vegetation community per CDFG 2010.
** Totals may not sum due to rounding.

Although permanent and temporary direct impacts to vegetation communities would occur as a result of the project, only one community, red willow thickets, is considered sensitive or of special status. Permanent direct impacts to 0.03 acre of red willow thickets, which is a special status riparian community, is considered significant without appropriate mitigation. This vegetation community is also considered a wetland under the jurisdiction of the USACE, RWQCB, and CDFW, and will be mitigated concurrently with temporary and permanent impacts to state and federal jurisdictional waters and wetlands, as discussed in Item 4c. **Implementation of MM-BIO-7 would reduce impacts to less than significant** by establishing off-site mitigation requirements for unavoidable permanent impacts to state and federal wetlands within the project footprint.

Indirect Impacts

Potential short-term indirect impacts to riparian communities in the buffer of the project site would primarily result from the potential generation of fugitive dust. Excessive dust can decrease the vigor and productivity of vegetation through effects on light, penetration, photosynthesis, respiration, transpiration, increased penetration of phytotoxic gaseous pollutants, and increased incidence of pests and diseases. **Implementation of MM-BIO-6 would reduce impacts to less than significant.by requiring periodic watering of exposed soils to control dust.**

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐

4c. Response (Source: Dudek 2016b, Rivertech Inc. and URS 2011)

Less Than Significant with Mitigation Incorporated. The July 2016 biological resources survey conducted by Dudek included a delineation of jurisdictional waters within the project site and a 100-foot buffer (project area). The jurisdictional delineation survey report is provided as Appendix D. A total of approximately 10.67 acres of jurisdictional wetlands and waters were mapped within the project study area. Desert Knolls Wash and its tributaries support an OHWM and flow to the Mojave River, and therefore, meet the definition of waters of the United States under the jurisdiction of the ACOE and RWQCB. Within the project area, there is a total of 0.08 acre of wetland waters of the United States, 4.26 acres of non-wetland waters, 6.20 acres of unvegetated streambed, and 0.13 acre of CDFW vegetated streambed. The total temporary and permanent impacts to jurisdictional waters associated with the proposed project are presented in Table 4-8.

Direct Impacts

Permanent direct impacts to 1.85 acres and temporary direct impacts to 2.33 acres of waters of the United States, and 3.12 acres of permanent impacts and 2.81 acres of temporary impacts to streambed are considered significant, requiring mitigation. Additionally, there are 0.11 acre of CDFW riparian habitat within the footprint that will be directly impacted (0.03 acre permanent and 0.08 acre temporary). Of this CDFW riparian habitat, 0.08 acre is also considered ACOE/RWQCB wetlands (0.03 acre permanent and 0.05 acre temporary).

Permanent direct impacts would be **less than significant with mitigation incorporated**. Implementation of MM-BIO-7 would reduce impacts to less than significant by establishing offsite mitigation requirements for unavoidable permanent impacts to state and federal waters with the project footprint.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

Table 4-8
Jurisdictional Waters Delineation Impacts Summary

Jurisdiction	Vegetation Community	Temporary Impact Acreage	Permanent Impact Acreage	Total Impact Acreage
ACOE/RWQCB Wetland Waters	Red Willow Thickets	0.05	0.03	0.08
	Non-vegetated Floodplain	<0.01	0.00	<0.01
ACOE/RWQCB Wetland Waters Subtotal		*0.05*	*0.03*	*0.08*
ACOE/RWQCB Non-Wetland Waters	Non-vegetated Floodplain	2.33	1.84	4.14
	Developed	0.00	0.01	0.01
ACOE/RWQCB Non-wetland Waters Subtotal		*2.33*	*1.85*	*4.18*
CDFW Unvegetated Streambed	Allscale Scrub	0.32	0.52	0.84
	Non-vegetated Floodplain	2.30	1.84	4.14
	Disturbed	0.19	0.74	0.93
	Developed	0.00	0.02	0.02
CDFW Unvegetated Streambed Subtotal		*2.81*	*3.12*	*5.93*
CDFW Vegetated Streambed	Red Willow Thickets	0.05	0.03	0.08
	Non-vegetated Floodplain	0.03	<0.01	0.03
CDFW Vegetated Streambed Subtotal		*0.08*	*0.03*	*0.11*

Note: * Acreage may not total due to rounding.

Indirect Impacts

The project would change the hydrology and hydraulics of the project site due to the addition of riprap sides and grade stabilizing structures to the wash bottom. Changes in the downstream hydrology of a wash have the potential to result in erosion or aggradation (increase in elevation through deposition of sediment) of downstream reaches of the drainage, if the structures are not properly designed. However, the goal of the proposed project is to convey flows at a reduced rate to alleviate significant historic flooding in the area. The hydrology report prepared by Rivertech Inc. and URS determined that average velocity as a result of project design and implementation would be lower than baseline (Rivertech Inc. and URS 2011). Therefore, the project is not expected to change the quality of downstream hydrology, and would actually reduce ongoing erosion of the existing wash banks, resulting in an improvement in current rates of sedimentation and downstream water quality. Therefore, **impacts are considered less than significant.**

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

Potential short-term indirect impacts to jurisdictional waters are the same as those that could affect special-status vegetation communities and include the generation of fugitive dust, increased human activity, and the introduction of chemical pollutants. All vegetation with avoided jurisdictional waters on site could be impacted by potential short-term indirect impacts. **Implementation of MM-BIO-7 would reduce impacts to less than significant** through avoidance minimization, and mitigation of temporary and permanent impacts to state and federal jurisdictional waters.

MM-BIO-7 Avoidance, Minimization, and Mitigation for Jurisdictional Waters

Appropriate permits shall be obtained from the regulatory agencies, including a CWA Section 404 permit from the ACOE (an Individual Permit will be required), a Water Quality Certification from the RWQCB, and a Streambed Alteration Agreement from the CDFW.

All mitigation measures and conditions contained within the permits shall be implemented. At a minimum, the following shall be completed for mitigation for impacts to waters of the United States and jurisdictional streambed:

1. **Compensation for Permanent Impacts:** Permanent impacts to waters of the United States and jurisdictional streambed shall be offset by compensation at a minimum 1:1 ratio, or as otherwise required by the respective permits. Permanent impacts to ACOE/RWQCB wetland and CDFW riparian vegetation will be offset by compensation at a 2:1 ratio, or as otherwise required by the respective permits. CDFW riparian vegetation is made up of red willow thickets, a sensitive plant community, and therefore this mitigation ratio will also compensate for impacts to sensitive plant communities.
2. **Temporary Impacts:** All areas temporarily impacted shall be restored to native grade and contour.
3. **Best Management Practices**. Avoided jurisdictional waters shall be fenced or flagged as an ESA. Best management practices shall be implemented to avoid indirect impacts to jurisdictional waters, including:
   a. Vehicles and equipment will not be operated in ponded or flowing water except as described in the permits.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
b. Water containing mud, silt, or other pollutants from grading or other activities will not be allowed to enter jurisdictional waters or be placed in locations that may be subjected to high storm flows. c. Spoil sites will not be located within 30 feet from the boundaries of jurisdictional waters or in locations that may be subject to high storm flows, where spoils might be washed back into drainages. d. Raw cement/concrete or washings thereof, asphalt, paint, or other coating material, oil, or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from project-related activities, will be prevented from contaminating the soil and/or entering avoided jurisdictional waters. e. No equipment maintenance will occur within 150 feet of jurisdictional waters, and no petroleum products or other pollutants from the equipment will be allowed to enter these areas or enter any off-site state-jurisdictional waters under any flow.				
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐

4d. Response (Source: Dudek 2016a)

Less Than Significant Impact. The proposed project site consists of a 0.6-mile segment of Desert Knolls Wash, which extends in a southerly direction adjacent to existing residential development to the east. The segment of the wash within the project site may provide opportunity for local wildlife movement south towards the confluence with the Mojave River, however, this drainage discharges onto the site from a trapezoidal channel at the northern boundary and is constrained by existing roadways and development. The Wash may still be utilized by local wildlife for movement following construction since the wash bottom will remain earthen and only woody vegetation removed during maintenance. However, there are no significant wildlife corridors within the project site; therefore, there would be a **less than significant impact** to wildlife corridors.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☒	☐

4e. Response (Source: Dudek 2016a)

Less Than Significant Impact. Section 88.01.060, Desert Native Plant Protection, of the County Development Code regulates the removal or harvesting of specified desert native plants in order to preserve and protect the plants and to provide for the conservation and wise use of desert resources. The proposed project site would be acquired by the County and owned in fee title, which would exempt the project from the native desert plant protection ordinance. However, it has been the County's environmentally sensitive practice to identify healthy, salvageable native desert plant specimens and relocate them prior to construction. The project would not be in conflict with any local policies or ordinances. One Joshua tree occurs immediately adjacent to the project footprint, but it will be protected in place by implementation of MM-BIO-6. The potential for impacts associated with project conflict with local policies and ordinances would be **less than significant**.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

4f. Response (Source: Dudek 2016a, Town of Apple Valley 2009)

No Impact. The Apple Valley Multi-Species Conservation Plan is under development and the preliminary boundary (Apple Valley 2010) overlaps the project site. Because the Apple Valley MSHCP is only under development, no conserved areas or conservation actions have been identified. Therefore, the proposed project is not currently in conflict with the Apple Valley MSHCP achieving their conservation goals and **no impact** will occur.

V. CULTURAL RESOURCES – Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?	☐	☒	☐	☐

5a. Response (Sources: CRM Tech 2015a, San Manuel Band of Mission Indians, et al 2014)

Less Than Significant with Mitigation Incorporated. A cultural resources study, including a records search, ground survey and exploratory trenching was conducted by CRM Tech in June 2015 within a 78-acre Area of Potential Effect (APE) which includes the project

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

footprint, staging areas and adjacent parcels occupied by buildings that may receive visual or other indirect effects.

The results of the records search provided by the Archaeological Information Center (AIC) at the San Bernardino County Museum, Redlands, indicated that a total of 39 cultural resources including five isolates and three "pending" sites, have been identified within a one-mile radius of the project site. Four of the archaeological sites identified in the records search, including three prehistoric sites and one historic-period site (identified as Sites 36-000967, 36-007147, 36-013879, and PSBR-16) were previously recorded within or partially within the project APE. Additionally, a late historic-period building recorded within the project area was reviewed for potential indirect effects by the proposed project. The building is a fourplex that was constructed around 1966. Historical research has yielded no evidence that the building is closely associated with any persons or events of recognized significance in national, state, or local history. The building is a common example of the then-popular Ranch-style residential architecture, but does not stand out as an important example of that style or of its type, period, region, or method of construction. Based on these considerations, the study concluded that the building does not appear eligible for listing in the National Register or the California Register, and thus does not qualify as a "historic property" or a "historical resource." Additionally, the proposed project is located outside of the project footprint and will not be directly change through implementation of the proposed project, nor would the historic context of the project area be changed through the construction of bank and invert stabilization improvements in Desert Knolls Wash.

The CRM Tech Phase I ground survey and Phase II exploratory trenching within the project footprint did not find evidence of three of the four archaeological sites at their previously reported locations, leaving one site (identified as site 36-013879) potentially occurring within the project footprint. Site 36-013879 is described as a large prehistoric habitation site which encompasses several previously recorded sites, including one that was determined eligible for listing in the National Register of Historic Places. The excavation of three exploratory trenches within site 36-013879 encountered no significant cultural remains. Due to the site's location in an active wash, the portion of the site within the project site is unlikely to contain intact, potentially significant archaeological deposits. The cultural resources report prepared by CRM Tech concluded that the project would not affect site 36-

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

013879, or cause a substantial adverse change to the potential significance or integrity of the site. However, the presence of known prehistoric sites in a relatively concentrated cluster in and near the project site suggests a heightened possibility for similar cultural remains to be encountered in subsurface deposits beyond the active flowpath of the Desert Knolls Wash.

There is an existing 2014 Memorandum of Understanding (MOU) between the San Manuel Band of Mission Indians, the San Bernardino County Flood Control District, and the Lewis Center for Educational Research which establishes specific protocols for the treatment of Native American cultural resources and procedures for tribal participation during ground-disturbing activities. Specifically, the MOU requires that an approved Native American monitor be present during "all archeological testing, cultural resources studies, and surveys, geological, geotechnical testing, grading and all other ground-disturbing activities associated with the project that could potentially affect cultural resources. The monitoring requirements set forth in this MOU have been included in MM-CUL-1, below.

In the event that cultural resources are found during construction activities, implementation of MM-CUL-1 will reduce the potential for impacts to such resources to **less than significant with mitigation incorporated by protecting the resources as agreed to in the MOU**.

Mitigation Measures

MM-CUL-1 In order to evaluate and protect previously undetected subsurface cultural deposits, an archeological monitoring program shall be implemented in coordination with the San Manuel Band of Mission Indians and in accordance with the requirements of the 2014 MOU between the San Manuel Band of Mission Indians, the San Bernardino County Flood Control District, and the Lewis Center for Educational Research. The program shall include the following provisions:

1. All disturbance of native soils shall be monitored by a qualified archeologist and an approved Native American cultural resources monitor. The provisions set forth in the Native American Monitoring Protocol (Attachment B to the 2014 MOU) shall be implemented during monitoring. Whenever cultural materials more than 50 years old are discovered, they need to be field-recorded and evaluated. All work must be halted in the immediate vicinity of the

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
cultural resource found until a qualified archaeologist and approved Native American cultural resources monitor can assess the significance of the resource. If a substantial cultural deposit is encountered, however, the monitors shall have the power to temporarily halt or divert construction activities in that area to allow for controlled removal. 2. Any artifacts collected during the monitoring program shall be cleaned, identified, catalogued, analyzed, and prepared for curation at an appropriate repository. 3. Site records or site record updates that incorporate the artifacts encountered during monitoring should be prepared and submitted to the South Central Coastal Information Center. 4. A report that documents the methods and results of the monitoring program, including an itemized inventory of recovered artifacts and a detailed artifact analysis shall be prepared upon completion of any recovery activities during implementation of the proposed project.				
b) Cause a substantial adverse change in the significance of an archeological resource pursuant to § 15064.5?	☐	☒	☐	☐

5b. Response (Sources: CRM Tech 2015a, San Manuel Band of Mission Indians, et al 2014)

Less Than Significant with Mitigation Incorporated. As described above under item 5a, above, the results of the cultural resources survey conducted by CRM Tech indicates that one site (identified as site 36-013879) was previously recorded within the project site and consisted of a large prehistoric habitation site. No cultural remains were uncovered during exploratory trenches and the results of the survey report indicated that the project would not affect site 36-013879, or cause a substantial adverse change to the potential significance or integrity of the site. However, the presence of known prehistoric sites within the project area indicates that additional cultural remains may be encountered in subsurface deposits beyond the active flowpath of the Desert Knolls Wash.

As described above in Item 5a, the San Manuel Band of Mission Indians, San Bernardino County Flood Control District, and the Lewis Center for Educational Research entered into an MOU in 2014, which establishes specific protocols for the treatment of Native American cultural resources and procedures for tribal participation during ground-disturbing activities. In the event

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
that cultural resources are found during construction activities, implementation of MM-CUL-1 will reduce the potential for impacts to such resources to **less than significant with mitigation incorporated by protecting the resources as agreed to in the MOU**. **Mitigation Measures** Refer to Mitigation Measure CUL-1				
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐

5c. Response (Sources: CRM Tech 2015b)

Less Than Significant with Mitigation Incorporated. A paleontological resources study, including a records search and ground survey, was conducted by CRM Tech in June 2015 within a 14-acre Area of Potential Effect (APE) which includes the project footprint and staging areas. The survey was intended to determine whether rock deposits and sediment underlying the proposed project footprint have the potential to contain fossils that may be uncovered during excavation and construction of the proposed bank and invert stabilization improvements. Common fossils include marine shells, the bones and teeth of fish, reptiles, and mammals, leaf imprints, and petrified wood. The results of the records search provided by the San Bernardino County Museum, Redlands and Natural History Museum of Los Angeles County, indicated that no paleontological resources had been found within the APE, but that resources had been found nearby from sediments similar to those with the APE.

The results of the survey report indicate that specific mapped rock formations within the project footprint have a low to high potential for containing paleontological resources and fossil material. There is a low potential for the igneous rock and Holocene-age surface sediments in the southwestern portion of the project site to contain fossils. However, the Pleistocene-age sediments in the northern portion of the Desert Knolls Wash have a high potential to contain paleontological resources. In the event that paleontological resources are uncovered during construction activities, implementation of MM-CUL-2 will reduce the potential for impacts to such resources to **less than significant with mitigation incorporated through monitoring of mapped Pleistocene-age sediments and recovery of any resources observed within the footprint**.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
MM-CUL-2 Earth moving operations within the area of mapped Pleistocene-age sediments shall be monitored by a qualified paleontologist. In the event that paleontological materials are discovered, all work must be halted in the immediate vicinity of the paleontologic resource found until the monitor can assess the significance of the resource. The monitor shall have the power to temporarily halt or divert construction activities in that area to allow for controlled removal. Any recovered specimens shall be identified and curated at a repository.				
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

5d. Response (Sources: CRM Tech 2015a)

Less Than Significant with Mitigation Incorporated. The project site is located within the traditional ancestral territory of the San Manuel Band of Mission Indians (Tribe). Native American human remains have been recovered within the project area and are currently in the possession of the County of San Bernardino Coroner awaiting disposition instructions from the Tribe. As described above in Items 5a and 5b, the San Manuel Band of Mission Indians, San Bernardino County Flood Control District, and the Lewis Center for Educational Research entered into an MOU in 2014, which establishes specific protocols for the treatment of Native American cultural resources and procedures for tribal participation during ground-disturbing activities. The 2014 MOU also includes specific measures that will be implemented by the County in case of future discovery of Native American human remains during construction of the proposed project.

Implementation of the of **MM-CUL-3,** below, which details the provisions set forth in the cultural resources MOU to report, recover, and ensure the respectful treatment of Native American human remains will reduce the potential for impacts to such resources to **less than significant with mitigation incorporated**.

Mitigation Measures

MM-CUL-3 The measures set forth in the existing MOU (including the reburial agreement provided as Attachment D to the MOU) regarding discovery of Native American human remains shall be implemented as follows.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Ground disturbing activities within 50 feet of a discovery of Native American human remains shall immediately cease and the human remains shall be secured in place by Consultant, Project Coordinators, and/or Native American lead monitor. After notification is provided to the County Coroner, the Tribe, and the Native American Heritage Commission (NAHC), the Consultant and/or the Native American lead monitoring shall notify and coordinate with the most likely descendent (San Manuel Band of Mission Indians or Tribe) to schedule a site visit. The San Manuel Band of Mission Indians, pursuance to California Public Resources Code Section 5097.98(a), shall be allowed to: (1) inspect the site of the discovery; and, (2) make determinations as to how the human remains and any associated grave goods should be treated and re-interred with appropriate dignity. The San Manuel Band of Mission Indians or their designee shall complete the inspection and provide written recommendations to the proper agencies within forty-eight (48) hours of being granted access to the site. The County agrees to discuss in good faith what constitutes “appropriate dignity”, as that term is used in the applicable statutes and in the Tribe’s customs and traditions. The Tribe shall have the final determination as to the disposition and treatment of human remains and any associated grave goods following NAPGRA protocols. The County acknowledges that the Tribe’s highest priority is to avoid disturbing human remains, and agree to avoid such disturbance through consultation and good faith efforts whenever feasible. Mitigation shall be considered and each incident shall be treated individually on a case by case basis. Whenever there is a discovery of human remains, the parties acknowledge the Tribe’s cultural practice and desire for the human remains to be left “in situ” and without further and future disturbance. The County will use good faith efforts to accommodate the Tribe’s cultural practices. No photographs may be taken of the human remains, except by written authorization from the Coroner and the Tribe. The archeologist may create a drawing of the human remains for cataloging purposes; however, no photographs				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
or electronic means of recording the human remains shall be permitted. The County agrees that the reburial of any human remains and their associated funerary objects will be in an area as close as possible to the location of their discovery. If associated midden soil has been moved, it should also be returned to its original location along with any associated funerary objects. The human remains shall not be subject to any future disturbances and the County will take appropriate measures to ensure this, including recording information with the appropriate authorities and maintaining it as confidential. Reburial of human remains shall be accomplished in compliance with the California Public Resources code Section 5097.98(a) and (b). The exact reburial location will be determined after consultation with the Tribe. The exact location will be determined after consultation with the Tribe. The exact location will be recorded in a manner to protect it, in accordance with Section VIII. The County shall be responsible for reburial costs up to a maximum of $600 per discovery. If immediate reburial is not reasonably feasible, the County agrees that all human remains, including funerary objects, and associated soils that may have moved remain with the Coroner's Office until arrangements are made for a reburial.				
VI. GEOLOGY AND SOILS – Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐

6a.i. Response (Sources: DOC 2016; Town of Apple Valley 2009)

Less Than Significant Impact. Based upon a review of the Town of Apple Valley General Plan, there are no Alquist-Priolo Earthquake Fault Zones mapped within the limits of Apple Valley, including the proposed project site. However, the site is located in proximity to several surface faults that are currently designated as potentially active by the California Geological Survey pursuant to the guidelines of the Alquist-Priolo Earthquake Fault Zoning Act. The nearest of these

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
faults is the Helendale Fault, located approximately 10 miles northeast of the project site. Faulting activity at these faults or other nearby faults could cause ground shaking at the Desert Knolls Wash site. However, since active faults are not present within project area, the risk of loss, injury, or death due to ground-surface rupture is not considered likely. Additionally, the proposed project would be constructed in accordance with applicable design and construction requirements of the California Building Code (CBC) and San Bernardino County Flood Control design specifications, which would reduce the potential for risks related to seismic events. As such, impacts associated with the rupture of a known earthquake fault are considered **less than significant**.				
ii. Strong seismic ground shaking?	☐	☐	☒	☐
6a.ii. Response (Sources: Town of Apple Valley 2009) **Less Than Significant Impact.** As stated above under Response 6a.i, the proposed project site is not located in an area that has known or potentially active faults. However, rupture of nearby potentially active faults may cause ground shaking within the project area. The proposed project does not include construction of any building structures, dams, levees, or other large structures that could pose a risk to local residents during strong seismic ground shaking. Therefore, impacts from ground shaking events are anticipated to be **less than significant**.				
iii. Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
6a.iii. Response (Sources: Town of Apple Valley 2009) **Less Than Significant Impact.** Liquefaction is a secondary effect of seismic shaking that causes soils to lose the ability to support structures. For liquefaction to occur, three conditions must coincide: (1) loose, recently deposited sediments, typically sandy in composition; (2) shallow groundwater, typically within 50 feet of the ground surface; and (3) seismic shaking with ground accelerations over 02 g (local acceleration due to gravity). The alluvium underlying Apple Valley is coarsely granular and percolates well; the water table is below 50 feet of the ground surface throughout most of the area, with the exception of the Mojave River floodplain, where water-saturated sediments occur within about 50 feet of the surface. Thus, the project area is likely vulnerable to liquefaction during an earthquake. Other geologic hazards known to occur within the project area include slope failure, sidehill fill deformation, ridgetop fissuring, and shattering. Slope failure can occur when seismic activity displaces soil on a natural or manufactured slope, causing significant displacement.				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
However, the proposed project would be constructed in accordance with applicable design and construction requirements of the California Building Code (CBC) and San Bernardino County Flood Control specifications, which would reduce the potential for risks related to seismic events. The project does not include construction of any building structures, dams, levees, or other large structures that would be occupied or could pose a risk to local residents. Therefore, the potential for impacts associated with liquefaction and other soil related hazards would be **less than significant**.				
iv. Landslides?	☐	☐	☒	☐
6a.iv. Response (Source: Town of Apple Valley 2009, Exhibit IV-2) **Less Than Significant Impact.** The project site is partially located within an area where numerous rockfalls and landslides are expected to occur during an earthquake. However, the proposed project involves construction of bank and invert stabilization improvements within a 0.6-mile segment of Desert Wash. There are no habitable buildings or other large structures proposed that could put occupants or local residents at risk in the case of landslide. Thus, the project would result in a **less than significant impact** associated with landslides.				
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
6b. Response (Source: SWRCB 2012) **Less Than Significant Impact.** Ground surfaces will be exposed during construction. Construction projects that involve the disturbance of 1 or more acres of soil are required to obtain coverage under the State Water Resources Control Board (SWRCB) General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit). The Construction General Permit requires the development and implementation of a stormwater pollution prevention plan (SWPPP). The SWPPP would contain a site map(s) that depicts the location of BMPs such as silt fencing, sandbag berms, and general good housekeeping methods intended to prevent the off-site discharge of soil or construction materials in stormwater. During the maintenance of the stabilized wash, ground surfaces will be compacted or stabilized through placement of rock and regrowth of native vegetation. Therefore, the potential for substantial soil erosion or the loss of topsoil is considered **less than significant**.				
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
6c. Response (Source: Town of Apple Valley; Exhibit IV-1) **Less Than Significant Impact.** As described in Item 6aiii, above, the project site is located with an existing desert wash and in an area with the potential for liquefaction, slope failure, sidehill fill deformation, ridgetop fissuring, and shattering. However, the proposed project would be constructed in accordance with design and construction requirements of the California Building Code (CBC) and the County of San Bernardino County Flood Control District, which would reduce the potential for risks related to being located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project. Impacts would be **less than significant.**				
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
6d. Response (Source: Town of Apple Valley, WebSoilsSurvey 2016) **Less Than Significant Impact.** Expansive soils contain high levels of clay that expand when wet and contract when dry, which can damage building foundations and other structures. The soils within the project area are categorized as well drained and excessively drained, which is not indicative of clay soils. Therefore, the potential for impacts associated with expansive soils are **less than significant.**				
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
6e. Response (Source: SBCFCD 2013) **No Impact**. The proposed project involves the construction, operation, and maintenance of bank and invert stabilization improvements within an approximately 0.6-mile segment of Desert Knolls Wash. Implementation of the proposed project would not include uses that could generate wastewater, and therefore would not require septic tanks or other alternative wastewater treatment methods. Implementation of the proposed project would result in **no impact** associated with soils incapable of supporting septic systems or alternative wastewater treatment methods.				
VII. GREENHOUSE GAS EMISSIONS – Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

7a. Response (Source: County of San Bernardino 2011)

Less Than Significant Impact. Global climate change is a cumulative impact. A project participates in this potential impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. Thus, GHG impacts are recognized as exclusively cumulative impacts; there are no non-cumulative GHG emission impacts from a climate change perspective (CAPCOA 2008). This approach is consistent with that recommended by the California Natural Resources Agency, which noted in its Public Notice for the proposed CEQA amendments that evidence indicates, in most cases, that the impact of GHG emissions should be considered in the context of a cumulative impact, rather than a project-level impact (CNRA 2009a). Similarly, the *Final Statement of Reasons for Regulatory Action* for amendments to the CEQA Guidelines confirms that an EIR or other environmental document must analyze the incremental contribution of a project to GHG levels and determine whether those emissions are cumulatively considerable (CNRA 2009b).

The CEQA Guidelines provide for streamlining the environmental review of project-level analysis of GHG emissions from a programmatic document, such as a GHG reduction plan, and allow for a finding of less than significant where a project is determined to be consistent with a local reduction plan (14 CCR Section 15183.5). The CEQA Guidelines provide that the environmental analysis of specific projects may be tiered from a programmatic GHG plan that substantially lessens the cumulative effect of GHG emissions. If a public agency adopts such a programmatic GHG plan, the environmental review of subsequent projects may be streamlined. A specific project's incremental contribution of GHG emissions will not be considered cumulatively significant if the project complies with the adopted GHG plan.

County of San Bernardino GHG Reduction Plan

The County developed and adopted a GHG plan in September 2011 that presents a comprehensive set of actions to reduce its internal and external GHG emissions to 15% below current levels by 2020, consistent with the Assembly Bill (AB) 32 Scoping Plan. The County's GHG reduction plan was prepared to accomplish the following specific objectives:

- Reduce emissions from activities over which the County has jurisdictional and operational control consistent with the target reductions of the AB 32 Scoping Plan;

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

- Provide estimated GHG reductions associated with the County of San Bernardino's existing sustainability efforts and integrate the County's sustainability efforts into the discrete actions of the GHG Plan;
- Provide a list of discrete actions that will reduce GHG emissions; and
- Approve a GHG Plan that satisfies the requirements of Section 15183.5 of the CEQA Guidelines so that compliance with the GHG Plan can be used in appropriate situations to determine the significance of a project's effects relating to GHG emissions, thus providing streamlined CEQA analysis of future projects that are consistent with the approved GHG Plan (County of San Bernardino 2011).

All development projects, including those otherwise determined to be exempt from CEQA, are subject to applicable Development Code provisions, including the GHG performance standards and state requirements. With the application of the GHG performance standards, projects that are exempt from CEQA and small projects that do not exceed 3,000 metric tons (MT) of carbon dioxide equivalent (CO_2E) per year (MT CO_2E/year)[1] are considered to be consistent with the GHG reduction plan and determined to have a less than significant individual and cumulative impact for GHG emissions (County of San Bernardino 2011). The development of this threshold implies that it should be applied to the total of a project's annual operational emissions plus its construction emissions annualized over the project life.

The GHG reduction plan includes goals and objectives aimed to reduce emissions generated during construction of projects. With respect to the proposed project, the GHG reduction plan specifies the following:

- GHG Goal TL 4: Reduce GHG emissions by regulating the idling of diesel-fueled vehicles and equipment and encouraging the use of alternative fuels and transportation technologies.
- Objective GHG TL 4.1: Reduce the exhaust emissions of diesel-fueled vehicles and equipment.

Other reduction strategies include an anti-idling enforcement policy, whereby the County

[1] The CO_2 equivalent for a gas is derived by multiplying the mass of the gas by the associated global warming potential (GWP), such that MT CO_2E = (metric tons of a GHG) x (GWP of the GHG). For example, the GWP for CH_4 is 21. This means that emissions of 1 metric ton of methane are equivalent to emissions of 21 metric tons of CO_2.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
requires that diesel-fueled vehicles and off-road equipment shall not be left idling on site for periods in excess of 5 minutes. The County would also continue to implement its diesel exhaust emissions control measures, which extend beyond the idling restriction described above in the anti-idling enforcement policy. The County's diesel exhaust control measures described in Development Code Section 83.01.040 apply to all discretionary land use projects approved by the County on or after January 15, 2009. These measures include, but are not limited to, the following. *Off-Road Diesel Vehicle/Equipment Operations*. All business establishments and contractors that use off-road diesel vehicle/equipment as part of their normal business operations shall adhere to the following measures during their operations in order to reduce diesel particulate matter emissions from diesel-fueled engines: • Use reformulated ultra-low-sulfur diesel fuel in equipment and use equipment certified by the EPA or that pre-dates EPA regulations. • Maintain engines in good working order to reduce emissions. • Signs shall be posted requiring vehicle drivers to turn off engines when parked. • Any requirements or standards subsequently adopted by the Mojave Desert Air Quality Management District or the California Air Resources Board. • Provide temporary traffic control during all phases of construction as required. • On-site electrical power connections shall be provided for electric construction tools to eliminate the need for diesel-powered electric generators, where feasible. • Maintain construction equipment engines in good working order to reduce emissions. The developer shall have each contractor certify that all construction equipment is properly serviced and maintained in good operating condition. • Contractors shall use ultra-low sulfur diesel fuel for stationary construction equipment as required by Air Quality Management District Rules 431.1 and 431.2 to reduce the release of undesirable emissions. • Substitute electric and gasoline-powered equipment for diesel-powered equipment, where feasible.				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

City of Apple Valley Climate Action Plan

The City Climate Action Plan contains various implementation strategies that would reduce air pollutant emissions within the City. The primary focus of these strategies is to reduce long-term operational emissions associated with vehicular travel, which are associated with residential, commercial, retail, industrial, educational, and recreational land uses. However, the City's Climate Action Plan does include some policies and strategies aimed at reducing GHG emissions associated with construction. These polices include but are not limited to, the following.

- ND-9: During project construction, on-site off-road construction equipment shall utilize biodiesel fuel (a minimum of B20), except for equipment where use of biodiesel fuel would void the equipment warranty.
- ND-25. Recycle and/or salvage non-hazardous construction and demolition waste, and develop and implement a construction waste management plan quantifying the reduction in the waste stream.
- ND-7. Preserve trees occurring on-site either through in situ protection during and after construction, or through transplant and relocation within landscaped areas.

Construction GHG Emissions. Construction of the proposed project would result in GHG emissions, which are primarily associated with use of off-road construction equipment, on-road hauling and vendor trucks, and worker vehicles.

CalEEMod Version 2013.2.1 was used to calculate the annual GHG emissions based on the construction scenario described in Section 4.3, Air Quality. The GHG emissions are expressed in units of metric tons of carbon dioxide equivalent (MT CO_2E) per construction year. On-site sources of GHG emissions include off-road equipment and off-site sources, include hauling and vendor trucks and worker vehicles. Table 4-9, Desert Knolls Estimated Annual Construction GHG Emissions, presents construction emissions for the proposed project in 2018, 2019, and 2020 from on-site and off-site emission sources.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

Table 4-9
Desert Knolls Estimated Annual Construction GHG Emissions

	MT CO_2	MT CH_4	MT N_2O	MT CO_2E
2017	589.74	0.08	0.00	591.36
2019	100.87	0.02	0.00	101.35
Total	**690.61**	**0.10**	**0.00**	**692.71**
Annualized emissions over 30 years	**—**	**—**	**—**	**23.09**

Source: San Bernardino County 2011; see Appendix B for detailed results.
Notes: MT = metric tons; CO_2 = carbon dioxide; CH_4 = methane; N_2O =nitrous oxide; CO_2E = carbon dioxide equivalent.

As shown in Table 4-9, the estimated total GHG emissions during construction of Desert Knolls would be 693 MT CO_2E in 2017 and 101 MT CO_2E in 2018. Total emissions annualized over 30 years—the estimated lifespan for a public infrastructure project—would be 23 MT CO_2E/year.

In addition, as with project-generated construction air quality pollutant emissions, GHG emissions generated during construction of the proposed project would be short term in nature, lasting only for the duration of the construction period; they would not represent a long-term source of GHG emissions.

Operational (Maintenance) GHG Emissions. As discussed in Section 4.3, Air Quality, maintenance activities would include cleanup of debris and exporting debris off site. Maintenance for the project would begin in 2018 after construction is completed. Maintenance for the proposed is still in the planning stages; however to conservatively estimate emissions from potential maintenance, assumptions based off previous County projects were utilized to estimate emissions.

The proposed project covers maintenance for the first 5 years. Maintenance would last approximately 3 months, or 60 working days, per year over the 5-year period. Equipment used during maintenance activities would include operation of one loader (rubber-tired loader) and one bulldozer (crawler tractor, 410 HP) for 8 hours per day. A water truck would also be utilized to control fugitive dust. Haul trucks would export an estimated 16,200 cubic yards over the 3-month duration. During the 5-year period, the maximum annual GHG emissions would occur in the first year; emissions in future years would likely be lower due to turnover in the vehicle and equipment fleets and implementation of more stringent air emissions regulations. Maximum

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

annual maintenance GHG emissions for the proposed project are presented in Table 4-10. The annualized GHG construction emissions from Table 4-9 have been added to the annual operational emissions for comparison with the significance threshold of 3,000 MT CO_2E/year.

Table 4-10
Estimated Maximum Annual Maintenance GHG Emissions

	MT CO_2	MT CH_4	MT N_2O	MT CO_2E
2018	8.02	0.14	0.00	80.33
Annualized construction emissions	—	—	—	23.09
Total	**—**	**—**	**—**	**103.42**
Threshold	**—**	**—**	**—**	***3,000***
Threshold exceeded?	**—**	**—**	**—**	**No**

Source: San Bernardino County 2011; see Appendix B for detailed results.
Notes: MT = metric tons; CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2E = carbon dioxide equivalent.

As shown in Table 4-10, the estimated total GHG emissions (annualized construction emissions plus emissions associated with maintenance) would be 205 MT CO_2E/year in 2018 a. As shown, the total annual emissions would not exceed the GHG significance threshold of 3,000 MT CO_2E/year.

Because the project's construction and operational GHG emissions would not result in a cumulatively considerable contribution, the project would result in a cumulative impact in terms of climate change that is **less than significant**.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

7b. Response (Source: County of San Bernardino 2011)

Less Than Significant Impact. As discussed in Response 7a and as stated in the County Final GHG Reduction Plan (2011), with the application of the GHG performance standards, small projects that do not exceed 3,000 MT CO_2E/ year are considered to be consistent with the GHG Plan and determined to have a less than significant individual and cumulative impact for GHG emissions.

Construction and maintenance of the proposed project would not exceed the 3,000 MT CO_2E/year threshold adopted by the County. Based on the guidance presented in the County's GHG Reduction Plan, the proposed project would be consistent with the applicable plan adopted

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
to reduce GHG emissions; therefore, the project would result in a **less than significant** cumulative impact to GHG emissions and climate change.				
VIII. HAZARDS AND HAZARDOUS MATERIALS. Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☒	☐	☐

8a. Response (Source: Town of Apple Valley 2009)

Less Than Significant. A variety of hazardous substances and wastes would be stored, used, and generated during construction of the proposed project. These would include fuels for machinery and vehicles, new and used motor oils, and storage containers and applicators containing such materials. Accidental spills, leaks, fires, explosions or pressure releases involving hazardous materials represent a potential threat to human health and the environment if not properly treated. Accident prevention and containment are the responsibility of the construction contractors, and provisions to properly manage hazardous substances and wastes are typically included in construction specifications. Adherence to the construction specifications and applicable regulations regarding hazardous materials and hazardous waste, including disposal, would ensure that construction of the proposed project would not create a significant hazard to the public or the environment. Additionally, with implementation of **MM-HAZ-1**, all impacts related to hazardous materials during construction would be less than significant.

Hazardous materials shall not be disposed of or released onto the ground, the underlying groundwater, or any surface water. Totally enclosed containment shall be provided for all trash. All construction waste, including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials, shall be removed to a waste facility permitted to treat, store, or dispose of such materials. There is no proposed use, routine transport, or disposal of hazardous materials during operation of the proposed project.

Impacts to the environment and the public related to the routine transport, use, or disposal of hazardous materials would be considered less than significant with mitigation incorporated.

MM-HAZ-1 A hazardous substance management, handling, storage, disposal, and emergency response plan shall be prepared and implemented, and hazardous materials spill kits shall be maintained on site for small spills.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐

8b. Response (Source: Town of Apple Valley 2009)

Less Than Significant with Mitigation Incorporated. As discussed in Response 8a, a variety of hazardous substances and wastes would be stored, used, and generated during construction of the proposed project. Accidental spills, leaks, fires, explosions, or pressure releases involving hazardous materials represent a potential threat to human health and the environment if not properly treated. With implementation of **MM-HAZ-1**, all impacts related to hazardous materials during construction would be reduced to less than significant levels. There would no potential for use or release of hazardous materials during operation and maintenance of the proposed bank and invert stabilization improvements.

As such, impacts to the environment and the public related to the accidental release of hazardous materials from the site would be considered **less than significant with mitigation incorporated**.

c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☒	☐	☐

8c. Response (Source: Town of Apple Valley 2009)

Less Than Significant with Mitigation Incorporated. The proposed project site is located approximately 300 feet from the Lewis Center Academy for Academic Excellence, 0.75 mile northwest of Desert Knolls Elementary School, 0.75 mile east of Sixth Street Preparatory School, 1.5 miles east from Victor Valley High School, and 1.75 miles east from Del Rey Elementary School. As discussed in Responses 8a and 8b, a variety of hazardous substances and wastes would be stored, used, and generated during construction of the proposed project. As proposed in **MM-HAZ-1**, a hazardous substance management, handling, storage, disposal, and emergency response plan shall be prepared and implemented, and hazardous materials spill kits shall be maintained on site for small spills. There is no use, disposal, or routine transport of hazardous materials proposed during the operation phase of the stabilized wash.

Therefore, impacts related to hazardous emissions or involving handling of hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
proposed school would be considered **less than significant with mitigation incorporated**.				
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐

8d. Response (Source: Dudek 2016c)

Less Than Significant Impact. Dudek conducted a review a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5, on October 18, 2016, by Shelah Riggs, Project Manager at Dudek. The results of the review indicate that the project site is located within two miles of the project site:

1. Green Tree East Special Education, Meadow Grove Drive/Gibraltar Drive, City of Victorville, Type – School Investigation, Status – No Action Required.
2. Proposed Apple Valley North Early Education Center, Palmero Road/Nakash Road, Town of Apple Valley, Type – School Investigation, Status – No Action Required.
3. Victorville Community Day School, Corta Drive/Corta Place, City of Victorville, Type – School Investigation, Status – No Action Required.

The project site was not included on this list as a hazardous materials site. All three of the sites listed in the database review were school site investigation and no action was required. Since the project is not listed as hazardous materials sites and there are no known hazardous waste sites within 2 miles of the project site, implementation of the proposed project would not create a significant hazard to the public or the environment and impacts would be considered less than significant. Implementation of the proposed project would not create a significant hazard to the public or the environment and impacts would be considered **less than significant**.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☒	☐

8e. Response (Source: Town of Apple Valley 2009)

Less Than Significant Impact. The nearest airport to the project site is the Apple Valley Public Airport, which is located approximately 5.5 miles northeast of the site. Therefore, the proposed

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
project site is not located within the 2-mile radius of the Apple Valley Airport Notice Area. Additionally, project construction and operation would not result in a safety hazard for those working or residing in the project area. The proposed project would not result in construction of facilities or structures that could visually or physically obstruct flight paths or roads leading to Apple Valley Airport. The project does not involve the construction of new residential development and workers in the area would be limited to temporary construction staff and County employees conducting periodic maintenance of the site. There are no public use airports within 2 miles of the project site, and therefore, implementation of the proposed project would result in **less than significant impacts** due to safety hazards associated with private or public airports or conflict with an airport land use plan.				
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
8f. Response (Source: Town of Apple Valley 2009) **No Impact.** There are no private airstrips within the vicinity (two mile radius) of the proposed project site. Therefore, implementation of the proposed project would not create a safety hazard for people residing or working within the project area. The project would result in **no impact** associated with private airstrips.				
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☒	☐	☐
8g. Response (Source: Town of Apple Valley 2009) **Less Than Significant Impact.** The Town of Apple Valley General Plan identifies evacuation routes along Central Road, State Route 18, and Bear Valley Road. There are no other known emergency evacuation or response plans within the vicinity of the project site. Central Road and Bear Valley Road are not located within the project vicinity, but State Route 18 extends along the north and westerly project boundaries. No temporary road closures are required during construction, operation, or maintenance of the proposed project. Additionally, all equipment and materials will be delivered and stored at the construction staging sites located along the easterly boundary of the Wash. Therefore, the project will result in a **less than significant impact** to implementation of an adopted emergency response plan or emergency evacuation plan.				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

8h. Response (Source: Town of Apple Valley 2009)

Less Than Significant Impact. The proposed project site is located within a desert wash with undeveloped lands to the west and south and residential development to the east. Once constructed, the stabilized banks and invert of the wash would be maintained and would not be considered wildlands that would pose a risk of wildfire to the surrounding land uses. Impacts associated with exposure of people or structures to loss from wildland fire would be **less than significant**.

IX. HYDROLOGY AND WATER QUALITY – Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐

9a. Response (Source: SWRCB 2012)

Less Than Significant Impact. The approximately 15-acre Dessert Knolls Wash Improvements footprint would be graded during project construction, which would temporarily expose soils to stormwater runoff. Construction projects that involve the disturbance of 1 or more acres of soil are required to obtain coverage under the SWRCB Construction General Permit. Construction activity subject to this permit includes clearing, grading, and disturbances to ground surfaces, such as stockpiling or excavation. The Construction General Permit requires the development and implementation of a SWPPP. The SWPPP would contain a site map(s) that depicts the location of stockpiles, staging areas, and the type and location of BMPs such as silt fencing, sandbag berms, and general good housekeeping methods intended to prevent the off-site discharge of soil or construction materials in stormwater.

Once constructed, the stabilized wash segment will convey flows downstream which will reduce the potential for flooding in the surrounding area. The proposed project, once built, is not expected to violate water quality standards or waste discharge requirements. Impacts associated with operation of the stabilized wash would be **less than significant**.

b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of	☐	☐	☒	☐

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				

9b. Response (Source: SBCFCD 2013, Town of Apple Valley 2009)

No Impact. The proposed project is located within the boundaries of the Mojave Groundwater Basin. There is no proposed use of groundwater or installation of groundwater wells associated with the proposed project. The project includes the installation of some grouted and ungrouted rock to create structures to stabilize the wash. However, the remainder of the wash bottom will remain earthen. Therefore, implementation of the proposed project will result in **no impact** associated with depletion of groundwater supplies or interference with groundwater recharge.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐

9c. Response (Sources: SWRCB 2012)

Less Than Significant Impact. The proposed project is intended to provide flood protection for existing structures and residences in the project area. During construction, ground surfaces will be graded and exposed, which could result in erosion and siltation if exposed to stormwater. As described in Response 9a, construction projects that involve the disturbance of 1 or more acres of soil, such as the proposed project, are required to obtain coverage under the SWRCB Construction General Permit. The Construction General Permit requires the development and implementation of a SWPPP. The SWPPP would contain a site map(s) that depicts the location of stockpiles, staging areas, and the type and location of BMPs such as silt fencing, sandbag berms, and general good housekeeping methods intended to prevent erosion and the off-site discharge of silt or debris in stormwater.

Following construction, the stabilized wash slopes and access road would be compacted and maintained to prevent erosion during periods of rainfall. Accumulated silt and debris in the wash bottom would be removed as needed to maintain wash capacity. Therefore, implementation of the proposed project would result in **less than significant impacts** associated with substantial erosion or siltation on or off site through alteration of existing drainage patterns. On the contrary, implementation of the proposed project is expected to benefit the surrounding area by stabilizing the wash and reducing the amount of sediment and debris that might otherwise be carried

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
downstream during large storm events.				
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒
9d. Response (Sources: SBCFCD 2013, Williamson & Schmid 1994, LCER Specific Plan) **No Impact.** The proposed project is intended to provide flood protection for existing structures and residential development in the project area. Desert Knolls Wash is addressed in the Apple Valley West/Desert Knolls Master Plan of Drainage (MPD) and is considered a necessary flood control facility under the Lewis Center Educational Research Specific Plan. Therefore, implementation of the proposed project will result in **no impact** to on-or-off site flooding since it is intended and designed to address existing historical flooding in the project area.				
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
9e. Response (Sources: SBCFCD 2013, Williamson & Schmid 1994, LCER Specific Plan) **No Impact.** As discussed in item 9d, the proposed project is intended to provide flood protection for existing structures and residential development in the project area. Desert Knolls Wash is addressed in the Apple Valley West/Desert Knolls Master Plan of Drainage (MPD) and is considered a necessary flood control facility under the Lewis Center Educational Research Specific Plan. Therefore, implementation of the proposed project will result in **no impact** to an exceedance of the capacity of planned stormwater drainage systems or provide additional sources of polluted runoff.				
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
9f. Response (Sources: SWRCB 2012) **Less Than Significant Impact.** As described in Responses 9a to 9f, the potential for erosion, siltation, and off-site discharge of non-stormwater materials during construction will be minimized through adherence to the requirements of the SWRCB Construction General Permit, including development and on-site implementation of a SWPPP. The silt fencing, sandbag berms, and other BMPs described in the SWPPP will prevent erosion and the off-site discharge of silt or debris in stormwater.				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Following construction, the stabilized wash slopes and access road will be compacted and maintained to prevent erosion during periods of rainfall. Any accumulated silt and debris in the wash bottom will be removed as needed. Therefore, implementation of the proposed project will result in a **less than significant impact** associated with degradation of water quality.				
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
9g. Response (Source: Town of Apple Valley 2009) **No Impact**. The proposed project involves the construction, operation, and maintenance of wash improvements within an approximately 0.6-mile segment of Desert Knolls Wash. There is no component of the project that involves the construction of housing; therefore, implementation of the proposed project would result in **no impact**.				
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
9h. Response (Source: Town of Apple Valley 2009) **No Impact**. As described in Responses 9c, 9d, and 9e, the proposed project is intended to provide flood protection for existing properties and residential development in the project area. Therefore, implementation of the proposed project will result in **no impact** associated with impeding or redirecting runoff. On the contrary, implementation of the proposed project will alleviate local flood hazards.				
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐
9i. Response (Source: Town of Apple Valley 2009) **Less Than Significant Impact.** The proposed project is intended to provide flood protection for existing properties and residential development in the project area. The proposed wash improvements include the construction of stabilized slopes and revetment structures. The construction of a levee or dam is not required for the amount or velocity of flows in the Desert Knolls Wash. Therefore, the potential for exposure of people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of failure of a dam, is considered **less than significant**.				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☒	☐

9j. Response (Source: Town of Apple Valley 2009)

Less Than Significant Impact. Based upon the project site's distance (more than 70 miles) from the nearest ocean, there is no potential for inundation by a tsunami.

Based upon review of the Apple Valley General Plan, development near the base of mountains and downstream from canyons is particularly susceptible to mudflows. Although the project site is not located adjacent to mountains or within a canyon, it is located adjacent to areas where local geological and groundwater conditions suggest a potential for liquefaction and landslides during an earthquake which may contribute to mudflow events. However, the proposed wash improvements are intended to stabilize the existing wash and provide flood protection for existing structures and residences in the area, further decreasing the likelihood of mudflow in the area. Therefore, impacts related to inundation by mudflow would be **less than significant**.

A seiche can occur within an enclosed waterbody and is a wave typically created by seismic activity. The nearest large body of water is Lake Silverwood, which is located approximately 16 miles southwest of the project site. Due to the distance of Lake Silverwood, the potential for overtopping and inundation of the area surrounding the project site by a seiche is considered **less than significant**.

X. **LAND USE AND PLANNING–** Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒

10a. Response (Source: Town of Apple Valley 2009)

No Impact. The proposed project footprint consists of vacant portion of developed land surrounded by undeveloped land to the west and south, and State Route 18 to the north. All residential development and The Lewis Center for Educational Research campus is located to the east of the project site. There are no existing structures within the project footprint and the proposed project would not divide an existing community since all development occurs east of the project site. There is **no impact** associated with the physical division of an established community through implementation of the proposed project.

b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan,	☐	☐	☒	☐

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				

10b. Response (Source: Town of Apple Valley 2009)

Less Than Significant Impact. The proposed project site is located within the Town of Apple Valley. The Town of Apple Valley General Plan designates land use on the project site as Specific Plan (SP). The adopted Specific Plan for the site and the surrounding area is the Lewis Center Educational Research Specific Plan, which designates the project site as a Flood Zone. As a condition of the Initial Study/MND prepared for the Specific Plan, construction of flood improvements within the property designated as Flood Zone are required to protect the adjacent residential and educational uses proposed as part of the development addressed under the Specific Plan. The proposed wash improvements are proposed in support of existing and planned adjacent development and would not create any new permanent sources of traffic, odor, light, or glare that would be incompatible with surrounding uses or designations.. Therefore, the proposed project would not conflict with existing zoning or planning designations. Impacts are considered **less than significant**.

c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

10c. Response (Source: Dudek 2016b, Town of Apple Valley 2009)

No Impact. The West Mojave Habitat Conservation Plan and Apple Valley Multi-Species Conservation Plan have been adopted or are in preparation to address resources within the project vicinity. The project site is not located within the boundary of either conservation plan. Therefore, implementation of the proposed project would result in **no impact** associated with conflict with habitat conservation plans or natural community conservation plans.

XI. MINERAL RESOURCES – Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒

11a. Response (Source: Town of Apple Valley 2009)

No Impact. Based on the City of Apple Valley General Plan Energy and Mineral Resources element, the project site is not mapped within a known mineral resources site. Therefore, implementation of the project would result in **no impact** to the availability of a regionally important mineral resource.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Result in the loss of availability of a local -important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

11b. Response (Source: Town of Apple Valley 2009)

No Impact. As discussed under Response 11a, above, the project site is not mapped within an area supporting known mineral resources. Therefore, the project would have **no impact** with respect to the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan

XII. NOISE – Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☒	☐	☐

12a. Response (Sources: Town of Apple Valley 2016, FHWA 2008)

Less Than Significant with Mitigation Incorporated. The Town of Apple Valley's Development Code (Title 9, within the Code of Ordinances) includes standards for exposure of excessive noise levels to sensitive receptors, including residential land uses. Section 9.73.060 (F) of the Development Code addresses noise from construction activities by prohibiting the operation of any tools or equipment used in construction, drilling, repair, alteration, or demolition work between weekday hours of 7 p.m. and 7 a.m., or at any time on weekends or holidays if such work creates a noise, except for emergency work of public service utilities or by variance. Additionally, this section states that where technically and economically feasible, construction activities shall be conducted in such a manner that the maximum noise levels from mobile equipment at single-family residences will not exceed 75 dBA from 7 a.m. to 7 p.m. or 60 dBA from 7 p.m. to 7 a.m. for nonscheduled intermittent or short-term operations (less than 10 days). The noise standard for stationary equipment (defined as repetitively scheduled and relatively long-term (i.e., 10 days or more) is 60 dBA from 7 a.m. to 7 p.m. or 50 dBA from 7 p.m. to 7 a.m. at single-family residences.

Construction of the proposed project (consisting of wash stabilization improvements, rock silting basin and access road) will require the use of a grader, excavator, loader, dozer/crawler, dump trucks, a water truck, hand tools and other equipment which will generate noise and vibrations. Construction of the project is anticipated to last for approximately 9 months; however, the work will move from move from place to place within the project site and all work will occur during the hours of 7:00 a.m.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

and 7:00 p.m. Mondays through Saturdays (and would not occur on Sundays or federal holidays).

The Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM) (FHWA 2008) was used to estimate construction noise levels at the nearest occupied noise-sensitive land uses. Although the model was funded and promulgated by the FHWA, the RCNM is often used for non-roadway projects, because the same types of construction equipment used for roadway projects are also used for other project types. Input variables for the RCNM consist of the receiver/land use types, the equipment type and number of each (e.g., two graders, a loader, a tractor), the duty cycle for each piece of equipment (e.g., percentage of hours the equipment typically works per day), and the distance from the noise-sensitive receiver. No topographical or structural shielding was assumed in the modeling. The RCNM has default duty-cycle values for the various pieces of equipment, which were derived from an extensive study of typical construction activity patterns. Those default duty-cycle values were used for this noise analysis.

The nearest sensitive receptors are residences and a school located immediately adjacent to the construction impact area (south and east of the project site). Using the FHWA's RCNM construction noise model and construction information (types and number of construction equipment by phase), the estimated noise levels from construction were calculated for a representative range of source-receiver distances, as presented in Table 4-11, Construction Noise Model Results Summary. The RCNM inputs and outputs are provided in Appendix G.

Table 4-11
Construction Noise Model Results Summary

Construction Phase	Construction Noise at Representative Receiver Distances (dBA L_{eq})	
	Nearest Construction Work - 20 Feet (Approx.)	*Typical Construction Work - 195 Feet (Approx.)*
Clearing & Grubbing	88	75
Concrete Structure	82	73
Excavation	89	73
Fill, Backfill & Recompaction	85	72
Loading & Hauling	85	73
Rock Slope Protection	86	73
Sewer Relocation	84	65
Street Improvement/ Miscellaneous Work	84	72

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact

As presented in Table 4-11, the highest noise levels are predicted to occur during the excavation activities when noise levels from construction activities would be as high as 89 dBA equivalent continuous sound level (L_{eq}) at the nearest existing residences, approximately 20 feet away. At more typical distances of approximately 195 feet, construction noise would range from approximately 65 to 75 dBA L_{eq}.

The proposed project, once operational, is not anticipated to generate noise, and therefore would not result in an increase in noise during long-term operation. Periodic maintenance would involve short-term use of a rubber tired loader, a bulldozer (crawler tractor), a water and haul trucks. As required, maintenance will be limited to the hours of 7:00 a.m. and 7:00 p.m., except weekends and federal holidays, in accordance with Town of Apple Valley ordinances. Similarly to construction noise, maintenance activity noise is estimated to be as high as 85 dBA L_{eq} at the nearest existing residences; at more typical distances of approximately 195 feet, noise from maintenance activities would be approximately 69 dBA L_{eq}.

Construction noise and periodic maintenance noise would exceed Town of Apple Valley construction noise standards and are therefore considered potentially significant. With incorporation of Mitigation Measures NOI-1 through NOI-4, noise from construction and maintenance would be reduced substantially, and would be in compliance with the locally applicable noise standards. Construction and maintenance-related noise impacts would be **less than significant with mitigation incorporated**.

Mitigation Measures

MM-NOI-1 All noise-producing project equipment and vehicles using internal-combustion engines shall be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) shall be equipped with shrouds and noise-control features that are readily available for that type of equipment. All mobile or fixed noise-producing equipment used on the project that is regulated for noise output by a local, state, or federal agency shall comply with such regulation in the course of project activity.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
MM-NOI-2 Electrically powered equipment shall be used instead of pneumatic or internal-combustion powered equipment, where feasible. Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors. Construction site and access road speed limits shall be established and enforced during the construction period. Construction operations shall not occur between 7:00 p.m. and 7:00 a.m. Monday through Friday, or at any time on weekends or on federal holidays. The hours of construction, including noisy maintenance activities and all spoils and material transport, shall be restricted to the periods and days permitted by the local noise or other applicable ordinance. **MM-NOI-3** The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only. **MM-NOI-4** The on-site construction supervisor shall have the responsibility and authority to receive and resolve noise complaints. A clear appeal process to the owner shall be established prior to construction commencement that will allow for resolution of noise problems that cannot be immediately solved by the site supervisor.				
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐

12b. Response (Sources: Town of Apple Valley 2016, Caltrans 2013)

Less Than Significant Impact. The Town of Apple Valley's Development Code (9.73.060 (G)) prohibits the operation of any device that creates a vibration above the threshold of perception at or beyond the property boundary of the source if on private property or at 150 feet from the source if on a public space or public right-of-way.

The proposed project, once operational, is not anticipated to generate vibration. Annual maintenance would be short term and the heavy equipment used would be limited to one bulldozer, one loader, one bulldozer, one water truck and three dump trucks. Therefore, the project would not result in vibration-related impacts during operation.

Ground-borne vibration information related to construction activities has been collected by the

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
California Department of Transportation (Caltrans 2013). Based upon this information, transient vibrations (such as construction activity) with a peak particle velocity of approximately 0.035 inches per second may be characterized as barely perceptible, and vibration levels of 0.24 inches per second may be characterized as distinctly perceptible. The heavier pieces of construction equipment, such as bulldozers, would have peak particle velocities of approximately 0.089 inch/second or less at a distance of 25 feet (DOT 2006). Ground-borne vibration is typically attenuated over short distances. At a distance of 150 feet, the vibration level from heavy construction equipment associated with the proposed project would be approximately 0.006 inches per second, which is well below the threshold of perception. Impacts related to ground-borne vibration are considered to be **less than significant**.				
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
12c. Response (Sources: Town of Apple Valley 2016) **Less Than Significant Impact.** As discussed in Response 12a, construction activities and periodic maintenance would generate temporary noise; however, once construction and maintenance is complete, operation of the proposed project would not generate noise. Therefore, the project would not result in a substantial permanent increase in ambient noise levels in the project vicinity. Impacts are considered **less than significant**.				
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
12d. Response (Source: Response 12a) **Less Than Significant with Mitigation Incorporated.** As discussed in Response 12a, construction and periodic maintenance of the proposed project will require the use of heavy equipment as well as hand tools, which will generate noise and vibration. Based upon the construction analysis summarized in Response 12a, construction noise levels at the nearest sensitive receivers (residences) are estimated to be as high as 89 dBA L_{eq} during the loudest construction phase for brief periods of time (i.e., when work takes place very near the residential areas). During more typical conditions (when work activities take place further away), noise levels are anticipated to range from approximately 65 to 75 dBA L_{eq}. These noise levels are likely to be substantially higher than the ambient noise levels in the project area. Therefore, the noise from construction and maintenance is considered potentially significant. The potential for				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
noise impacts will be reduced to the extent practicable through implementation of Mitigation Measures 12a to 12d. Impacts associated with a temporary or periodic increase in ambient noise levels are considered **less than significant with mitigation incorporated**. **Mitigation Measures** Refer to Mitigation Measures NOI-1 through NOI-4.				
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐
12e. Response (Source: Town of Apple Valley 1995) **Less Than Significant Impact.** The project site is located approximately 5.4 miles from the Apple Valley Airport. The project site is not within the influence area of the Apple Valley Airport or any other airport (Town of Apple Valley 1995). Moreover, the proposed project consists of the construction of slope and invert stabilization improvements, rock silting basin and an access road and would not involve construction of residential, commercial, or institutional uses that could expose people to excessive noise levels. There are no other public or private airports within 2 miles of the project site. Therefore, the project will result in a **less than significant impact** associated with exposure of people to excessive public airstrip noise.				
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
12f. Response (Source: Town of Apple Valley 1995) **No Impacts.** The proposed project site is not located in the vicinity of a private airport. Therefore, the project would result in **no impacts** associated with exposure of people to excessive private airstrip noise.				
XIII. POPULATION AND HOUSING – Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
13a. Response (Source: Town of Apple Valley 2009, SBCFCD 2013) **Less Than Significant Impact.** The proposed project consists of the construction, operation, and maintenance of wash improvements within an approximately 0.6-mile segment of Desert Knolls Wash. The project does not propose construction of any new residential or commercial development, the extension of roads or any other infrastructure that might induce population growth. The proposed wash improvements are intended to protect existing residential development and structures within The Lewis Center for Educational Research campus. Therefore, the potential for impacts related to population growth would be less than significant.				
b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
13b. Response (Source: SBCFCD 2013) **No impact.** The proposed project would be located entirely within undeveloped land, and would not displace or demolish any existing housing. Therefore, implementation of the proposed project would not necessitate the construction of replacement housing elsewhere.				
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☒	☐
13c. Response (Source: SBCFCD 2013) **No impact.** See Response 13(b), the proposed project would not displace a substantial number of people, as there is no existing housing within the project footprint. The proposed project site is entirely undeveloped, therefore, implementation of the proposed project would not displace people, nor would it not necessitate the construction of replacement housing elsewhere.				
XIV. PUBLIC SERVICES – Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire protection?	☐	☐	☒	☐
14a. Response (Source: Town of Apple Valley 2009) **Less Than Significant Impact.** Apple Valley Fire Department maintains and staffs seven fire stations in Apple Valley. Of these, five are staffed 24- hours per day, seven days per week.				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
Another fire station is staffed on an as needed basis by on-call firefighters, and the seventh station is staffed entirely by private ambulance company personnel. The closest fire station to the project site is Fire Station 331 located at 22400 Headquarters Drive approximately 6.3 miles southeast of the project. During construction, the project would result in a minor increase in the risk of equipment fire or a release of a hazardous substance that would require an emergency response from the fire department. However, construction is temporary and the potential for construction activities to result in an emergency is considered minimal. Once construction is complete, operation and maintenance of the proposed wash improvements would not increase the need for fire protection. Impacts related to fire protection would be **less than significant**				
b) Police protection?	☐	☐	☒	☐
14b. Response (Source: Town of Apple Valley 2009) **No Impact.** Police services are provided to the Town of Apple Valley through a contractual agreement with the San Bernardino County Sheriff's Department. The Sheriff's Department assigns staff to the Apple Valley Police Department within the approximately 72 square miles that are encompassed by the Town's corporate limits. The Sheriff's Department also serves unincorporated areas in the vicinity of Apple Valley, including the Town's Sphere of Influence. The Apple Valley Police Department is located in the Apple Valley Civic Center at 14931 Dale Evans Parkway, approximately 3.7 miles east from the project. Flood control stabilized washes are not considered facilities that would attract criminal activity. Therefore, the proposed project would not increase the need for police protection. Impacts are considered **less than significant**.				
c) Schools?	☐	☐	☐	☒
14c. Response (Source: SBCFCD 2013) **No Impact**. The proposed project involves the construction, operation, and maintenance of stabilized bank and invert wash improvements within an approximately 0.6-mile segment of Desert Knolls Wash to protect the local area from flooding. The project does not involve the construction of any new residential or commercial development, or new infrastructure (such as roads) that could result in population growth and require additional school services. Therefore, the proposed project would result in **no impact** to schools.				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Parks?	☐	☐	☐	☒

14d. Response (Source: SBCFCD 2013)

No Impact. The proposed project involves the construction, operation, and maintenance of stabilized bank and invert wash improvements within an approximately 0.6-mile segment of Desert Knolls Wash to protect the local area from flooding. The project does not involve the construction of any new residential or commercial development, or new infrastructure (such as roads) that could result in population growth and generate additional demand for parks. Therefore, the proposed project would result in **no impact** to parks.

e) Other public facilities?	☐	☐	☐	☒

14e. Response (Source: SBCFCD 2013)

No Impact. The proposed project does not involve the construction of any new residential or commercial development, or new infrastructure (such as roads) that could result in population growth and require additional demand for public facilities or services. The proposed project is a public facility that is intended to reduce the risk of flooding in the area. Therefore, the proposed project would result in **no impact** to public facilities.

XV. RECREATION.				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒

15a. Response (Source: SBCFCD 2013)

No Impact. The project consists of the construction, operation, and maintenance of stabilized bank and invert wash improvements within an approximately 0.6-mile segment of Desert Knolls Wash. The proposed project does not include new residential or commercial development that would increase demand for parks or other recreational services. As such, the use of existing neighborhoods, regional parks, and other recreational facilities would not increase such that physical deterioration of the facility would be accelerated. Therefore, **no impact** would occur as a result of implementation of the proposed project.

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

15a. Response (Source: SBCFCD 2013)

No Impact. The project consists of the construction, operation, and maintenance of stabilized bank and invert wash improvements within an approximately 0.6-mile segment of Desert Knolls Wash. The project does not include the construction or expansion of any recreational facilities. The proposed project will not result in an increase in the population or generate a need for new or expanded recreational facilities. Therefore, there is **no impact** associated with the construction or expansion of recreational facilities as a result of the proposed project.

XVI. TRANSPORTATION/TRAFFIC – Would the project:				
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐

16a. Response (Source: Town of Apple Valley 2009)

Less Than Significant with Mitigation Incorporated. The majority of the roadways in the vicinity of the project site that would be used for access are two-lane rural roads that have low traffic trip volumes. However, State Route 18 is designated as a "Major Divided Arterial" on the Town of Apple Valley General Plan Circulation and Transportation map There are no designated bicycle or pedestrian paths or mass transit routes in the project area. The project would temporarily add trips on the local roadways during construction of the wash improvements associated with employees, material deliveries, and equipment. During operation, minimal vehicle trips would be required for management and periodic maintenance of the facilities. Maintenance equipment is limited to a maximum of one bulldozer, one water truck, one loader, and three dump trucks used on an annual basis. The delivery of this equipment would not require road closures or a traffic control plan. Therefore, potential impacts to traffic would be **less than significant with mitigation incorporated**.

b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards	☐	☐	☒	☐

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
established by the county congestion management agency for designated roads or highways?				

16b. Response (Source: Town of Apple Valley 2009)

Less Than Significant Impact. As stated in Response 16a, the proposed project would result in a minor increase in traffic during construction of the proposed wash improvements. During construction, traffic along area roadways would temporarily increase due to trips associated with employee, material delivery, and equipment delivery trips. However, there are no road closures or diversions proposed since the project footprint and construction staging areas do not include occur on or immediately adjacent to existing roadways. The potential impacts to traffic would be **less than significant.**

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒

16c. Response (Source: Town of Apple Valley 2009)

No Impact. The nearest airport to the project site is the Apple Valley Public Airport, which is located approximately 5.5 miles northeast of the project site. Therefore, the proposed project site is not located within the 2-mile radius of the Apple Valley Airport Notice Area. Project construction and operation of the wash improvements would not result in a change in air traffic patterns. Additionally, the project does not involve the construction of new residential development and workers in the area would be limited to temporary construction staff and County employees conducting periodic maintenance of the stabilized wash. There are no private use airports within the vicinity of the proposed project. Therefore, implementation of the proposed project would result in **no impact** to safety hazards associated with a change in air traffic patterns.

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐

16d. Response (Source: SBCFCD 2013)

Less Than Significant Impact. The proposed project does not include the construction of new roads that would include sharp turns or new intersections. The transport of equipment to construct the stabilized bank and invert wash improvements will be temporary and all construction staging and activities would occur off of existing roadways within the project site

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
and the construction staging sites. Therefore, there would be a **less than significant impact** associated with traffic hazards due to a design feature or incompatible uses.				
e) Result in inadequate emergency access?	☐	☒	☐	☐
16e. Response (Source: Town of Apple Valley 2009) **Less Than Significant Impact.** The Town of Apple Valley General Plan identifies an evacuation route along State Route 18. There are no other known emergency evacuation or response plans within the vicinity of the project site. There are no temporary road closures are required during construction, operation, or maintenance of the proposed project. Access to State Route 18 will be maintained during and after construction. Therefore, impacts to long-term emergency access would be less than significant. The project would result in a **less than significant impact** to traffic and emergency access.				
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒
16f. Response (Source: Town of Apple Valley 2009) **No Impact.** There are no designated bicycle or pedestrian paths or mass transit routes in the project area. The proposed project would not affect planned alternative transportation routes or modes, nor would it conflict with adopted policies, plans, and programs supporting alternative transportation. Implementation of the proposed project would result in **no impact**.				
XVII. UTILITIES AND SYSTEM SERVICES – Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
17a. Response (Source: SBCFCD 2013) **No Impact**. The proposed project consists of the construction, operation, and maintenance of stabilized bank and invert wash improvements within an approximately 0.6-mile segment of Desert Knolls Wash. The project does not propose construction of any new residential or commercial development. There is no component of the project that would generate wastewater or require wastewater treatment; therefore, implementation of the proposed project would result in no impact.				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
17b. Response (Source: SBCFCD 2013) **No Impact**. As described in Response 17a, the proposed project consists of the construction, operation, and maintenance of wash improvements within an approximately 0.6-mile segment of Desert Knolls Wash. The project does not propose construction of any new residential or commercial development. There is no component of the project that would require water service or wastewater treatment; therefore, implementation of the proposed project would result in no impact.				
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
17c. Response (Source: SBCFCD 2013) **No Impact**. The proposed project involves proposed project consists of the construction, operation, and maintenance of wash improvements within Desert Knolls Wash, which is intended to address the need for stormwater drainage facilities in the project area as set forth in the Apple Valley/Desert Knolls Master Plan of Drainage and would not require or result in the need for additional stormwater facilities or expansion of existing facilities. Implementation of the proposed project would result in **no impact**.				
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
17d. Response (Source: SBCFCD 2013) **No Impact**. As described in Responses 17b and 17c, the proposed project consists of the construction, operation, and maintenance of wash improvements within an approximately 0.6-mile segment of Desert Knolls Wash. The project does not propose construction of any new residential or commercial development. There is no component of the project that would require water service; therefore, implementation of the proposed project would result in **no impact** associated with the need for new or expanded water entitlements.				

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒

17e. Response (Source: SBCFCD 2013)

No Impact. As described in Responses 17a, b and d, above, the proposed project consists of the construction, operation, and maintenance of wash improvements within an approximately 0.6-mile segment of Desert Knolls Wash. The project does not propose construction of any new residential or commercial development. There is no component of the project that would require wastewater treatment; therefore, implementation of the proposed project would result in **no impact** associated with wastewater treatment capacity.

f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐

17f. Response (Source: SBCFCD 2013)

Less Than Significant Impact. The proposed project would generate a minimal amount of waste during construction. Construction-related waste products include but are not limited to concrete, material packaging, and motor oil containers. Any waste materials produced by during construction will be taken off site and disposed of in accordance with County requirements.

The grading of Desert Knolls Wash is anticipated to involve net excavation of up to approximately 99,000 cubic yards and fill of up to approximately 32,000 cubic yards. Therefore, a total of approximately 67,000 cubic yards of soil would require offsite hauling and disposal. The excess soil generated during grading and construction of the Desert Knolls Wash wash improvements are expected to be stockpiled and/or used on site (beyond wash limits), removed by contractors, and used in County projects or other local construction projects. The County is not proposing to dispose of these soils in the local landfill.

The solid waste generated during project construction would be short term in nature, recycled on the site to the extent practicable, and would not be substantial or interfere with the sufficient permitted capacity of nearby landfills. Therefore, impacts would be **less than significant.**

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

17g. Response (Source: SBCFCD 2013)

Less Than Significant Impact. As described in Response 17f, the proposed project would result in a minimal amount of waste during construction. During operation of the wash improvements, any waste materials produced by maintenance staff would be taken off site and disposed of in accordance with County requirements. The project would comply with all applicable federal, state, and local laws and regulations related to solid waste. Impacts would be **less than significant**.

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or an endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐

18a. Response (Source: Initial Study Checklist)

Less Than Significant Impact. As indicated in this IS/MND, the project's potential impacts to the environment, wildlife species, and plant or animal communities will be either less than significant or will be mitigated below a level of significance.

Based upon the results of the cultural resources and paleontological surveys conducted by CRM Tech in 2015, there is the potential for discovery of previously unknown cultural resources and fossil bearing sediment during construction. Construction monitoring during ground disturbing activities by an approved Native American monitor and qualified archeologist/paleontologist and requirements for work stoppage and recovery of any artifacts will be conducted in accordance with MM-CUL-1, -2, and 3. Therefore, as indicated in this IS/MND, the project's potential impacts to the environment, wildlife species, and/or archaeological resources will be either less than significant or will be mitigated below a level of significance.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigation Incorporated	Less Than Significant Impact	No Impact
18b. Response (Source: Initial Study Checklist) **Less Than Significant Impact.** As discussed in this document, potential adverse impacts are temporary and will cease upon construction completion. The potential for impacts associated with operation of the stabilized bank and invert wash improvements are limited to periodic maintenance. These maintenance activities are minimal, involve limited numbers of maintenance staff and equipment, and would occur on an annual basis to ensure that the capacity of the wash is retained and that any accumulated sediment, trash, or debris is removed. The construction of these bank and invert stabilization improvements to address flood control in the area are addressed in the Desert Knolls Wash/Apple Valley Master Drainage Plan and the Lewis Center Educational Research Specific Plan. Cumulatively considerable impacts would be **less than significant**.				
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐
18c. Response (Source: Initial Study Checklist) **Less Than Significant Impact.** As discussed in this IS/MND, the proposed project involves the construction, operation, and maintenance of the proposed wash improvements within an approximately 0.6-mile segment of Desert Knolls Wash. The project is intended to provide flood protection to existing residences and education facilities. The need for the project is addressed in both the Desert Knolls Wash/Apple Valley Master Drainage Plan and the Lewis Center Educational Research Specific Plan. The proposed wash improvements, including the rock silting basin and access road, will be designed in accordance with the Uniform Building Code and San Bernardino County Flood Control specifications. Therefore, implementation of the proposed project would result in a **less than significant impact** to the public; on the contrary, the project is expected to benefit the public by providing necessary flood control facilities.				

Initial Study Checklist References

See Chapter 7, References, for full citations of documents referred to in this IS/MND and environmental checklist.

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5 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation Measure		Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
		Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
MM-BIO-1	**Special-Status Plants and Sensitive Vegetation** Surveys shall be conducted for special-status plant species the season prior to construction. Surveys shall occur at the appropriate time to capture the characteristics necessary to identify the taxon. Surveys shall be conducted consistent with CDFW protocols and by a qualified botanist knowledgeable of the local flora. If special-status plants are not observed during focused surveys, no additional mitigation is required. If a special-status plant species is detected, the outer extent of each occurrence shall be flagged at the time of the survey and the following avoidance measures implemented: 1. **Establish Environmentally Sensitive Areas (ESAs)**. Prior to the start of any ground- or vegetation-disturbing activities, a qualified biologist shall establish ESAs to protect and avoid special-status plants that occur outside of the project disturbance areas and within 100 feet of project disturbance areas. The locations of ESAs shall be clearly depicted on construction drawings, which shall also include all avoidance and minimization measures on the margins of the construction plans. ESAs shall be clearly delineated in the field with temporary construction fencing to ensure that avoided plants are not inadvertently harmed during construction. 2. **Monitoring.** A qualified biologist shall conduct weekly monitoring of the ESAs that protect		X	X	X	San Bernardino County Flood Control District		

Mitigation Measure	Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
	Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
special-status plant occurrences. The monitor shall have the authority to stop construction activities in the vicinity (within 100 feet) of an ESA if it is determined as a result of monitoring that corrective actions are necessary to avoid and protect the ESA. For direct permanent impacts, the loss of the occurrence shall be assessed in the context of the regional population for that species. If the loss of the occurrence would result in a greater than 10% loss of the population, mitigation shall be implemented for direct impacts to special-status plants through one or a combination of the following strategies. 1. **Off-site compensation**. Compensation lands with occupied habitat at a 1:1 ratio for any habitat occupied by special-status plants. Occupied habitat will be calculated on the project site and on the compensation lands as including each special-status plant occurrence and a surrounding 100-foot buffer area. 2. **Salvage**. The County shall consult with the Rancho Santa Ana Botanic Gardens or another qualified entity, to develop an appropriate experimental salvage and relocation strategy, based on the life history of the species permanently impacted. The plan shall include at minimum: (a) collection/salvage measures for plants or seed banks, to retain intact soil conditions and maximize success likelihood; (b) details regarding storage of plants or seed banks; (c) location of the proposed recipient site, and detailed site preparation and plant introduction							

Mitigation Measure	Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
	Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
techniques details for top soil storage, as applicable; (d) time of year that the salvage and replanting or seeding will occur and the methodology of the replanting; (e) a description of the irrigation, if used; (f) success criteria; and (g) a detailed monitoring program, commensurate with the plan's goals.							
MM-BIO-2 **Desert Tortoise** A preconstruction desert tortoise survey shall be conducted in accordance with current USFWS protocol. If the survey is negative, no additional mitigation is required. If the survey is positive, an incidental take permit (ITP) shall be obtained from the USFWS and CDFW. Occupied habitat shall be mitigated at a minimum 1:1 ratio or as specified in the ITP. Avoidance and minimization measures shall be implemented in accordance with provisions of the ITP and shall include, at a minimum: 1. Environmental awareness training for all construction personnel to educate them on desert tortoise, protective status, and avoidance measures to be implemented by all personnel, including looking under vehicles and equipment prior to moving; 2. Presence of a qualified biological monitor during initial grading activities and as needed to document compliance with the conditions of the ITP, the biological monitor will have the authority to stop work as needed to avoid direct impact to desert tortoise; 3. Should a desert tortoise be found during		X	X		San Bernardino County Flood Control District		

	Mitigation Measure	Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
		Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
	construction activities, activities shall cease until either the tortoise moves out of harm's way or a qualified biologist authorized under the project's ITP ("authorized biologist") relocates the tortoise.							
MM-BIO-3	**Burrowing Owl** A preconstruction survey shall be conducted in accordance with the latest CDFW guidelines. If the survey is negative, no additional mitigation is required. If the survey is positive, a burrowing owl management plan will be prepared that describes the nature and significance of the impact and then sets mitigation goals as described in the CDFW Staff Report on Burrowing Owl Mitigation (CDFG 2012). The burrowing owl management plan would be approved by CDFW. At a minimum, the burrowing owl management plan would include on-site measures to avoid harm to burrowing owls, as well as burrow creation and habitat enhancement		X	X	X	San Bernardino County Flood Control District		
MM-BIO-4	**Loggerhead Shrike and other Nesting Bird Species** Ground-disturbance activities shall be avoided during nesting bird season, from approximately February 1 through August 31. If ground-disturbing activities cannot be completed outside the nesting bird season, the following measures shall be implemented: Surveys shall be conducted within 300 feet of disturbance areas (500 feet for raptors, least Bell's vireo, and southwestern willow flycatcher) no earlier than 3 days prior to the commencement of disturbance. If ground-disturbance activities are delayed, then additional pre-disturbance surveys shall be conducted such that no more than 3 days will have elapsed		X	X		San Bernardino County Flood Control District		

Mitigation Measure		Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
		Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
	between the survey and ground-disturbance activities. If active nests are found, clearing and construction shall be postponed or halted within a buffer area established by the qualified biologist that is suitable to the particular bird species and location of the nest until the nest is vacated and juveniles have fledged, as determined by the qualified biologist. The construction avoidance area shall be clearly demarcated in the field with highly visible construction fencing or flagging, and construction personnel shall be instructed on the sensitivity of nest areas. A qualified biologist shall serve as a construction monitor during those periods if construction activities must occur within active nest buffer area to ensure that no inadvertent impacts on these nests occur. The results of the survey, including graphics showing the locations of any active nests detected, and documentation of any recommended avoidance measures, shall be submitted to the County within 24 hours.							
MM-BIO-5	**Least Bell's Vireo and other Special-Status Riparian Bird Species** Ground-disturbance activities shall be avoided during the riparian bird nesting season, from approximately April 1 through August 15. If ground-disturbing activities cannot be completed outside the nesting bird season, the following measures shall be implemented: If construction activities begin between March 15 and September 15, two preconstruction surveys shall be conducted within riparian habitat found within 500 feet of the disturbance areas. One survey shall occur no earlier than 7 days prior to the commencement of activity, with the second occurring within 3 days of		X	X		San Bernardino County Flood Control District		

	Mitigation Measure	Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
		Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
	activity commencement. If ground-disturbance activities are delayed, then additional pre-disturbance surveys shall be conducted such that no more than 3 days will have elapsed between the last survey and ground-disturbance activities. The survey shall be completed by a biologist who holds a USFWS permit for southwestern willow flycatcher. If active nests of least Bell's vireo, southwestern willow flycatcher, yellow-breasted chat, summer tanager, or yellow warbler are found, the qualified biologist would monitor and determine if construction noise levels or motion are potential sources for nest failure, and avoidance buffers would be established accordingly. Additional follow-up weekly visits by the qualified biologist would be required if active nests occur within 300 feet of the project construction activities.							
MM-BIO-6	**Indirect Impacts to Special-Status Species** Best management practices shall be implemented to minimize indirect impacts to special-status species. 1. **Minimize construction impacts.** The construction limits shall be flagged prior to ground-disturbance activities and all construction activities, including equipment staging and maintenance, shall be conducted within the flagged disturbance limits. 2. **Avoid Toxic Substances on Road Surfaces.** Soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants. 3. **Avoid Wildlife Entrapment:** a. ***Backfill trenches.*** At the end of each		X	X		San Bernardino County Flood Control District		

Mitigation Measure	Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
	Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
workday, check that all potential wildlife pitfalls (trenches, bores, and other excavations) have been backfilled, covered, or sloped to allow wildlife egress. Should wildlife become trapped, a qualified biologist shall remove and relocate it. b. ***Avoid entrapment of nesting or migratory birds.*** All pipes or other construction materials or supplies will be covered or capped in storage or laydown areas at the end of each workday. No pipes or tubing of sizes or inside diameters ranging from 1 to 10 inches will be left open either temporarily or permanently. 4. **Minimize Spills of Hazardous Materials.** All vehicles and equipment shall be maintained in proper condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. Hazardous spills shall be immediately cleaned up, and the contaminated soil shall be properly handled or disposed of at a licensed facility. Servicing of construction equipment shall take place only at a designated staging area. 5. **Worker Guidelines.** All trash and food-related waste shall be placed in self-closing containers and removed regularly from the site to prevent overflow. Workers shall not feed wildlife or bring pets to the project site. 6. **Invasive Weeds.** The spread of invasive weeds shall be minimized through removal of non-native weed species and remedial measures as							

	Mitigation Measure	Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
		Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
	determined during routine monitoring. 7. **Dust Minimization**. The spread of dust shall be minimized through periodic watering of actively disturbed soils or previously disturbed soils.							
MM-BIO-7	**Avoidance, Minimization, and Mitigation for Jurisdictional Waters** Appropriate permits shall be obtained from the regulatory agencies, including a CWA Section 404 permit from the ACOE (an Individual Permit will be required), a Water Quality Certification from the RWQCB, and a Streambed Alteration Agreement from the CDFW. All mitigation measures and conditions contained within the permits shall be implemented. At a minimum, the following shall be completed for mitigation for impacts to waters of the United States and jurisdictional streambed: 1. **Compensation for Permanent Impacts:** Permanent impacts to waters of the United States and jurisdictional streambed shall be offset by compensation at a minimum 1:1 ratio, or as otherwise required by the respective permits. Permanent impacts to ACOE/RWQCB wetland and CDFW riparian vegetation will be offset by compensation at a 2:1 ratio, or as otherwise required by the respective permits. CDFW riparian vegetation is made up of red willow thickets, a sensitive plant community, and therefore this mitigation ratio will also compensate for impacts to sensitive plant communities. **Temporary Impacts:** All areas temporarily impacted		X	X	X	San Bernardino County Flood Control District		

Mitigation Measure	Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
	Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
shall be restored to native grade and contour. • **Best Management Practices**. Avoided jurisdictional waters shall be fenced or flagged as an ESA. Best management practices shall be implemented to avoid indirect impacts to jurisdictional waters, including: a. Vehicles and equipment will not be operated in ponded or flowing water except as described in the permits. b. Water containing mud, silt, or other pollutants from grading or other activities will not be allowed to enter jurisdictional waters or be placed in locations that may be subjected to high storm flows. c. Spoil sites will not be located within 30 feet from the boundaries of jurisdictional waters or in locations that may be subject to high storm flows, where spoils might be washed back into drainages. d. Raw cement/concrete or washings thereof, asphalt, paint, or other coating material, oil, or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from project-related activities, will be prevented from contaminating the soil and/or entering avoided jurisdictional waters. No equipment maintenance will occur within 150 feet of							

	Mitigation Measure	Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
		Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
	jurisdictional waters, and no petroleum products or other pollutants from the equipment will be allowed to enter these areas or enter any off-site state-jurisdictional waters under any flow.							
MM-CUL-1	In order to evaluate and protect previously undetected subsurface cultural deposits, an archeological monitoring program shall be implemented in coordination with the San Manuel Band of Mission Indians and in accordance with the requirements of the 2014 MOU between the San Manuel Band of Mission Indians, the San Bernardino County Flood Control District, and the Lewis Center for Educational Research. The program shall include the following provisions: 1. All disturbance of native soils shall be monitored by a qualified archeologist and an approved Native American cultural resources monitor. The provisions set forth in the Native American Monitoring Protocol (Attachment B to the 2014 MOU) shall be implemented during monitoring. Whenever cultural materials more than 50 years old are discovered, they need to be field-recorded and evaluated. All work must be halted in the immediate vicinity of the cultural resource found until a qualified archaeologist and approved Native American cultural resources monitor can assess the significance of the resource. If a substantial cultural deposit is encountered, however, the monitors shall have the power to temporarily halt or divert construction activities in that area to allow for controlled removal.		X	X	X	San Bernardino County Flood Control District		

	Mitigation Measure	Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
		Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
	2. Any artifacts collected during the monitoring program shall be cleaned, identified, catalogued, analyzed, and prepared for curation at an appropriate repository. 3. Site records or site record updates that incorporate the artifacts encountered during monitoring should be prepared and submitted to the South Central Coastal Information Center. A report that documents the methods and results of the monitoring program, including an itemized inventory of recovered artifacts and a detailed artifact analysis shall be prepared upon completion of any recovery activities during implementation of the proposed project.							
MM-CUL-2	Earth moving operations within the area of mapped Pleistocene-age sediments shall be monitored by a qualified paleontologist. In the event that paleontological materials are discovered, all work must be halted in the immediate vicinity of the paleontologic resource found until the monitor can assess the significance of the resource. The monitor shall have the power to temporarily halt or divert construction activities in that area to allow for controlled removal. Any recovered specimens shall be identified and curated at a repository.			X		San Bernardino County Flood Control District		
MM-CUL-3	The measures set forth in the existing MOU (including the reburial agreement provided as Attachment D to the MOU) regarding discovery of Native American human remains shall be implemented as follows. Ground disturbing activities within 50 feet of a discovery of Native American human remains shall immediately cease and the human remains shall be		X	X	X	San Bernardino County Flood Control District		

Mitigation Measure	Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
	Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
secured in place by Consultant, Project Coordinators, and/or Native American lead monitor. After notification is provided to the County Coroner, the Tribe, and the Native American Heritage Commission (NAHC), the Consultant and/or the Native American lead monitoring shall notify and coordinate with the most likely descendent (San Manuel Band of Mission Indians or Tribe) to schedule a site visit. The San Manuel Band of Mission Indians, pursuance to California Public Resources Code Section 5097.98(a), shall be allowed to: (1) inspect the site of the discovery; and, (2) make determinations as to how the human remains and any associated grave goods should be treated and re-interred with appropriate dignity. The San Manuel Band of Mission Indians or their designee shall complete the inspection and provide written recommendations to the proper agencies within forty-eight (48) hours of being granted access to the site. The County agrees to discuss in good faith what constitutes “appropriate dignity”, as that term is used in the applicable statutes and in the Tribe’s customs and traditions. The Tribe shall have the final determination as to the disposition and treatment of human remains and any associated grave goods following NAPGRA protocols. The County acknowledges that the Tribe’s highest priority is to avoid disturbing human remains, and agree to avoid such disturbance through consultation and good faith efforts whenever feasible. Mitigation shall be considered and each incident shall be treated individually on a case by case basis. Whenever there is a discovery of human remains, the							

Mitigation Measure	Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
	Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
parties acknowledge the Tribe's cultural practice and desire for the human remains to be left "in situ" and without further and future disturbance. The County will use good faith efforts to accommodate the Tribe's cultural practices. No photographs may be taken of the human remains, except by written authorization from the Coroner and the Tribe. The archeologist may create a drawing of the human remains for cataloging purposes; however, no photographs or electronic means of recording the human remains shall be permitted. The County agrees that the reburial of any human remains and their associated funerary objects will be in an area as close as possible to the location of their discovery. If associated midden soil has been moved, it should also be returned to its original location along with any associated funerary objects. The human remains shall not be subject to any future disturbances and the County will take appropriate measures to ensure this, including recording information with the appropriate authorities and maintaining it as confidential. Reburial of human remains shall be accomplished in compliance with the California Public Resources code Section 5097.98(a) and (b). The exact reburial location will be determined after consultation with the Tribe. The exact location will be determined after consultation with the Tribe. The exact location will be recorded in a manner to protect it, in accordance with Section VIII. The County shall be responsible for reburial costs up to a maximum of $600 per discovery. If immediate reburial is not reasonably feasible, the County agrees that all human remains, including							

Mitigation Measure		Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
		Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
	funerary objects, and associated soils that may have moved remain with the Coroner's Office until arrangements are made for a reburial							
MM-HAZ-1	A hazardous substance management, handling, storage, disposal, and emergency response plan shall be prepared and implemented, and hazardous materials spill kits shall be maintained on site for small spills.		X	X		San Bernardino County Flood Control District		
MM-NOI-1	All noise-producing project equipment and vehicles using internal-combustion engines shall be equipped with mufflers, air-inlet silencers where appropriate, and any other shrouds, shields, or other noise-reducing features in good operating condition that meet or exceed original factory specification. Mobile or fixed "package" equipment (e.g., arc-welders, air compressors) shall be equipped with shrouds and noise-control features that are readily available for that type of equipment. All mobile or fixed noise-producing equipment used on the project that is regulated for noise output by a local, state, or federal agency shall comply with such regulation in the course of project activity.			X		San Bernardino County Flood Control District		
MM-NOI-2	Electrically powered equipment shall be used instead of pneumatic or internal-combustion powered equipment, where feasible. Material stockpiles and mobile equipment staging, parking, and maintenance areas shall be located as far as practicable from noise-sensitive receptors. Construction site and access road speed limits shall be established and enforced during the construction period. Construction operations shall not occur between 7:00 p.m. and 7:00 a.m. Monday			X		San Bernardino County Flood Control District		

Mitigation Measure		Time Frame of Mitigation				Monitoring Reporting Agency	Date of Completion	Date of Verification
		Planning	*Pre-Const.*	*During Const.*	*Post Const.*			
	through Friday, or at any time on weekends or on federal holidays. The hours of construction, including noisy maintenance activities and all spoils and material transport, shall be restricted to the periods and days permitted by the local noise or other applicable ordinance.							
MM-NOI-3:	The use of noise-producing signals, including horns, whistles, alarms, and bells, shall be for safety warning purposes only.			X		San Bernardino County Flood Control District		
MM-NOI-4:	The on-site construction supervisor shall have the responsibility and authority to receive and resolve noise complaints. A clear appeal process to the owner shall be established prior to construction commencement that will allow for resolution of noise problems that cannot be immediately solved by the site supervisor.			X		San Bernardino County Flood Control District		

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6 LIST OF PREPARERS

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County of San Bernardino Flood Control District
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San Bernardino, California 92415

Erwin Fogerson, PE, Division Chief, Flood Design

6.2 Project Consultants

Dudek

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Nicholas Lorenzen, Air Quality Specialist
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Mike Romich, Senior Biologist
Anna Cassady, Biologist
Andrew Greis, GIS Technician
Laurel Porter, Technical Editor
Devin Brookhart, Publications Specialist Lead
Lindsey Powers, Publications Specialist

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7 REFERENCES

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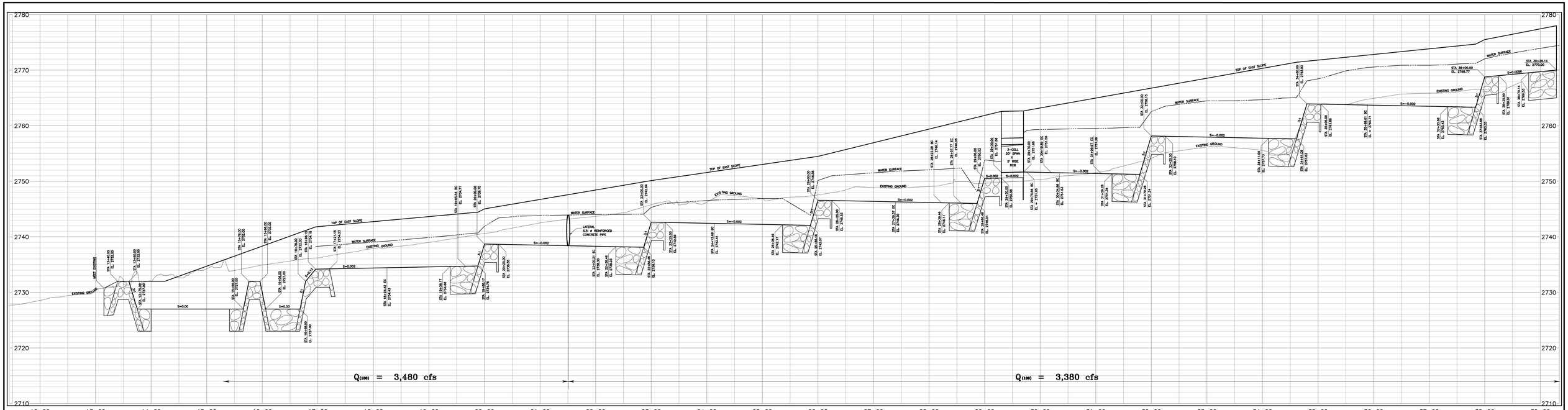
APPENDIX A

Grading Plans



PROFILE

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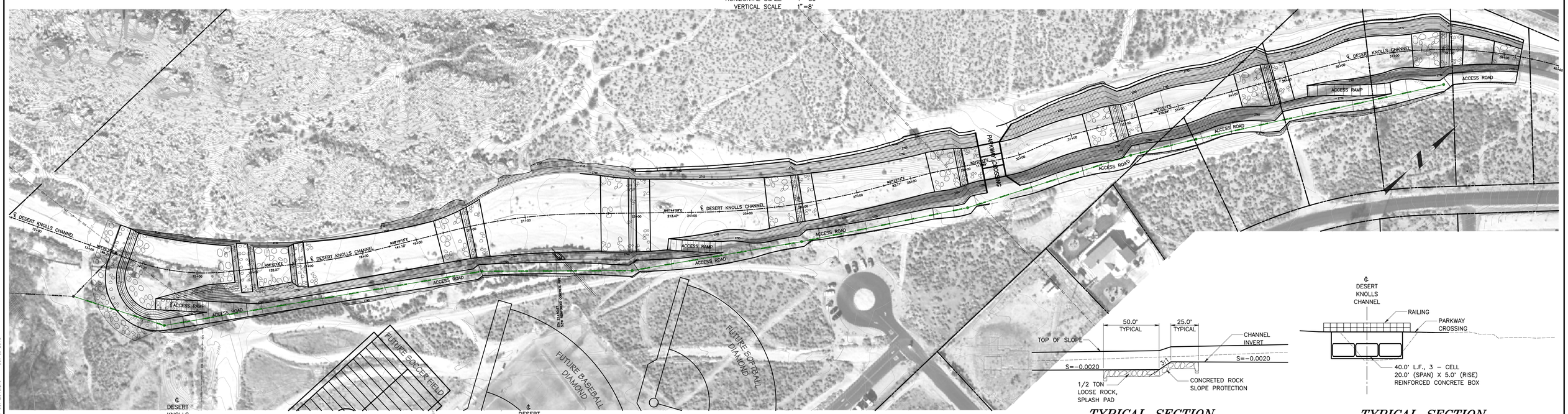
VERTICAL SCALE 1"=8'



PLAN

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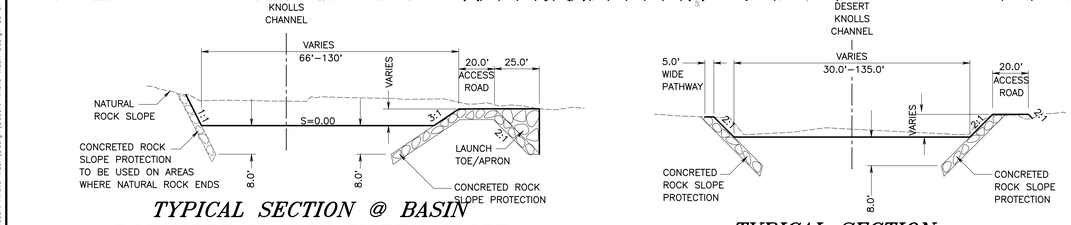


TYPICAL SECTION @ BASIN DOWNSTREAM WITH NORTH SLOPE UTILIZING NATURAL ROCK SLOPE

NOT TO SCALE

TYPICAL SECTION CHANNEL

NOT TO SCALE

TYPICAL SECTION GRADE CONTROL STRUCTURE

NOT TO SCALE

TYPICAL SECTION PARKWAY CROSSING

NOT TO SCALE

PRELIMINARY

REVISIONS			
MARK	DATE	DESCRIPTION	BY:

SUBMITTED BY: JON SMITH, P.E. DATE

RECOMMENDED BY: ERWIN FOGERSON, P.E. DATE

APPROVED BY: KEVIN BLAKESLEE, P.E. FLOOD CONTROL ENGINEER DATE

PROJ. ENGR.	DESIGNED BY	REV'D BY	DRAWN BY
	DJN		DJN

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

APPLE VALLEY DRAINAGE SYSTEM

DESERT KNOLLS CHANNEL IMPROVEMENT PLAN PHASE III (@ LEWIS CENTER FOR EDUCATIONAL RESEARCH)

DATE: Oct, 2013
SCALE: AS SHOWN
FILE NO. 6-402-
SHEET NO. 1 of 1

S:\701854 - Desert Knolls Wash\Design\Desert Knolls Wash Design as of Oct 2013.pro Oct 9, 2013

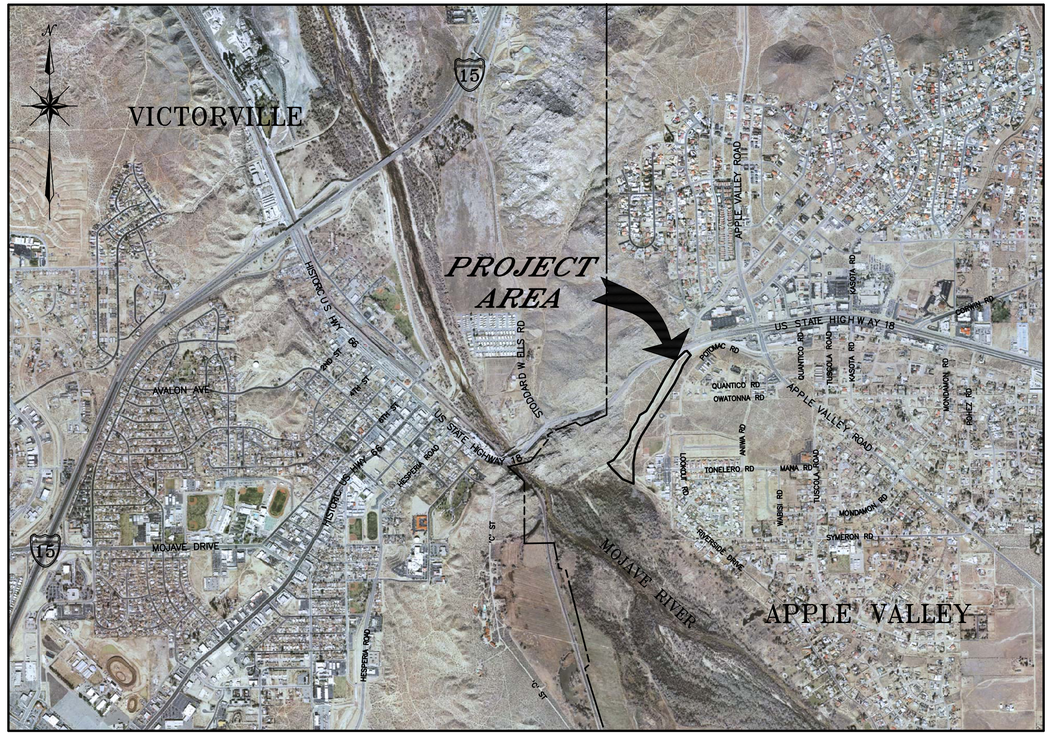
SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

PLANS FOR CONSTRUCTION ON

DESERT KNOLLS WASH PHASE III

WORK ORDER NO. F01854

LOCATED IN THE TOWN OF APPLE VALLEY
OF THE COUNTY OF SAN BERNARDINO



PROJECT LOCATION MAP

NOT TO SCALE

GENERAL NOTES:

1 SEE "SPECIAL PROVISIONS" FOR ADDITIONAL CONSTRUCTION INFORMATION & DETAILS.

2 IN GENERAL, ALL MATERIALS & CONSTRUCTION METHODS SHALL CONFORM TO THE 2006 EDITION STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS" UNLESS OTHERWISE SPECIFIED.

3 THESE PLANS DEPICT ALL ACTIVE UTILITIES KNOWN BY THE DISTRICT TO EXIST AT THIS TIME. LOCATIONS ARE APPROXIMATE & SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO ANY EXCAVATION. OPERATORS OF OVERHEAD UTILITIES SHALL BE NOTIFIED BY THE CONTRACTOR AT LEAST TWO WORKING DAYS PRIOR TO START OF CONSTRUCTION.

4 THE CONTRACTOR SHALL CALL "UNDERGOUND SERVICE ALERT", 1-800-227-2600 AT LEAST 48 HOURS IN ADVANCE OF ANY WORK WITHIN THE PROJECT AREA TO ALLOW UTILITY OPERATORS TO CHECK & MARK LOCATIONS OF EXISTING FACILITIES.

REFERENCES:

BASIS OF BEARING

BASED ON STATIC GPS TIES TO SAN BERNARDINO COUNTY GPS CONTROL POINTS "6023" & "20038", CALIFORNIA COORDINATE SYSTEM (CCS83), ZONE V, NAD83, EPOCH 1992.88.
BEING N82°24'36.91"W

BENCH MARKS

FD 2" BRASS CAP STAMPED 'BM 705-107 S.B.CO. 1968'
IN CONCRETE SIDEWALK @ SW CORNER S.H.18 & KASOTA RD
PER SPSN 01497 & CSFB 4186/780.
ELEVATION = 2820.992' (NAVD 1929)

APPROVED BY :

KEVIN BLAKESLEE, DEPUTY DIRECTOR/FLOOD CONTROL ENGINEER R.C.E. C53095 DATE

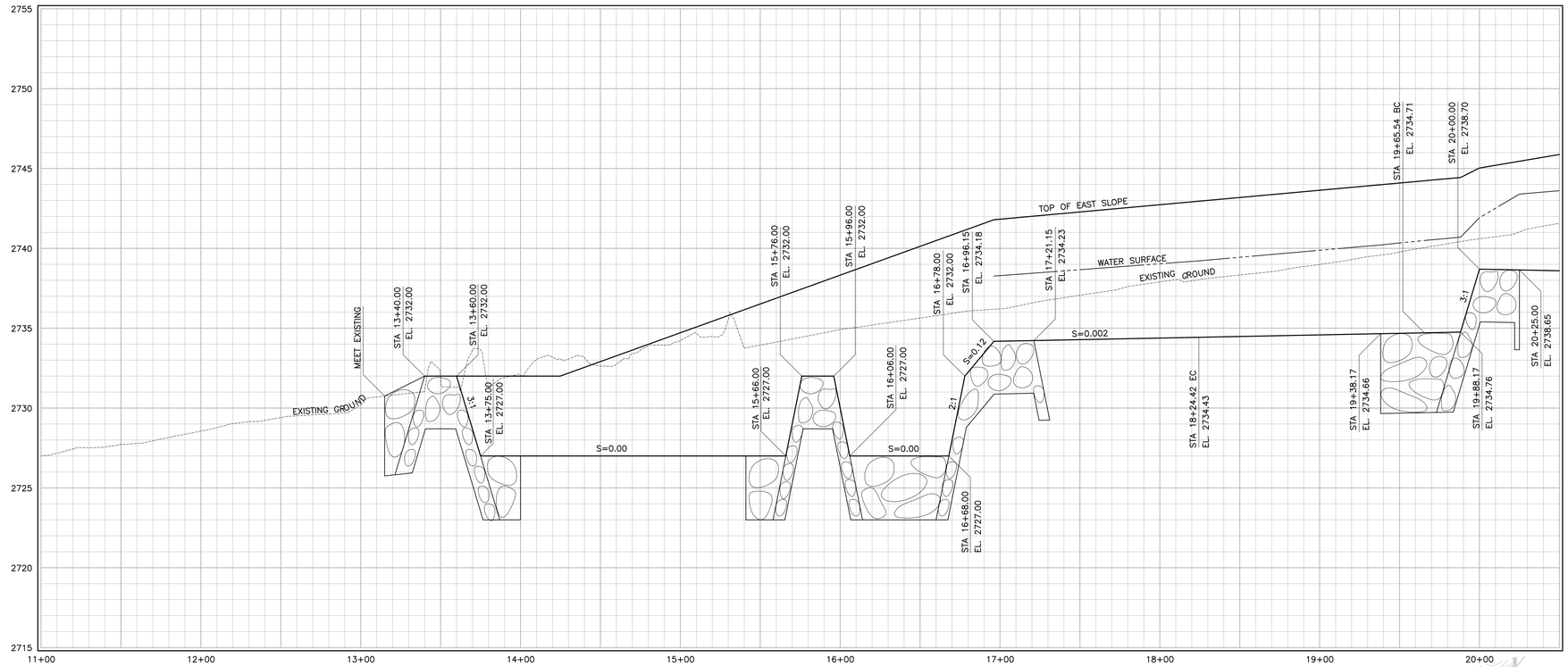
RECOMMENDED FOR AUTHORIZATION BY :

GERRY NEWCOMBE, DIRECTOR OF PUBLIC WORKS DATE

PRELIMINARY

SHEET 1 of xx

S:\F01854 - Desert Knolls Wash\Design\Desert Knolls Wash Design as of Oct 2013.pro Oct 9, 2013



PROFILE

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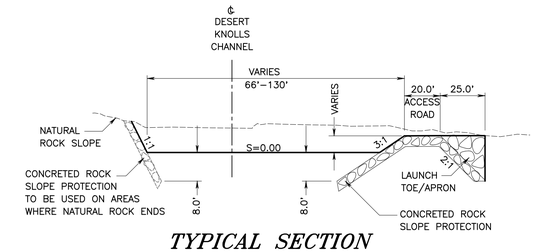

TYPICAL SECTION WITH NORTH SLOPE UTILIZING NATURAL ROCK SLOPE

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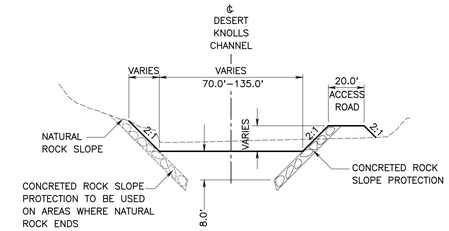

TYPICAL SECTION CHANNEL

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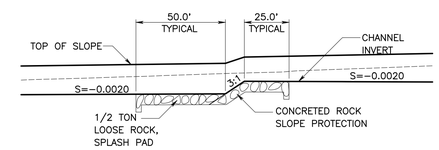
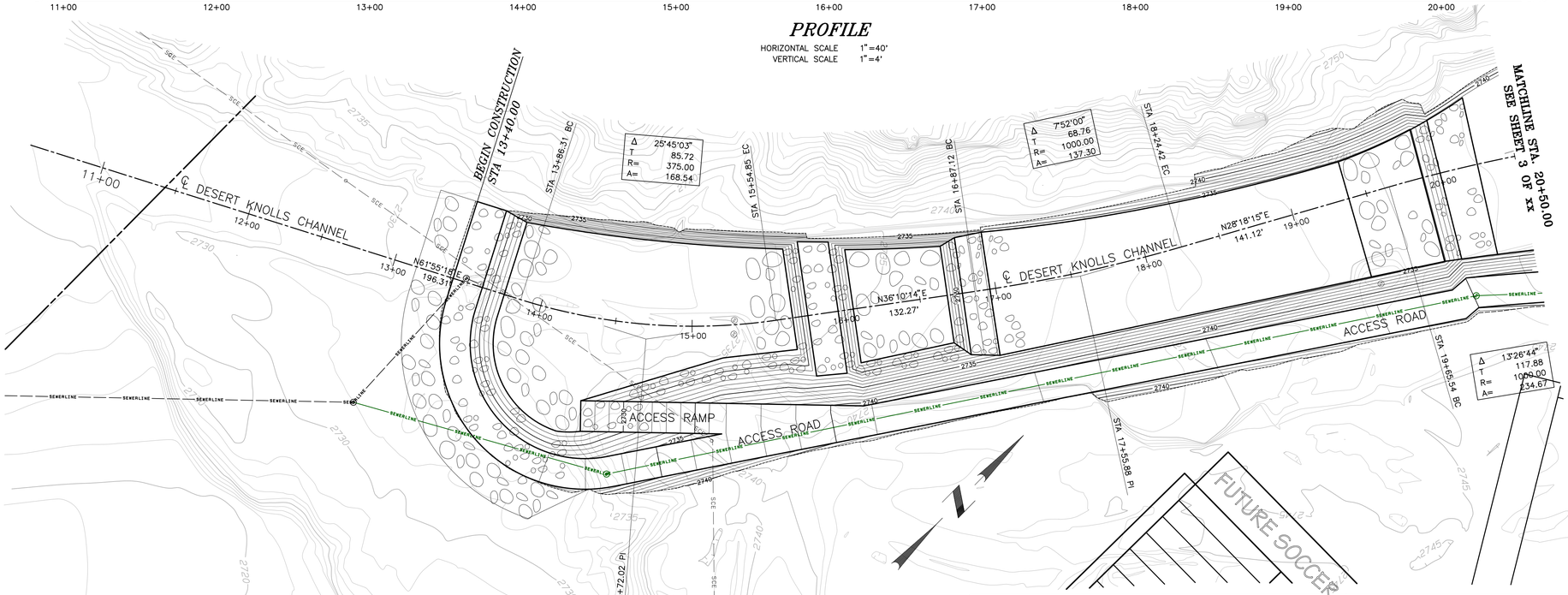


TYPICAL SECTION GRADE CONTROL STRUCTURE

NOT TO SCALE



PLAN

GRAPHIC SCALE 1"=40'

0 40 80 120

PRELIMINARY

REVISIONS			
MARK	DATE	DESCRIPTION	BY:

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT 1939 CALIFORNIA

SUBMITTED BY: JON SMITH, P.E. DATE

RECOMMENDED BY: ERWIN FOGERSON, P.E. DATE

APPROVED BY: KEVIN BLAKESLEE, P.E. FLOOD CONTROL ENGINEER DATE

PROJ. ENGR.	DESIGNED BY	REV'D BY	DRAWN BY
	DJN		DJN

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

APPLE VALLEY DRAINAGE SYSTEM

DESERT KNOLLS WASH

PLAN & PROFILE

STA. 10+50.00 – STA. 20+50.00

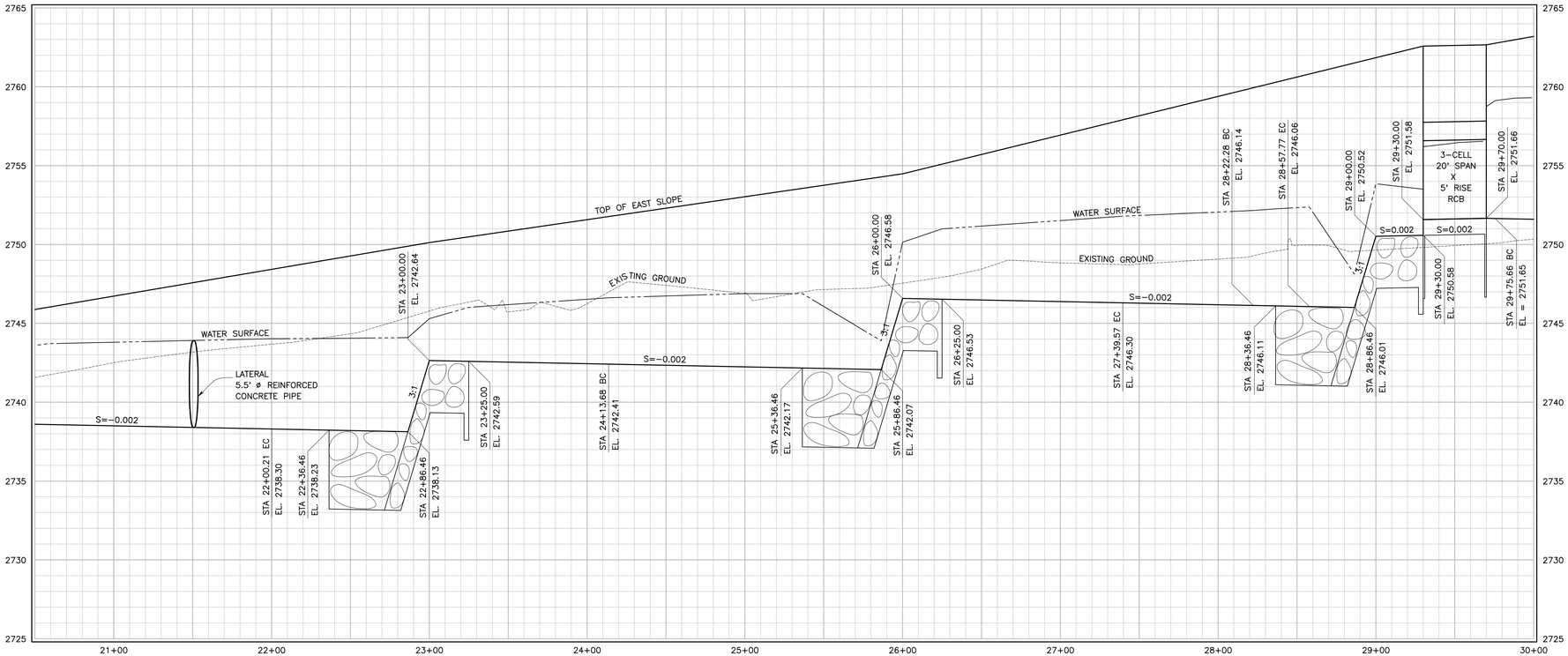
DATE: Oct, 2013

SCALE: AS SHOWN

FILE NO.: 6-402-

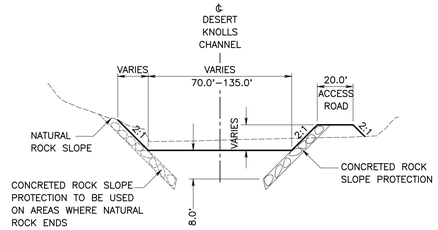
SHEET NO.: 2 of xx

S:\701954 – Desert Knolls Wash\Design\Desert Knolls Wash Design as of Oct 2013.pro Oct 9, 2013



PROFILE

HORIZONTAL SCALE 1"=40'
VERTICAL SCALE 1"=4'



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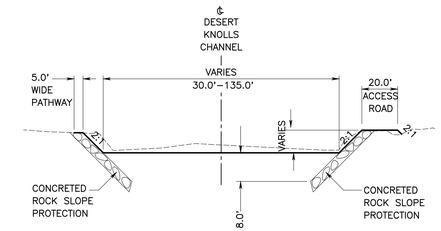

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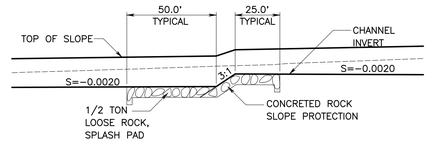

TYPICAL SECTION GRADE CONTROL STRUCTURE

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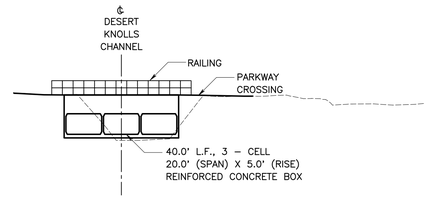
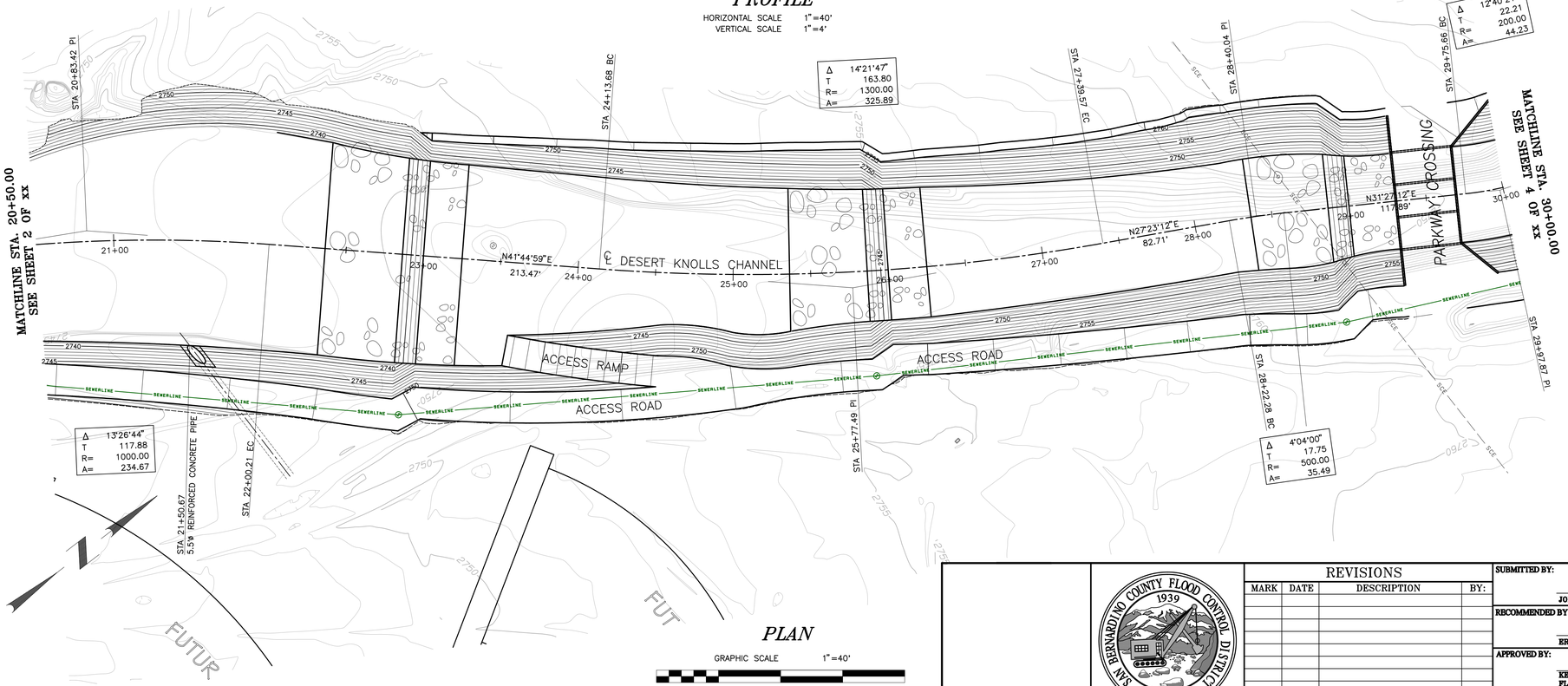


TYPICAL SECTION PARKWAY CROSSING

NOT TO SCALE



PLAN

GRAPHIC SCALE 1"=40'
0 40 80 120

PRELIMINARY

REVISIONS			
MARK	DATE	DESCRIPTION	BY:

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT 1939 CALIFORNIA

SUBMITTED BY: JON SMITH, P.E. DATE
RECOMMENDED BY: ERWIN FOGERSON, P.E. DATE
APPROVED BY: KEVIN BLAKESLEE, P.E. FLOOD CONTROL ENGINEER DATE

PROJ. ENGR.	DESIGNED BY	REV'D BY	DRAWN BY
	DJN		DJN

SAN BERNARDINO COUNTY
FLOOD CONTROL DISTRICT

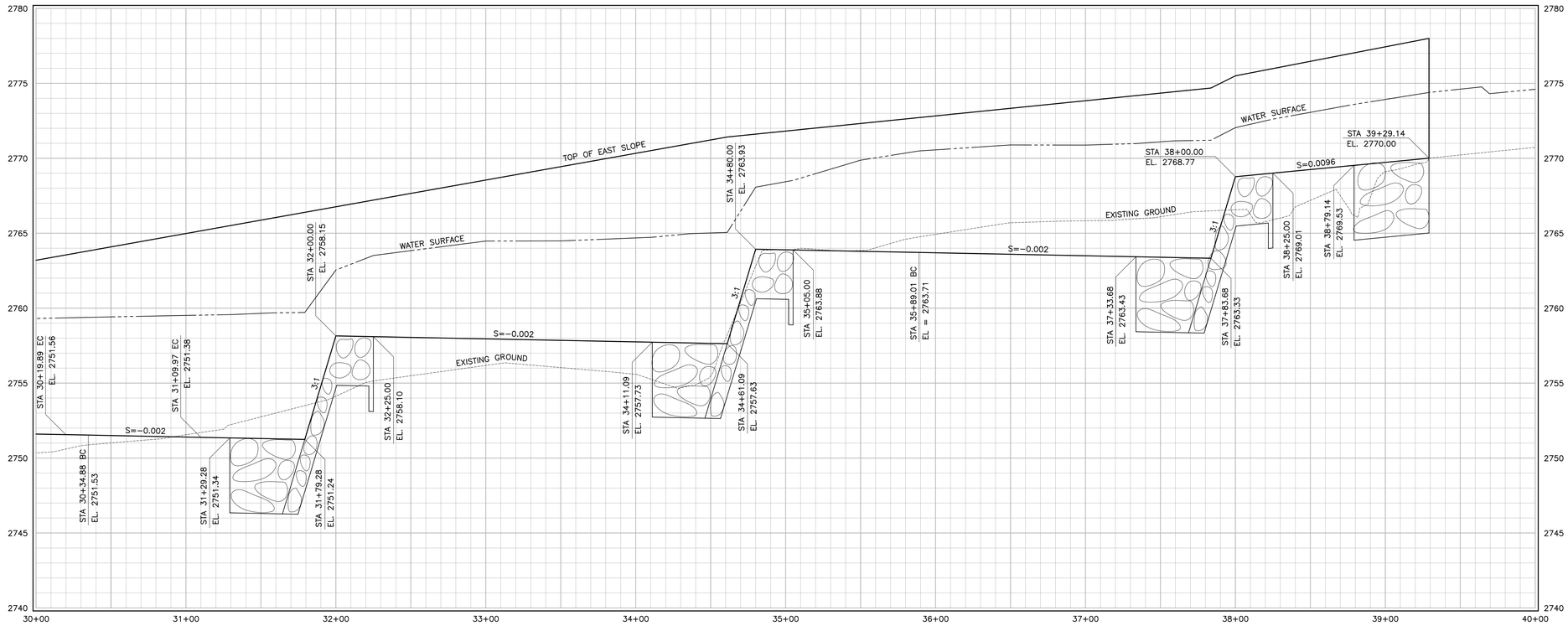
APPLE VALLEY DRAINAGE SYSTEM

DESERT KNOLLS WASH

PLAN & PROFILE
STA. 20+50.00 - STA. 30+00.00

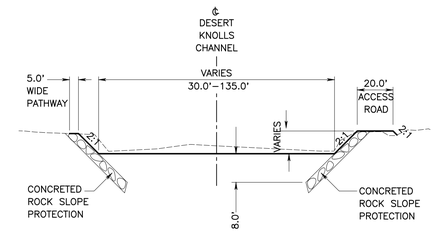
DATE: Oct, 2013
SCALE: AS SHOWN
FILE NO.: 6-402-
SHEET NO.: 3 of xx

S:\701854 - Desert Knolls Wash\Design\Desert Knolls Wash Design as of Oct 2013.pro Oct 9, 2013



PROFILE

HORIZONTAL SCALE 1"=40'
VERTICAL SCALE 1"=4'



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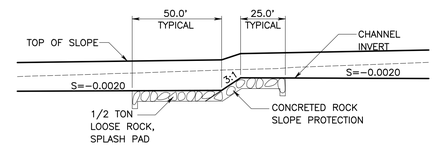

TYPICAL SECTION GRADE CONTROL STRUCTURE

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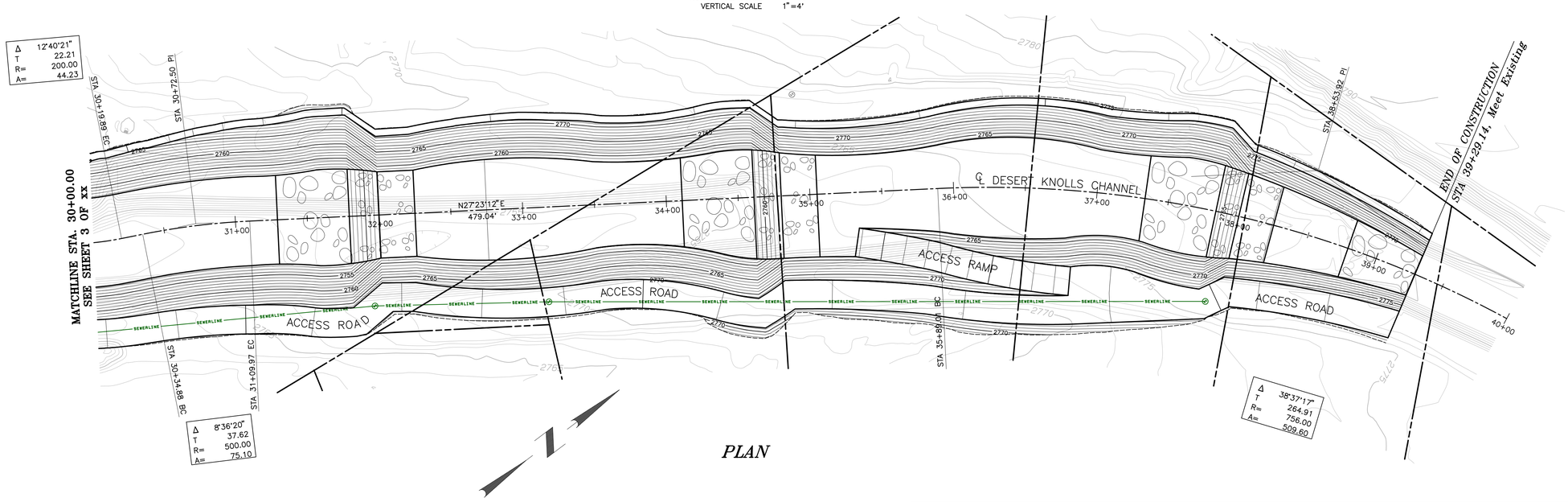


PLAN

GRAPHIC SCALE 1"=40'
0 40 80 120

PRELIMINARY

REVISIONS			
MARK	DATE	DESCRIPTION	BY:

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT 1939 CALIFORNIA

SUBMITTED BY: JON SMITH, P.E. DATE
RECOMMENDED BY: ERWIN FOGERSON, P.E. DATE
APPROVED BY: KEVIN BLAKESLEE, P.E. FLOOD CONTROL ENGINEER DATE

PROJ. ENGR.	DESIGNED BY	REV'D BY	DRAWN BY
	DJN		DJN

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

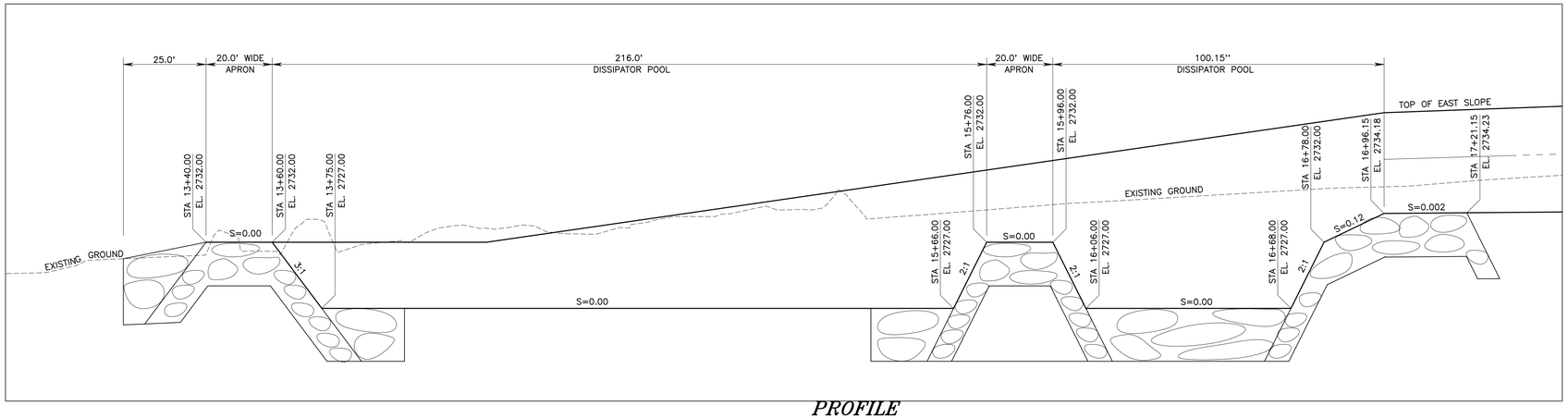
APPLE VALLEY DRAINAGE SYSTEM

DESERT KNOLLS WASH

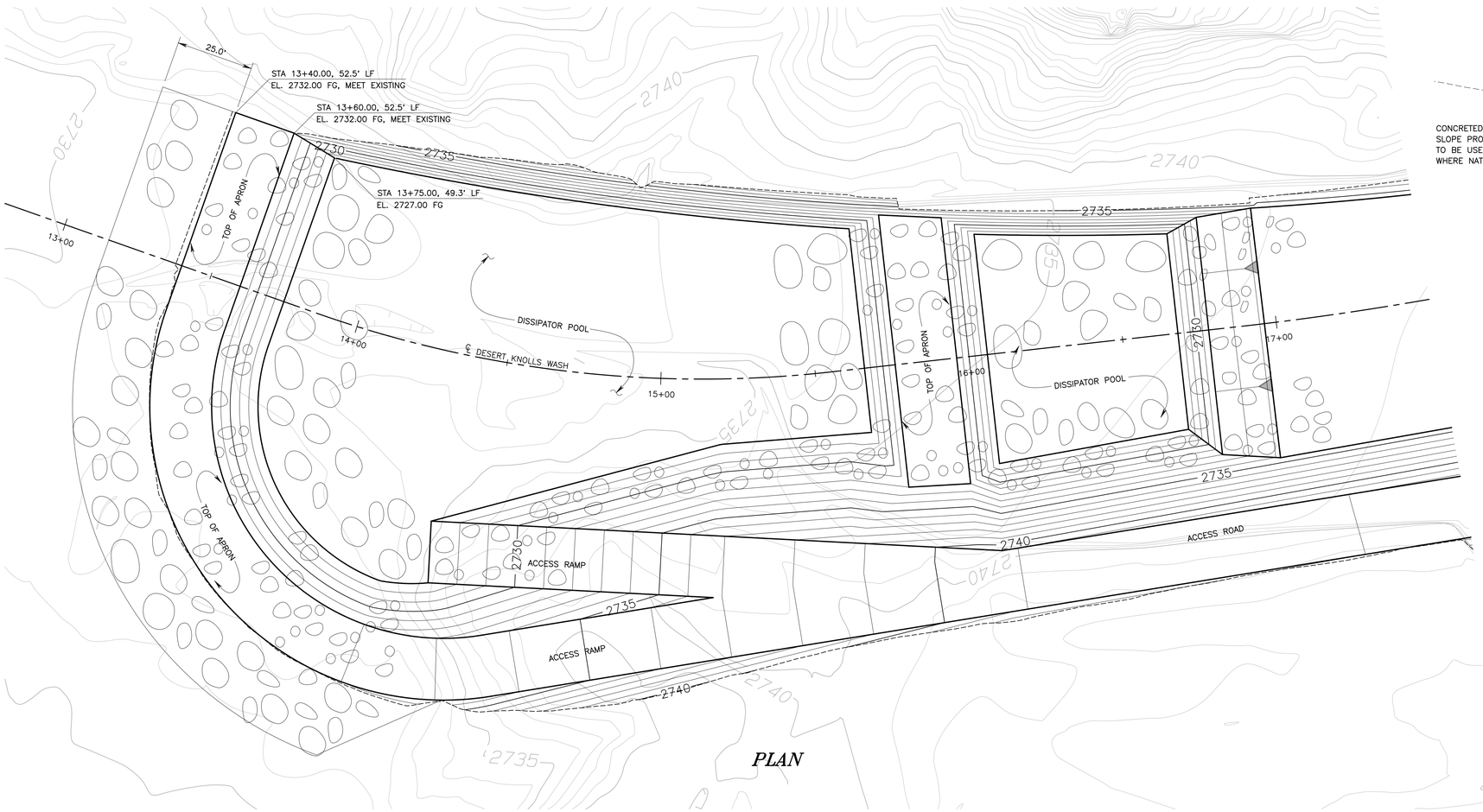
PLAN & PROFILE
STA. 30+00.00 – STA. 39+29.14

DATE Oct, 2013
SCALE AS SHOWN
FILE NO. 6-402-
SHEET NO. 4 of xx

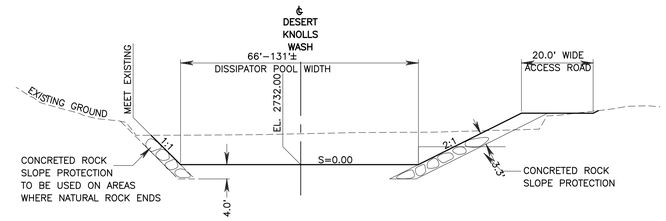
S:\701854 - Desert Knolls Wash\Design\Desert Knolls Wash Design as of Oct 2013.pro Oct 9, 2013



PROFILE



PLAN



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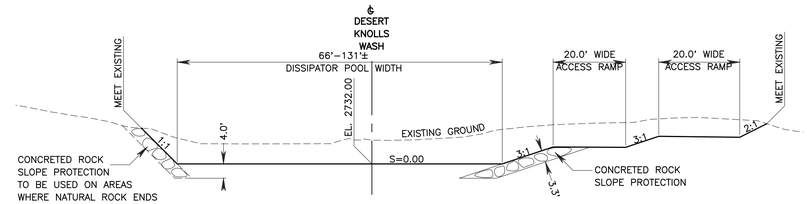
SCALE 1" = 20"



TYPICAL SECTION DISSIPATOR POOL WITH ACCESS RAMP
(STA. 13+60.00 – STA. 15+76.00)
SCALE 1" = 20"

PRELIMINARY

GRAPHIC SCALE 1"=20'
0 20 40 60

REVISIONS

MARK	DATE	DESCRIPTION	BY:

SUBMITTED BY: JON SMITH, P.E. DATE
RECOMMENDED BY: ERWIN FOGERSON, P.E. DATE
APPROVED BY: KEVIN BLAKESLEE, P.E. FLOOD CONTROL ENGINEER DATE

PROJ. ENGR.	DESIGNED BY	REV'D BY	DRAWN BY
	DJN		DJN

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT
APPLE VALLEY DRAINAGE SYSTEM
DESERT KNOLLS WASH
DESILTING BASIN

DATE: Oct, 2013
SCALE: AS SHOWN
FILE NO.: 6-402-
SHEET NO.: 5 of xx

S:\7015154 – Desert Knolls Wash\Design\Desert Knolls Wash Design as of Oct 2013.pro Oct 9, 2013

APPENDIX B

Air Quality and Greenhouse Gases

Desert Knolls Wash Phase III Construction Summer Emissions

Mojave Desert AQMD Air District, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	30
Climate Zone	10			**Operational Year**	2018
Utility Company	Statewide Average				
CO2 Intensity (lb/MWhr)	1001.57	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See Section 1.0 Project Characteristics. Operational 2018, consistent with construction schedule provided by the applicant.

Land Use - Based on applicant-provided site plan

Construction Phase - See 3.0 Construction Detail. Based on applicant-provided construction schedule

Off-road Equipment - See Construction Detail 3.0. Based on applicant-provided construction equipment information. Service truck (1)

Off-road Equipment - See Construction 3.0 Detail. Based on applicant-provided equipment assumptions.

Off-road Equipment - See Construction Detail 3.0 Based on applicant-provided construction assumptions. Dump (3) and water trucks (1).

Off-road Equipment - See Construction 3.0 for Details. Based on applicant-supplied construction equipment information. Dump trucks (3) water trucks (1)

Off-road Equipment - See Construction 3.0 Detail. Based on applicant-provided equipment assumptions.

Off-road Equipment - See Construction 3.0 Detail. Based on applicant-provided equipment assumptions.

Off-road Equipment - See Construction Detail 3.0. Based on applicant supplied construction information. Service Truck (2) Water Truck (1)

Off-road Equipment - See Construction 3.0 for detail. Based on applicant-provided equipment information. water truck (1) and service truck (1)

Trips and VMT - Worker Trips rounded to even values, and water and service trucks were counted as vendor trucks. Due to the close proximity of nearby dump sites. Hauling distance was shorted to 10 miles.

Grading - See 3.0 Construction Detail. 72,000 CY of export (110,000 CY cut - 38,000 CY fill remaining onsite = 72,000 CY Shrink factor accounted for) X acres disturbed. Based on applicant-provided data.

Energy Use - None

Land Use Change - None

Sequestration - None

Construction Off-road Equipment Mitigation - None

Operational Off-Road Equipment - None

Off-road Equipment - None

Off-road Equipment - None

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tblConstructionPhase	PhaseEndDate	9/4/2017	8/31/2017
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tblConstructionPhase	PhaseStartDate	9/23/2017	9/25/2017
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tblConstructionPhase	PhaseStartDate	11/18/2017	10/23/2017

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tblConstructionPhase	PhaseStartDate	8/22/2017	8/18/2017
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2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	11.9375	105.5099	137.1696	0.2259	22.5112	4.7395	27.0993	10.6883	4.3602	14.9971	0.0000	22,349.3913	22,349.3913	2.2821	0.0000	22,397.3150
2018	7.7686	70.1851	73.9992	0.1116	21.2632	3.4230	24.6862	8.8403	3.1712	12.0115	0.0000	10,951.8341	10,951.8341	1.4890	0.0000	10,983.1031
Total	**19.7061**	**175.6950**	**211.1688**	**0.3375**	**43.7744**	**8.1625**	**51.7855**	**19.5286**	**7.5313**	**27.0086**	**0.0000**	**33,301.2253**	**33,301.2253**	**3.7711**	**0.0000**	**33,380.4181**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	11.9375	105.5099	137.1696	0.2259	9.7707	4.7395	14.3588	4.4404	4.3602	8.7509	0.0000	22,349.3912	22,349.3912	2.2821	0.0000	22,397.3150
2018	7.7686	70.1851	73.9992	0.1116	13.4899	3.4230	16.9129	4.7513	3.1712	7.9225	0.0000	10,951.8341	10,951.8341	1.4890	0.0000	10,983.1031

Total	**19.7061**	**175.6950**	**211.1688**	**0.3375**	**23.2606**	**8.1625**	**31.2717**	**9.1917**	**7.5313**	**16.6734**	**0.0000**	**33,301.2253**	**33,301.2253**	**3.7711**	**0.0000**	**33,380.4181**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**46.86**	**0.00**	**39.61**	**52.93**	**0.00**	**38.27**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.4175	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**2.4175**	**0.0000**	**2.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**	**0.0000**	**4.6000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.4175	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Total	**2.4175**	**0.0000**	**2.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**	**0.0000**	**4.6000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Mobilization, Clearning and Grubbing	Site Preparation	7/3/2017	7/19/2017	5	13	
2	Excavation	Grading	7/20/2017	10/11/2017	5	60	
3	Fill and Recompaction 1	Grading	8/1/2017	8/21/2017	5	15	
4	Sewer Relocation	Trenching	8/18/2017	8/31/2017	5	10	
5	Concrete Structure	Paving	9/11/2017	9/22/2017	5	10	
6	Hauling 1	Grading	9/25/2017	10/20/2017	5	20	
7	Parkway Improvement/Misc	Paving	10/16/2017	10/20/2017	5	5	
8	Rock Slope Protection 1	Grading	10/23/2017	11/17/2017	5	20	
9	Fill and Recompaction 2	Grading	10/23/2017	11/10/2017	5	15	
10	Hauling 2	Grading	11/13/2017	1/5/2018	5	40	
11	Rock Slope Protection 2	Grading	1/1/2018	3/23/2018	5	60	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor

Mobilization, Clearning and Grubbing	Concrete/Industrial Saws	1	8.00	81	0.73
Mobilization, Clearning and Grubbing	Crushing/Proc. Equipment	1	4.00	85	0.78
Mobilization, Clearning and Grubbing	Graders	1	8.00	174	0.41
Mobilization, Clearning and Grubbing	Rubber Tired Dozers	1	8.00	255	0.40
Mobilization, Clearning and Grubbing	Scrapers	0	8.00	361	0.48
Mobilization, Clearning and Grubbing	Tractors/Loaders/Backhoes	1	4.00	97	0.37
Excavation	Graders	0	8.00	174	0.41
Excavation	Rubber Tired Dozers	2	8.00	255	0.40
Excavation	Scrapers	2	8.00	361	0.48
Excavation	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Fill and Recompaction 1	Graders	1	8.00	174	0.41
Fill and Recompaction 1	Rollers	1	8.00	80	0.38
Fill and Recompaction 1	Rubber Tired Dozers	1	8.00	255	0.40
Fill and Recompaction 1	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Hauling 1	Graders	1	8.00	174	0.41
Hauling 1	Rubber Tired Dozers	1	8.00	255	0.40
Hauling 1	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Sewer Relocation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Rock Slope Protection 1	Excavators	1	8.00	162	0.38
Rock Slope Protection 1	Graders	0	8.00	174	0.41
Rock Slope Protection 1	Pumps	1	8.00	84	0.74
Rock Slope Protection 1	Rubber Tired Dozers	0	8.00	255	0.40
Rock Slope Protection 1	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Fill and Recompaction 2	Graders	1	8.00	174	0.41
Fill and Recompaction 2	Rollers	1	8.00	80	0.38
Fill and Recompaction 2	Rubber Tired Dozers	1	8.00	255	0.40
Fill and Recompaction 2	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Concrete Structure	Cement and Mortar Mixers	1	6.00	9	0.56
Concrete Structure	Pavers	1	6.00	125	0.42
Concrete Structure	Paving Equipment	0	8.00	130	0.36

Concrete Structure	Pumps	1	6.00	84	0.74
Concrete Structure	Rollers	0	8.00	80	0.38
Concrete Structure	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Parkway Improvement/Misc	Air Compressors	1	8.00	78	0.48
Parkway Improvement/Misc	Cement and Mortar Mixers	0	8.00	9	0.56
Parkway Improvement/Misc	Graders	1	8.00	174	0.41
Parkway Improvement/Misc	Pavers	0	8.00	125	0.42
Parkway Improvement/Misc	Paving Equipment	1	8.00	130	0.36
Parkway Improvement/Misc	Rollers	1	8.00	80	0.38
Parkway Improvement/Misc	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Hauling 2	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Hauling 2	Rubber Tired Dozers	1	8.00	255	0.40
Rock Slope Protection 2	Excavators	1	8.00	162	0.38
Rock Slope Protection 2	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Rock Slope Protection 2	Pumps	1	8.00	84	0.74
Hauling 2	Graders	1	8.00	174	0.41
Rock Slope Protection 2	Graders	1	8.00	174	0.41
Rock Slope Protection 2	Rubber Tired Dozers	1	8.00	255	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Mobilization, Clearning and Grubbing	5	13.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Excavation	4	10.00	2.00	0.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Fill and Recompaction 1	4	10.00	8.00	2,000.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Hauling 1	4	10.00	20.00	3,000.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Sewer Relocation	1	3.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Rock Slope Protection 1	3	8.00	0.00	7,125.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Fill and Recompaction 2	4	10.00	8.00	2,000.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Concrete Structure	3	8.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

Parkway Improvement/Misc	4	10.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Hauling 2	4	8.00	20.00	6,000.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Rock Slope Protection 2	5	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Mobilization, Clearning and Grubbing - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.2457	0.0000	7.2457	3.4424	0.0000	3.4424			0.0000			0.0000
Off-Road	3.2605	31.0984	21.9412	0.0264		1.7684	1.7684		1.6669	1.6669		2,631.6722	2,631.6722	0.6090		2,644.4612
Total	**3.2605**	**31.0984**	**21.9412**	**0.0264**	**7.2457**	**1.7684**	**9.0142**	**3.4424**	**1.6669**	**5.1093**		**2,631.6722**	**2,631.6722**	**0.6090**		**2,644.4612**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0211	0.1468	0.2689	4.4000e-004	0.0132	3.6700e-003	0.0168	3.7300e-003	3.3700e-003	7.1100e-003		42.9286	42.9286	2.5000e-004		42.9338

Worker	0.0502	0.0645	0.7529	1.3200e-003	0.1068	7.0000e-004	0.1075	0.0283	6.4000e-004	0.0290		103.8579	103.8579	5.6900e-003		103.9774
Total	**0.0713**	**0.2114**	**1.0218**	**1.7600e-003**	**0.1199**	**4.3700e-003**	**0.1243**	**0.0321**	**4.0100e-003**	**0.0361**		**146.7865**	**146.7865**	**5.9400e-003**		**146.9112**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.8258	0.0000	2.8258	1.3425	0.0000	1.3425			0.0000			0.0000
Off-Road	3.2605	31.0984	21.9412	0.0264		1.7684	1.7684		1.6669	1.6669	0.0000	2,631.6722	2,631.6722	0.6090		2,644.4612
Total	**3.2605**	**31.0984**	**21.9412**	**0.0264**	**2.8258**	**1.7684**	**4.5943**	**1.3425**	**1.6669**	**3.0094**	**0.0000**	**2,631.6722**	**2,631.6722**	**0.6090**		**2,644.4612**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0211	0.1468	0.2689	4.4000e-004	0.0132	3.6700e-003	0.0168	3.7300e-003	3.3700e-003	7.1100e-003		42.9286	42.9286	2.5000e-004		42.9338
Worker	0.0502	0.0645	0.7529	1.3200e-003	0.1068	7.0000e-004	0.1075	0.0283	6.4000e-004	0.0290		103.8579	103.8579	5.6900e-003		103.9774
Total	**0.0713**	**0.2114**	**1.0218**	**1.7600e-003**	**0.1199**	**4.3700e-003**	**0.1243**	**0.0321**	**4.0100e-003**	**0.0361**		**146.7865**	**146.7865**	**5.9400e-003**		**146.9112**

3.3 Excavation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					14.1652	0.0000	14.1652	6.8495	0.0000	6.8495			0.0000			0.0000
Off-Road	4.9789	59.0219	40.2777	0.0476		2.5354	2.5354		2.3325	2.3325		4,866.7229	4,866.7229	1.4912		4,898.0372
Total	**4.9789**	**59.0219**	**40.2777**	**0.0476**	**14.1652**	**2.5354**	**16.7005**	**6.8495**	**2.3325**	**9.1820**		**4,866.7229**	**4,866.7229**	**1.4912**		**4,898.0372**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0211	0.1468	0.2689	4.4000e-004	0.0132	3.6700e-003	0.0168	3.7300e-003	3.3700e-003	7.1100e-003		42.9286	42.9286	2.5000e-004		42.9338
Worker	0.0386	0.0496	0.5792	1.0100e-003	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		79.8907	79.8907	4.3800e-003		79.9826
Total	**0.0597**	**0.1965**	**0.8480**	**1.4500e-003**	**0.0953**	**4.2000e-003**	**0.0995**	**0.0255**	**3.8600e-003**	**0.0294**		**122.8193**	**122.8193**	**4.6300e-003**		**122.9164**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					5.5244	0.0000	5.5244	2.6713	0.0000	2.6713			0.0000			0.0000
Off-Road	4.9789	59.0219	40.2777	0.0476		2.5354	2.5354		2.3325	2.3325	0.0000	4,866.7229	4,866.7229	1.4912		4,898.0372
Total	**4.9789**	**59.0219**	**40.2777**	**0.0476**	**5.5244**	**2.5354**	**8.0598**	**2.6713**	**2.3325**	**5.0038**	**0.0000**	**4,866.7229**	**4,866.7229**	**1.4912**		**4,898.0372**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0211	0.1468	0.2689	4.4000e-004	0.0132	3.6700e-003	0.0168	3.7300e-003	3.3700e-003	7.1100e-003		42.9286	42.9286	2.5000e-004		42.9338
Worker	0.0386	0.0496	0.5792	1.0100e-003	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		79.8907	79.8907	4.3800e-003		79.9826
Total	**0.0597**	**0.1965**	**0.8480**	**1.4500e-003**	**0.0953**	**4.2000e-003**	**0.0995**	**0.0255**	**3.8600e-003**	**0.0294**		**122.8193**	**122.8193**	**4.6300e-003**		**122.9164**

3.4 Fill and Recompaction 1 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.7022	0.0000	6.7022	3.3902	0.0000	3.3902			0.0000			0.0000
Off-Road	2.7706	28.7793	19.1634	0.0208		1.5936	1.5936		1.4661	1.4661		2,134.0389	2,134.0389	0.6539		2,147.7701
Total	**2.7706**	**28.7793**	**19.1634**	**0.0208**	**6.7022**	**1.5936**	**8.2958**	**3.3902**	**1.4661**	**4.8562**		**2,134.0389**	**2,134.0389**	**0.6539**		**2,147.7701**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.0087	13.5228	27.5167	0.0484	1.1699	0.3547	1.5246	0.3210	0.3262	0.6473		4,777.3108	4,777.3108	0.0278		4,777.8938
Vendor	0.0845	0.5874	1.0755	1.7500e-003	0.0526	0.0147	0.0673	0.0149	0.0135	0.0284		171.7144	171.7144	9.8000e-004		171.7351
Worker	0.0386	0.0496	0.5792	1.0100e-003	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		79.8907	79.8907	4.3800e-003		79.9826
Total	**2.1318**	**14.1598**	**29.1714**	**0.0512**	**1.3046**	**0.3699**	**1.6745**	**0.3578**	**0.3402**	**0.6980**		**5,028.9159**	**5,028.9159**	**0.0331**		**5,029.6115**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6139	0.0000	2.6139	1.3222	0.0000	1.3222			0.0000			0.0000
Off-Road	2.7706	28.7793	19.1634	0.0208		1.5936	1.5936		1.4661	1.4661	0.0000	2,134.0389	2,134.0389	0.6539		2,147.7701
Total	**2.7706**	**28.7793**	**19.1634**	**0.0208**	**2.6139**	**1.5936**	**4.2074**	**1.3222**	**1.4661**	**2.7882**	**0.0000**	**2,134.0389**	**2,134.0389**	**0.6539**		**2,147.7701**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	2.0087	13.5228	27.5167	0.0484	1.1699	0.3547	1.5246	0.3210	0.3262	0.6473		4,777.3108	4,777.3108	0.0278		4,777.8938
Vendor	0.0845	0.5874	1.0755	1.7500e-003	0.0526	0.0147	0.0673	0.0149	0.0135	0.0284		171.7144	171.7144	9.8000e-004		171.7351
Worker	0.0386	0.0496	0.5792	1.0100e-003	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		79.8907	79.8907	4.3800e-003		79.9826
Total	**2.1318**	**14.1598**	**29.1714**	**0.0512**	**1.3046**	**0.3699**	**1.6745**	**0.3578**	**0.3402**	**0.6980**		**5,028.9159**	**5,028.9159**	**0.0331**		**5,029.6115**

3.5 Sewer Relocation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3168	3.0439	2.3938	3.1100e-003		0.2289	0.2289		0.2106	0.2106		318.2649	318.2649	0.0975		320.3128
Total	**0.3168**	**3.0439**	**2.3938**	**3.1100e-003**		**0.2289**	**0.2289**		**0.2106**	**0.2106**		**318.2649**	**318.2649**	**0.0975**		**320.3128**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0423	0.2937	0.5378	8.7000e-004	0.0263	7.3300e-003	0.0336	7.4700e-003	6.7400e-003	0.0142		85.8572	85.8572	4.9000e-004		85.8675
Worker	0.0116	0.0149	0.1737	3.0000e-004	0.0246	1.6000e-004	0.0248	6.5400e-003	1.5000e-004	6.6800e-003		23.9672	23.9672	1.3100e-003		23.9948

Total	**0.0539**	**0.3086**	**0.7115**	**1.1700e-003**	**0.0510**	**7.4900e-003**	**0.0584**	**0.0140**	**6.8900e-003**	**0.0209**		**109.8244**	**109.8244**	**1.8000e-003**		**109.8623**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3168	3.0439	2.3938	3.1100e-003		0.2289	0.2289		0.2106	0.2106	0.0000	318.2649	318.2649	0.0975		320.3128
Total	**0.3168**	**3.0439**	**2.3938**	**3.1100e-003**		**0.2289**	**0.2289**		**0.2106**	**0.2106**	**0.0000**	**318.2649**	**318.2649**	**0.0975**		**320.3128**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0423	0.2937	0.5378	8.7000e-004	0.0263	7.3300e-003	0.0336	7.4700e-003	6.7400e-003	0.0142		85.8572	85.8572	4.9000e-004		85.8675
Worker	0.0116	0.0149	0.1737	3.0000e-004	0.0246	1.6000e-004	0.0248	6.5400e-003	1.5000e-004	6.6800e-003		23.9672	23.9672	1.3100e-003		23.9948
Total	**0.0539**	**0.3086**	**0.7115**	**1.1700e-003**	**0.0510**	**7.4900e-003**	**0.0584**	**0.0140**	**6.8900e-003**	**0.0209**		**109.8244**	**109.8244**	**1.8000e-003**		**109.8623**

3.6 Concrete Structure - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7631	6.6985	5.2320	8.8500e-003		0.3957	0.3957		0.3838	0.3838		851.6738	851.6738	0.1504		854.8321
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7631**	**6.6985**	**5.2320**	**8.8500e-003**		**0.3957**	**0.3957**		**0.3838**	**0.3838**		**851.6738**	**851.6738**	**0.1504**		**854.8321**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0211	0.1468	0.2689	4.4000e-004	0.0132	3.6700e-003	0.0168	3.7300e-003	3.3700e-003	7.1100e-003		42.9286	42.9286	2.5000e-004		42.9338
Worker	0.0309	0.0397	0.4633	8.1000e-004	0.0657	4.3000e-004	0.0662	0.0174	3.9000e-004	0.0178		63.9126	63.9126	3.5000e-003		63.9861
Total	**0.0520**	**0.1866**	**0.7322**	**1.2500e-003**	**0.0789**	**4.1000e-003**	**0.0830**	**0.0212**	**3.7600e-003**	**0.0249**		**106.8412**	**106.8412**	**3.7500e-003**		**106.9199**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	0.7631	6.6985	5.2320	8.8500e-003		0.3957	0.3957		0.3838	0.3838	0.0000	851.6738	851.6738	0.1504		854.8321
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7631**	**6.6985**	**5.2320**	**8.8500e-003**		**0.3957**	**0.3957**		**0.3838**	**0.3838**	**0.0000**	**851.6738**	**851.6738**	**0.1504**		**854.8321**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0211	0.1468	0.2689	4.4000e-004	0.0132	3.6700e-003	0.0168	3.7300e-003	3.3700e-003	7.1100e-003		42.9286	42.9286	2.5000e-004		42.9338
Worker	0.0309	0.0397	0.4633	8.1000e-004	0.0657	4.3000e-004	0.0662	0.0174	3.9000e-004	0.0178		63.9126	63.9126	3.5000e-003		63.9861
Total	**0.0520**	**0.1866**	**0.7322**	**1.2500e-003**	**0.0789**	**4.1000e-003**	**0.0830**	**0.0212**	**3.7600e-003**	**0.0249**		**106.8412**	**106.8412**	**3.7500e-003**		**106.9199**

3.7 Hauling 1 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.7210	0.0000	6.7210	3.3930	0.0000	3.3930			0.0000			0.0000
Off-Road	2.7765	28.9217	19.5663	0.0213		1.6123	1.6123		1.4833	1.4833		2,184.1400	2,184.1400	0.6692		2,198.1935
Total	**2.7765**	**28.9217**	**19.5663**	**0.0213**	**6.7210**	**1.6123**	**8.3332**	**3.3930**	**1.4833**	**4.8763**		**2,184.1400**	**2,184.1400**	**0.6692**		**2,198.1935**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.2598	15.2132	30.9563	0.0544	1.3161	0.3991	1.7152	0.3612	0.3670	0.7282		5,374.4746	5,374.4746	0.0312		5,375.1305
Vendor	0.2113	1.4684	2.6888	4.3600e-003	0.1315	0.0367	0.1682	0.0373	0.0337	0.0711		429.2861	429.2861	2.4600e-003		429.3377
Worker	0.0386	0.0496	0.5792	1.0100e-003	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		79.8907	79.8907	4.3800e-003		79.9826
Total	**2.5097**	**16.7312**	**34.2243**	**0.0598**	**1.5298**	**0.4363**	**1.9660**	**0.4203**	**0.4012**	**0.8215**		**5,883.6514**	**5,883.6514**	**0.0381**		**5,884.4508**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6212	0.0000	2.6212	1.3233	0.0000	1.3233			0.0000			0.0000
Off-Road	2.7765	28.9217	19.5663	0.0213		1.6123	1.6123		1.4833	1.4833	0.0000	2,184.1400	2,184.1400	0.6692		2,198.1935
Total	**2.7765**	**28.9217**	**19.5663**	**0.0213**	**2.6212**	**1.6123**	**4.2334**	**1.3233**	**1.4833**	**2.8066**	**0.0000**	**2,184.1400**	**2,184.1400**	**0.6692**		**2,198.1935**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	2.2598	15.2132	30.9563	0.0544	1.3161	0.3991	1.7152	0.3612	0.3670	0.7282		5,374.4746	5,374.4746	0.0312		5,375.1305
Vendor	0.2113	1.4684	2.6888	4.3600e-003	0.1315	0.0367	0.1682	0.0373	0.0337	0.0711		429.2861	429.2861	2.4600e-003		429.3377
Worker	0.0386	0.0496	0.5792	1.0100e-003	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		79.8907	79.8907	4.3800e-003		79.9826
Total	**2.5097**	**16.7312**	**34.2243**	**0.0598**	**1.5298**	**0.4363**	**1.9660**	**0.4203**	**0.4012**	**0.8215**		**5,883.6514**	**5,883.6514**	**0.0381**		**5,884.4508**

3.8 Parkway Improvement/Misc - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9893	18.6722	11.8564	0.0168		1.1435	1.1435		1.0706	1.0706		1,691.3806	1,691.3806	0.4429		1,700.6810
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9893**	**18.6722**	**11.8564**	**0.0168**		**1.1435**	**1.1435**		**1.0706**	**1.0706**		**1,691.3806**	**1,691.3806**	**0.4429**		**1,700.6810**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0634	0.4405	0.8066	1.3100e-003	0.0395	0.0110	0.0505	0.0112	0.0101	0.0213		128.7858	128.7858	7.4000e-004		128.8013
Worker	0.0386	0.0496	0.5792	1.0100e-003	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		79.8907	79.8907	4.3800e-003		79.9826

Total	**0.1020**	**0.4902**	**1.3858**	**2.3200e-003**	**0.1216**	**0.0115**	**0.1331**	**0.0330**	**0.0106**	**0.0436**		**208.6765**	**208.6765**	**5.1200e-003**		**208.7839**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9893	18.6722	11.8564	0.0168		1.1435	1.1435		1.0706	1.0706	0.0000	1,691.3806	1,691.3806	0.4429		1,700.6810
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9893**	**18.6722**	**11.8564**	**0.0168**		**1.1435**	**1.1435**		**1.0706**	**1.0706**	**0.0000**	**1,691.3806**	**1,691.3806**	**0.4429**		**1,700.6810**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0634	0.4405	0.8066	1.3100e-003	0.0395	0.0110	0.0505	0.0112	0.0101	0.0213		128.7858	128.7858	7.4000e-004		128.8013
Worker	0.0386	0.0496	0.5792	1.0100e-003	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		79.8907	79.8907	4.3800e-003		79.9826
Total	**0.1020**	**0.4902**	**1.3858**	**2.3200e-003**	**0.1216**	**0.0115**	**0.1331**	**0.0330**	**0.0106**	**0.0436**		**208.6765**	**208.6765**	**5.1200e-003**		**208.7839**

3.9 Rock Slope Protection 1 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4005	0.0000	0.4005	0.0606	0.0000	0.0606			0.0000			0.0000
Off-Road	1.2776	11.5929	9.6465	0.0150		0.7412	0.7412		0.7071	0.7071		1,482.5613	1,482.5613	0.3171		1,489.2199
Total	**1.2776**	**11.5929**	**9.6465**	**0.0150**	**0.4005**	**0.7412**	**1.1417**	**0.0606**	**0.7071**	**0.7677**		**1,482.5613**	**1,482.5613**	**0.3171**		**1,489.2199**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.3670	36.1313	73.5212	0.1293	3.1257	0.9478	4.0735	0.8577	0.8717	1.7294		12,764.3773	12,764.3773	0.0742		12,765.9350
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0309	0.0397	0.4633	8.1000e-004	0.0657	4.3000e-004	0.0662	0.0174	3.9000e-004	0.0178		63.9126	63.9126	3.5000e-003		63.9861
Total	**5.3979**	**36.1710**	**73.9845**	**0.1301**	**3.1914**	**0.9482**	**4.1396**	**0.8752**	**0.8721**	**1.7472**		**12,828.2898**	**12,828.2898**	**0.0777**		**12,829.9211**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					0.1562	0.0000	0.1562	0.0237	0.0000	0.0237			0.0000			0.0000
Off-Road	1.2776	11.5929	9.6465	0.0150		0.7412	0.7412		0.7071	0.7071	0.0000	1,482.5613	1,482.5613	0.3171		1,489.2199
Total	**1.2776**	**11.5929**	**9.6465**	**0.0150**	**0.1562**	**0.7412**	**0.8974**	**0.0237**	**0.7071**	**0.7307**	**0.0000**	**1,482.5613**	**1,482.5613**	**0.3171**		**1,489.2199**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.3670	36.1313	73.5212	0.1293	3.1257	0.9478	4.0735	0.8577	0.8717	1.7294		12,764.3773	12,764.3773	0.0742		12,765.9350
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0309	0.0397	0.4633	8.1000e-004	0.0657	4.3000e-004	0.0662	0.0174	3.9000e-004	0.0178		63.9126	63.9126	3.5000e-003		63.9861
Total	**5.3979**	**36.1710**	**73.9845**	**0.1301**	**3.1914**	**0.9482**	**4.1396**	**0.8752**	**0.8721**	**1.7472**		**12,828.2898**	**12,828.2898**	**0.0777**		**12,829.9211**

3.10 Fill and Recompaction 2 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.7022	0.0000	6.7022	3.3902	0.0000	3.3902			0.0000			0.0000
Off-Road	2.7706	28.7793	19.1634	0.0208		1.5936	1.5936		1.4661	1.4661		2,134.0389	2,134.0389	0.6539		2,147.7701
Total	**2.7706**	**28.7793**	**19.1634**	**0.0208**	**6.7022**	**1.5936**	**8.2958**	**3.3902**	**1.4661**	**4.8562**		**2,134.0389**	**2,134.0389**	**0.6539**		**2,147.7701**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.0087	13.5228	27.5167	0.0484	1.1699	0.3547	1.5246	0.3210	0.3262	0.6473		4,777.3108	4,777.3108	0.0278		4,777.8938
Vendor	0.0845	0.5874	1.0755	1.7500e-003	0.0526	0.0147	0.0673	0.0149	0.0135	0.0284		171.7144	171.7144	9.8000e-004		171.7351
Worker	0.0386	0.0496	0.5792	1.0100e-003	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		79.8907	79.8907	4.3800e-003		79.9826
Total	**2.1318**	**14.1598**	**29.1714**	**0.0512**	**1.3046**	**0.3699**	**1.6745**	**0.3578**	**0.3402**	**0.6980**		**5,028.9159**	**5,028.9159**	**0.0331**		**5,029.6115**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6139	0.0000	2.6139	1.3222	0.0000	1.3222			0.0000			0.0000
Off-Road	2.7706	28.7793	19.1634	0.0208		1.5936	1.5936		1.4661	1.4661	0.0000	2,134.0389	2,134.0389	0.6539		2,147.7701
Total	**2.7706**	**28.7793**	**19.1634**	**0.0208**	**2.6139**	**1.5936**	**4.2074**	**1.3222**	**1.4661**	**2.7882**	**0.0000**	**2,134.0389**	**2,134.0389**	**0.6539**		**2,147.7701**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	2.0087	13.5228	27.5167	0.0484	1.1699	0.3547	1.5246	0.3210	0.3262	0.6473		4,777.3108	4,777.3108	0.0278		4,777.8938
Vendor	0.0845	0.5874	1.0755	1.7500e-003	0.0526	0.0147	0.0673	0.0149	0.0135	0.0284		171.7144	171.7144	9.8000e-004		171.7351
Worker	0.0386	0.0496	0.5792	1.0100e-003	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		79.8907	79.8907	4.3800e-003		79.9826
Total	**2.1318**	**14.1598**	**29.1714**	**0.0512**	**1.3046**	**0.3699**	**1.6745**	**0.3578**	**0.3402**	**0.6980**		**5,028.9159**	**5,028.9159**	**0.0331**		**5,029.6115**

3.11 Hauling 2 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1907	0.0000	6.1907	3.3358	0.0000	3.3358			0.0000			0.0000
Off-Road	2.7600	28.7420	19.4301	0.0212		1.6032	1.6032		1.4749	1.4749		2,170.8668	2,170.8668	0.6652		2,184.8350
Total	**2.7600**	**28.7420**	**19.4301**	**0.0212**	**6.1907**	**1.6032**	**7.7939**	**3.3358**	**1.4749**	**4.8107**		**2,170.8668**	**2,170.8668**	**0.6652**		**2,184.8350**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.2598	15.2132	30.9563	0.0544	1.4577	0.3991	1.8568	0.3959	0.3670	0.7629		5,374.4746	5,374.4746	0.0312		5,375.1305
Vendor	0.2113	1.4684	2.6888	4.3600e-003	0.1315	0.0367	0.1682	0.0373	0.0337	0.0711		429.2861	429.2861	2.4600e-003		429.3377
Worker	0.0309	0.0397	0.4633	8.1000e-004	0.0657	4.3000e-004	0.0662	0.0174	3.9000e-004	0.0178		63.9126	63.9126	3.5000e-003		63.9861

Total	**2.5020**	**16.7213**	**34.1084**	**0.0596**	**1.6550**	**0.4362**	**2.0912**	**0.4507**	**0.4011**	**0.8518**		**5,867.6733**	**5,867.6733**	**0.0372**		**5,868.4543**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.4144	0.0000	2.4144	1.3010	0.0000	1.3010			0.0000			0.0000
Off-Road	2.7600	28.7420	19.4301	0.0212		1.6032	1.6032		1.4749	1.4749	0.0000	2,170.8668	2,170.8668	0.6652		2,184.8350
Total	**2.7600**	**28.7420**	**19.4301**	**0.0212**	**2.4144**	**1.6032**	**4.0176**	**1.3010**	**1.4749**	**2.7759**	**0.0000**	**2,170.8668**	**2,170.8668**	**0.6652**		**2,184.8350**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.2598	15.2132	30.9563	0.0544	1.4577	0.3991	1.8568	0.3959	0.3670	0.7629		5,374.4746	5,374.4746	0.0312		5,375.1305
Vendor	0.2113	1.4684	2.6888	4.3600e-003	0.1315	0.0367	0.1682	0.0373	0.0337	0.0711		429.2861	429.2861	2.4600e-003		429.3377
Worker	0.0309	0.0397	0.4633	8.1000e-004	0.0657	4.3000e-004	0.0662	0.0174	3.9000e-004	0.0178		63.9126	63.9126	3.5000e-003		63.9861
Total	**2.5020**	**16.7213**	**34.1084**	**0.0596**	**1.6550**	**0.4362**	**2.0912**	**0.4507**	**0.4011**	**0.8518**		**5,867.6733**	**5,867.6733**	**0.0372**		**5,868.4543**

3.11 Hauling 2 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1907	0.0000	6.1907	3.3358	0.0000	3.3358			0.0000			0.0000
Off-Road	2.4255	25.1074	18.1792	0.0212		1.3720	1.3720		1.2622	1.2622		2,134.5188	2,134.5188	0.6645		2,148.4734
Total	**2.4255**	**25.1074**	**18.1792**	**0.0212**	**6.1907**	**1.3720**	**7.5627**	**3.3358**	**1.2622**	**4.5980**		**2,134.5188**	**2,134.5188**	**0.6645**		**2,148.4734**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.0941	13.6945	29.3531	0.0543	8.2572	0.3922	8.6493	2.0649	0.3607	2.4256		5,280.5295	5,280.5295	0.0310		5,281.1812
Vendor	0.1920	1.3207	2.4991	4.3500e-003	0.1315	0.0343	0.1658	0.0373	0.0315	0.0689		421.8565	421.8565	2.3900e-003		421.9067
Worker	0.0272	0.0359	0.4149	8.1000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.9000e-004	0.0178		61.4752	61.4752	3.2300e-003		61.5430
Total	**2.3133**	**15.0511**	**32.2671**	**0.0595**	**8.4544**	**0.4269**	**8.8813**	**2.1196**	**0.3926**	**2.5122**		**5,763.8613**	**5,763.8613**	**0.0367**		**5,764.6308**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					2.4144	0.0000	2.4144	1.3010	0.0000	1.3010			0.0000			0.0000
Off-Road	2.4255	25.1074	18.1792	0.0212		1.3720	1.3720		1.2622	1.2622	0.0000	2,134.5188	2,134.5188	0.6645		2,148.4734
Total	**2.4255**	**25.1074**	**18.1792**	**0.0212**	**2.4144**	**1.3720**	**3.7864**	**1.3010**	**1.2622**	**2.5632**	**0.0000**	**2,134.5188**	**2,134.5188**	**0.6645**		**2,148.4734**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.0941	13.6945	29.3531	0.0543	8.2572	0.3922	8.6493	2.0649	0.3607	2.4256		5,280.5295	5,280.5295	0.0310		5,281.1812
Vendor	0.1920	1.3207	2.4991	4.3500e-003	0.1315	0.0343	0.1658	0.0373	0.0315	0.0689		421.8565	421.8565	2.3900e-003		421.9067
Worker	0.0272	0.0359	0.4149	8.1000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.9000e-004	0.0178		61.4752	61.4752	3.2300e-003		61.5430
Total	**2.3133**	**15.0511**	**32.2671**	**0.0595**	**8.4544**	**0.4269**	**8.8813**	**2.1196**	**0.3926**	**2.5122**		**5,763.8613**	**5,763.8613**	**0.0367**		**5,764.6308**

3.12 Rock Slope Protection 2 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	3.0027	29.9907	23.1380	0.0301		1.6238	1.6238		1.5160	1.5160		2,991.9788	2,991.9788	0.7846		3,008.4560
Total	**3.0027**	**29.9907**	**23.1380**	**0.0301**	**6.5523**	**1.6238**	**8.1761**	**3.3675**	**1.5160**	**4.8835**		**2,991.9788**	**2,991.9788**	**0.7846**		**3,008.4560**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0272	0.0359	0.4149	8.1000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.9000e-004	0.0178		61.4752	61.4752	3.2300e-003		61.5430
Total	**0.0272**	**0.0359**	**0.4149**	**8.1000e-004**	**0.0657**	**4.2000e-004**	**0.0661**	**0.0174**	**3.9000e-004**	**0.0178**		**61.4752**	**61.4752**	**3.2300e-003**		**61.5430**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.5554	0.0000	2.5554	1.3133	0.0000	1.3133			0.0000			0.0000
Off-Road	3.0027	29.9907	23.1380	0.0301		1.6238	1.6238		1.5160	1.5160	0.0000	2,991.9788	2,991.9788	0.7846		3,008.4560
Total	**3.0027**	**29.9907**	**23.1380**	**0.0301**	**2.5554**	**1.6238**	**4.1792**	**1.3133**	**1.5160**	**2.8293**	**0.0000**	**2,991.9788**	**2,991.9788**	**0.7846**		**3,008.4560**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0272	0.0359	0.4149	8.1000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.9000e-004	0.0178		61.4752	61.4752	3.2300e-003		61.5430
Total	**0.0272**	**0.0359**	**0.4149**	**8.1000e-004**	**0.0657**	**4.2000e-004**	**0.0661**	**0.0174**	**3.9000e-004**	**0.0178**		**61.4752**	**61.4752**	**3.2300e-003**		**61.5430**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by

Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.446298	0.066796	0.175481	0.157351	0.043346	0.007350	0.008406	0.080779	0.001010	0.001390	0.007985	0.000539	0.003268

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.4175	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Unmitigated	2.4175	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Consumer Products	1.8644					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Architectural Coating	0.5532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.4175**	**0.0000**	**2.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**		**4.6000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Consumer Products	1.8644					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Architectural Coating	0.5532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.4175**	**0.0000**	**2.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**		**4.6000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Desert Knolls Wash Phase III Construction, Winter Emissions

Mojave Desert AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	30
Climate Zone	10			**Operational Year**	2018
Utility Company	Statewide Average				
CO2 Intensity (lb/MWhr)	1001.57	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See Section 1.0 Project Characteristics. Operational 2018, consistent with construction schedule provided by the applicant.

Land Use - Based on applicant-provided site plan

Construction Phase - See 3.0 Construction Detail. Based on applicant-provided construction schedule

Off-road Equipment - See Construction Detail 3.0. Based on applicant-provided construction equipment information. Service truck (1)

Off-road Equipment - See Construction 3.0 Detail. Based on applicant-provided equipment assumptions.

Off-road Equipment - See Construction Detail 3.0 Based on applicant-provided construction assumptions. Dump (3) and water trucks (1).

Off-road Equipment - See Construction 3.0 for Details. Based on applicant-supplied construction equipment information. Dump trucks (3) water trucks (1)

Off-road Equipment - See Construction 3.0 Detail. Based on applicant-provided equipment assumptions.

Off-road Equipment - See Construction 3.0 Detail. Based on applicant-provided equipment assumptions.

Off-road Equipment - See Construction Detail 3.0. Based on applicant supplied construction information. Service Truck (2) Water Truck (1)

Off-road Equipment - See Construction 3.0 for detail. Based on applicant-provided equipment information. water truck (1) and service truck (1)

Trips and VMT - Worker Trips rounded to even values, and water and service trucks were counted as vendor trucks. Due to the close proximity of nearby dump sites. Hauling distance was shorted to 10 miles.

Grading - See 3.0 Construction Detail. 72,000 CY of export (110,000 CY cut - 38,000 CY fill remaining onsite = 72,000 CY Shrink factor accounted for) X acres disturbed. Based on applicant-provided data.

Energy Use - None

Land Use Change - None

Sequestration - None

Construction Off-road Equipment Mitigation - None

Operational Off-Road Equipment - None

Off-road Equipment - None

Off-road Equipment - None

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	4.00	60.00
tblConstructionPhase	NumDays	4.00	15.00
tblConstructionPhase	NumDays	4.00	20.00
tblConstructionPhase	NumDays	4.00	20.00
tblConstructionPhase	NumDays	4.00	15.00
tblConstructionPhase	NumDays	10.00	5.00
tblConstructionPhase	NumDays	2.00	13.00
tblConstructionPhase	NumDays	4.00	40.00
tblConstructionPhase	NumDays	4.00	60.00
tblConstructionPhase	PhaseEndDate	11/1/2017	8/21/2017
tblConstructionPhase	PhaseEndDate	12/8/2017	11/10/2017
tblConstructionPhase	PhaseEndDate	9/14/2017	9/22/2017
tblConstructionPhase	PhaseEndDate	10/27/2017	10/20/2017
tblConstructionPhase	PhaseEndDate	9/4/2017	8/31/2017
tblConstructionPhase	PhaseEndDate	3/30/2018	3/23/2018
tblConstructionPhase	PhaseStartDate	10/12/2017	8/1/2017
tblConstructionPhase	PhaseStartDate	9/23/2017	9/25/2017
tblConstructionPhase	PhaseStartDate	10/21/2017	10/23/2017
tblConstructionPhase	PhaseStartDate	11/18/2017	10/23/2017

tblConstructionPhase	PhaseStartDate	9/1/2017	9/11/2017
tblConstructionPhase	PhaseStartDate	10/21/2017	10/16/2017
tblConstructionPhase	PhaseStartDate	8/22/2017	8/18/2017
tblConstructionPhase	PhaseStartDate	11/11/2017	11/13/2017
tblConstructionPhase	PhaseStartDate	1/6/2018	1/1/2018
tblGrading	AcresOfGrading	6.50	15.00
tblGrading	AcresOfGrading	20.00	0.00
tblGrading	MaterialExported	0.00	24,000.00
tblGrading	MaterialExported	0.00	48,000.00
tblGrading	MaterialImported	0.00	16,000.00
tblGrading	MaterialImported	0.00	57,000.00
tblGrading	MaterialImported	0.00	16,000.00
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	8.00	6.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	4.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblProjectCharacteristics	OperationalYear	2014	2018
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	8.00

tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	10.00	8.00
tblTripsAndVMT	WorkerTripNumber	13.00	8.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	12.6626	106.1705	157.8773	0.2251	22.5112	4.7408	27.1009	10.6883	4.3614	14.9983	0.0000	22,244.7393	22,244.7393	2.2832	0.0000	22,292.6860
2018	7.9691	70.8555	80.3504	0.1112	21.2632	3.4245	24.6877	8.8403	3.1725	12.0128	0.0000	10,910.1535	10,910.1535	1.4903	0.0000	10,941.4496
Total	**20.6316**	**177.0260**	**238.2278**	**0.3363**	**43.7744**	**8.1653**	**51.7885**	**19.5286**	**7.5339**	**27.0111**	**0.0000**	**33,154.8927**	**33,154.8927**	**3.7735**	**0.0000**	**33,234.1356**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2017	12.6626	106.1705	157.8773	0.2251	9.7707	4.7408	14.3603	4.4404	4.3614	8.7521	0.0000	22,244.7393	22,244.7393	2.2832	0.0000	22,292.6860
2018	7.9691	70.8555	80.3504	0.1112	13.4899	3.4245	16.9144	4.7513	3.1725	7.9239	0.0000	10,910.1534	10,910.1534	1.4903	0.0000	10,941.4496

Total	**20.6316**	**177.0260**	**238.2278**	**0.3363**	**23.2606**	**8.1653**	**31.2747**	**9.1917**	**7.5339**	**16.6760**	**0.0000**	**33,154.8927**	**33,154.8927**	**3.7735**	**0.0000**	**33,234.1356**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**46.86**	**0.00**	**39.61**	**52.93**	**0.00**	**38.26**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.4175	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**2.4175**	**0.0000**	**2.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**	**0.0000**	**4.6000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.4175	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

Total	**2.4175**	**0.0000**	**2.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**	**0.0000**	**4.6000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Mobilization, Clearning and Grubbing	Site Preparation	7/3/2017	7/19/2017	5	13	
2	Excavation	Grading	7/20/2017	10/11/2017	5	60	
3	Fill and Recompaction 1	Grading	8/1/2017	8/21/2017	5	15	
4	Sewer Relocation	Trenching	8/18/2017	8/31/2017	5	10	
5	Concrete Structure	Paving	9/11/2017	9/22/2017	5	10	
6	Hauling 1	Grading	9/25/2017	10/20/2017	5	20	
7	Parkway Improvement/Misc	Paving	10/16/2017	10/20/2017	5	5	
8	Rock Slope Protection 1	Grading	10/23/2017	11/17/2017	5	20	
9	Fill and Recompaction 2	Grading	10/23/2017	11/10/2017	5	15	
10	Hauling 2	Grading	11/13/2017	1/5/2018	5	40	
11	Rock Slope Protection 2	Grading	1/1/2018	3/23/2018	5	60	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor

Mobilization, Clearning and Grubbing	Concrete/Industrial Saws	1	8.00	81	0.73
Mobilization, Clearning and Grubbing	Crushing/Proc. Equipment	1	4.00	85	0.78
Mobilization, Clearning and Grubbing	Graders	1	8.00	174	0.41
Mobilization, Clearning and Grubbing	Rubber Tired Dozers	1	8.00	255	0.40
Mobilization, Clearning and Grubbing	Scrapers	0	8.00	361	0.48
Mobilization, Clearning and Grubbing	Tractors/Loaders/Backhoes	1	4.00	97	0.37
Excavation	Graders	0	8.00	174	0.41
Excavation	Rubber Tired Dozers	2	8.00	255	0.40
Excavation	Scrapers	2	8.00	361	0.48
Excavation	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Fill and Recompaction 1	Graders	1	8.00	174	0.41
Fill and Recompaction 1	Rollers	1	8.00	80	0.38
Fill and Recompaction 1	Rubber Tired Dozers	1	8.00	255	0.40
Fill and Recompaction 1	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Hauling 1	Graders	1	8.00	174	0.41
Hauling 1	Rubber Tired Dozers	1	8.00	255	0.40
Hauling 1	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Sewer Relocation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Rock Slope Protection 1	Excavators	1	8.00	162	0.38
Rock Slope Protection 1	Graders	0	8.00	174	0.41
Rock Slope Protection 1	Pumps	1	8.00	84	0.74
Rock Slope Protection 1	Rubber Tired Dozers	0	8.00	255	0.40
Rock Slope Protection 1	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Fill and Recompaction 2	Graders	1	8.00	174	0.41
Fill and Recompaction 2	Rollers	1	8.00	80	0.38
Fill and Recompaction 2	Rubber Tired Dozers	1	8.00	255	0.40
Fill and Recompaction 2	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Concrete Structure	Cement and Mortar Mixers	1	6.00	9	0.56
Concrete Structure	Pavers	1	6.00	125	0.42
Concrete Structure	Paving Equipment	0	8.00	130	0.36

Concrete Structure	Pumps	1	6.00	84	0.74
Concrete Structure	Rollers	0	8.00	80	0.38
Concrete Structure	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Parkway Improvement/Misc	Air Compressors	1	8.00	78	0.48
Parkway Improvement/Misc	Cement and Mortar Mixers	0	8.00	9	0.56
Parkway Improvement/Misc	Graders	1	8.00	174	0.41
Parkway Improvement/Misc	Pavers	0	8.00	125	0.42
Parkway Improvement/Misc	Paving Equipment	1	8.00	130	0.36
Parkway Improvement/Misc	Rollers	1	8.00	80	0.38
Parkway Improvement/Misc	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Hauling 2	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Hauling 2	Rubber Tired Dozers	1	8.00	255	0.40
Rock Slope Protection 2	Excavators	1	8.00	162	0.38
Rock Slope Protection 2	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Rock Slope Protection 2	Pumps	1	8.00	84	0.74
Hauling 2	Graders	1	8.00	174	0.41
Rock Slope Protection 2	Graders	1	8.00	174	0.41
Rock Slope Protection 2	Rubber Tired Dozers	1	8.00	255	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Mobilization, Clearning and Grubbing	5	13.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Excavation	4	10.00	2.00	0.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Fill and Recompaction 1	4	10.00	8.00	2,000.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Hauling 1	4	10.00	20.00	3,000.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Sewer Relocation	1	3.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Rock Slope Protection 1	3	8.00	0.00	7,125.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Fill and Recompaction 2	4	10.00	8.00	2,000.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Concrete Structure	3	8.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

Parkway Improvement/Misc	4	10.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Hauling 2	4	8.00	20.00	6,000.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Rock Slope Protection 2	5	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Mobilization, Clearning and Grubbing - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.2457	0.0000	7.2457	3.4424	0.0000	3.4424			0.0000			0.0000
Off-Road	3.2605	31.0984	21.9412	0.0264		1.7684	1.7684		1.6669	1.6669		2,631.6722	2,631.6722	0.6090		2,644.4612
Total	**3.2605**	**31.0984**	**21.9412**	**0.0264**	**7.2457**	**1.7684**	**9.0142**	**3.4424**	**1.6669**	**5.1093**		**2,631.6722**	**2,631.6722**	**0.6090**		**2,644.4612**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0230	0.1529	0.3223	4.3000e-004	0.0132	3.7000e-003	0.0169	3.7300e-003	3.4000e-003	7.1300e-003		42.5688	42.5688	2.6000e-004		42.5741

Worker	0.0409	0.0677	0.6136	1.1800e-003	0.1068	7.0000e-004	0.1075	0.0283	6.4000e-004	0.0290		93.3223	93.3223	5.6900e-003		93.4418
Total	**0.0639**	**0.2206**	**0.9359**	**1.6100e-003**	**0.1199**	**4.0000e-003**	**0.1243**	**0.0321**	**4.0400e-003**	**0.0361**		**135.8911**	**135.8911**	**5.9500e-003**		**136.0159**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.8258	0.0000	2.8258	1.3425	0.0000	1.3425			0.0000			0.0000
Off-Road	3.2605	31.0984	21.9412	0.0264		1.7684	1.7684		1.6669	1.6669	0.0000	2,631.6722	2,631.6722	0.6090		2,644.4612
Total	**3.2605**	**31.0984**	**21.9412**	**0.0264**	**2.8258**	**1.7684**	**4.5943**	**1.3425**	**1.6669**	**3.0094**	**0.0000**	**2,631.6722**	**2,631.6722**	**0.6090**		**2,644.4612**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0230	0.1529	0.3223	4.3000e-004	0.0132	3.7000e-003	0.0169	3.7300e-003	3.4000e-003	7.1300e-003		42.5688	42.5688	2.6000e-004		42.5741
Worker	0.0409	0.0677	0.6136	1.1800e-003	0.1068	7.0000e-004	0.1075	0.0283	6.4000e-004	0.0290		93.3223	93.3223	5.6900e-003		93.4418
Total	**0.0639**	**0.2206**	**0.9359**	**1.6100e-003**	**0.1199**	**4.0000e-003**	**0.1243**	**0.0321**	**4.0400e-003**	**0.0361**		**135.8911**	**135.8911**	**5.9500e-003**		**136.0159**

3.3 Excavation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					14.1652	0.0000	14.1652	6.8495	0.0000	6.8495			0.0000			0.0000
Off-Road	4.9789	59.0219	40.2777	0.0476		2.5354	2.5354		2.3325	2.3325		4,866.7229	4,866.7229	1.4912		4,898.0372
Total	**4.9789**	**59.0219**	**40.2777**	**0.0476**	**14.1652**	**2.5354**	**16.7005**	**6.8495**	**2.3325**	**9.1820**		**4,866.7229**	**4,866.7229**	**1.4912**		**4,898.0372**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0230	0.1529	0.3223	4.3000e-004	0.0132	3.7000e-003	0.0169	3.7300e-003	3.4000e-003	7.1300e-003		42.5688	42.5688	2.6000e-004		42.5741
Worker	0.0315	0.0521	0.4720	9.1000e-004	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		71.7864	71.7864	4.3800e-003		71.8783
Total	**0.0545**	**0.2050**	**0.7943**	**1.3400e-003**	**0.0953**	**4.2300e-003**	**0.0995**	**0.0255**	**3.8900e-003**	**0.0294**		**114.3551**	**114.3551**	**4.6400e-003**		**114.4524**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					5.5244	0.0000	5.5244	2.6713	0.0000	2.6713			0.0000			0.0000
Off-Road	4.9789	59.0219	40.2777	0.0476		2.5354	2.5354		2.3325	2.3325	0.0000	4,866.7229	4,866.7229	1.4912		4,898.0372
Total	**4.9789**	**59.0219**	**40.2777**	**0.0476**	**5.5244**	**2.5354**	**8.0598**	**2.6713**	**2.3325**	**5.0038**	**0.0000**	**4,866.7229**	**4,866.7229**	**1.4912**		**4,898.0372**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0230	0.1529	0.3223	4.3000e-004	0.0132	3.7000e-003	0.0169	3.7300e-003	3.4000e-003	7.1300e-003		42.5688	42.5688	2.6000e-004		42.5741
Worker	0.0315	0.0521	0.4720	9.1000e-004	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		71.7864	71.7864	4.3800e-003		71.8783
Total	**0.0545**	**0.2050**	**0.7943**	**1.3400e-003**	**0.0953**	**4.2300e-003**	**0.0995**	**0.0255**	**3.8900e-003**	**0.0294**		**114.3551**	**114.3551**	**4.6400e-003**		**114.4524**

3.4 Fill and Recompaction 1 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.7022	0.0000	6.7022	3.3902	0.0000	3.3902			0.0000			0.0000
Off-Road	2.7706	28.7793	19.1634	0.0208		1.5936	1.5936		1.4661	1.4661		2,134.0389	2,134.0389	0.6539		2,147.7701
Total	**2.7706**	**28.7793**	**19.1634**	**0.0208**	**6.7022**	**1.5936**	**8.2958**	**3.3902**	**1.4661**	**4.8562**		**2,134.0389**	**2,134.0389**	**0.6539**		**2,147.7701**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.1977	14.1353	32.8750	0.0482	1.1699	0.3558	1.5257	0.3210	0.3273	0.6483		4,754.1111	4,754.1111	0.0288		4,754.7155
Vendor	0.0921	0.6117	1.2893	1.7300e-003	0.0526	0.0148	0.0674	0.0149	0.0136	0.0285		170.2750	170.2750	1.0200e-003		170.2965
Worker	0.0315	0.0521	0.4720	9.1000e-004	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		71.7864	71.7864	4.3800e-003		71.8783
Total	**2.3213**	**14.7990**	**34.6363**	**0.0509**	**1.3046**	**0.3711**	**1.6758**	**0.3578**	**0.3413**	**0.6991**		**4,996.1725**	**4,996.1725**	**0.0342**		**4,996.8903**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6139	0.0000	2.6139	1.3222	0.0000	1.3222			0.0000			0.0000
Off-Road	2.7706	28.7793	19.1634	0.0208		1.5936	1.5936		1.4661	1.4661	0.0000	2,134.0389	2,134.0389	0.6539		2,147.7701
Total	**2.7706**	**28.7793**	**19.1634**	**0.0208**	**2.6139**	**1.5936**	**4.2074**	**1.3222**	**1.4661**	**2.7882**	**0.0000**	**2,134.0389**	**2,134.0389**	**0.6539**		**2,147.7701**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	2.1977	14.1353	32.8750	0.0482	1.1699	0.3558	1.5257	0.3210	0.3273	0.6483		4,754.1111	4,754.1111	0.0288		4,754.7155
Vendor	0.0921	0.6117	1.2893	1.7300e-003	0.0526	0.0148	0.0674	0.0149	0.0136	0.0285		170.2750	170.2750	1.0200e-003		170.2965
Worker	0.0315	0.0521	0.4720	9.1000e-004	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		71.7864	71.7864	4.3800e-003		71.8783
Total	**2.3213**	**14.7990**	**34.6363**	**0.0509**	**1.3046**	**0.3711**	**1.6758**	**0.3578**	**0.3413**	**0.6991**		**4,996.1725**	**4,996.1725**	**0.0342**		**4,996.8903**

3.5 Sewer Relocation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3168	3.0439	2.3938	3.1100e-003		0.2289	0.2289		0.2106	0.2106		318.2649	318.2649	0.0975		320.3128
Total	**0.3168**	**3.0439**	**2.3938**	**3.1100e-003**		**0.2289**	**0.2289**		**0.2106**	**0.2106**		**318.2649**	**318.2649**	**0.0975**		**320.3128**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0460	0.3058	0.6446	8.7000e-004	0.0263	7.3900e-003	0.0337	7.4700e-003	6.8000e-003	0.0143		85.1375	85.1375	5.1000e-004		85.1483
Worker	9.4400e-003	0.0156	0.1416	2.7000e-004	0.0246	1.6000e-004	0.0248	6.5400e-003	1.5000e-004	6.6800e-003		21.5359	21.5359	1.3100e-003		21.5635

Total	**0.0555**	**0.3215**	**0.7862**	**1.1400e-003**	**0.0510**	**7.5500e-003**	**0.0585**	**0.0140**	**6.9500e-003**	**0.0210**		**106.6734**	**106.6734**	**1.8200e-003**		**106.7117**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3168	3.0439	2.3938	3.1100e-003		0.2289	0.2289		0.2106	0.2106	0.0000	318.2649	318.2649	0.0975		320.3128
Total	**0.3168**	**3.0439**	**2.3938**	**3.1100e-003**		**0.2289**	**0.2289**		**0.2106**	**0.2106**	**0.0000**	**318.2649**	**318.2649**	**0.0975**		**320.3128**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0460	0.3058	0.6446	8.7000e-004	0.0263	7.3900e-003	0.0337	7.4700e-003	6.8000e-003	0.0143		85.1375	85.1375	5.1000e-004		85.1483
Worker	9.4400e-003	0.0156	0.1416	2.7000e-004	0.0246	1.6000e-004	0.0248	6.5400e-003	1.5000e-004	6.8800e-003		21.5359	21.5359	1.3100e-003		21.5635
Total	**0.0555**	**0.3215**	**0.7862**	**1.1400e-003**	**0.0510**	**7.5500e-003**	**0.0585**	**0.0140**	**6.9500e-003**	**0.0210**		**106.6734**	**106.6734**	**1.8200e-003**		**106.7117**

3.6 Concrete Structure - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7631	6.6985	5.2320	8.8500e-003		0.3957	0.3957		0.3838	0.3838		851.6738	851.6738	0.1504		854.8321
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7631**	**6.6985**	**5.2320**	**8.8500e-003**		**0.3957**	**0.3957**		**0.3838**	**0.3838**		**851.6738**	**851.6738**	**0.1504**		**854.8321**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0230	0.1529	0.3223	4.3000e-004	0.0132	3.7000e-003	0.0169	3.7300e-003	3.4000e-003	7.1300e-003		42.5688	42.5688	2.6000e-004		42.5741
Worker	0.0252	0.0417	0.3776	7.3000e-004	0.0657	4.3000e-004	0.0662	0.0174	3.9000e-004	0.0178		57.4291	57.4291	3.5000e-003		57.5026
Total	**0.0482**	**0.1946**	**0.6999**	**1.1600e-003**	**0.0789**	**4.1300e-003**	**0.0830**	**0.0212**	**3.7900e-003**	**0.0250**		**99.9979**	**99.9979**	**3.7600e-003**		**100.0768**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Off-Road	0.7631	6.6985	5.2320	8.8500e-003		0.3957	0.3957		0.3838	0.3838	0.0000	851.6738	851.6738	0.1504		854.8321
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.7631**	**6.6985**	**5.2320**	**8.8500e-003**		**0.3957**	**0.3957**		**0.3838**	**0.3838**	**0.0000**	**851.6738**	**851.6738**	**0.1504**		**854.8321**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0230	0.1529	0.3223	4.3000e-004	0.0132	3.7000e-003	0.0169	3.7300e-003	3.4000e-003	7.1300e-003		42.5688	42.5688	2.6000e-004		42.5741
Worker	0.0252	0.0417	0.3776	7.3000e-004	0.0657	4.3000e-004	0.0662	0.0174	3.9000e-004	0.0178		57.4291	57.4291	3.5000e-003		57.5026
Total	**0.0482**	**0.1946**	**0.6999**	**1.1600e-003**	**0.0789**	**4.1300e-003**	**0.0830**	**0.0212**	**3.7900e-003**	**0.0250**		**99.9979**	**99.9979**	**3.7600e-003**		**100.0768**

3.7 Hauling 1 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.7210	0.0000	6.7210	3.3930	0.0000	3.3930			0.0000			0.0000
Off-Road	2.7765	28.9217	19.5663	0.0213		1.6123	1.6123		1.4833	1.4833		2,184.1400	2,184.1400	0.6692		2,198.1935
Total	**2.7765**	**28.9217**	**19.5663**	**0.0213**	**6.7210**	**1.6123**	**8.3332**	**3.3930**	**1.4833**	**4.8763**		**2,184.1400**	**2,184.1400**	**0.6692**		**2,198.1935**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.4724	15.9022	36.9844	0.0543	1.3161	0.4003	1.7164	0.3612	0.3682	0.7293		5,348.3749	5,348.3749	0.0324		5,349.0549
Vendor	0.2302	1.5292	3.2232	4.3400e-003	0.1315	0.0370	0.1685	0.0373	0.0340	0.0713		425.6876	425.6876	2.5600e-003		425.7412
Worker	0.0315	0.0521	0.4720	9.1000e-004	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		71.7864	71.7864	4.3800e-003		71.8783
Total	**2.7341**	**17.4835**	**40.6796**	**0.0595**	**1.5298**	**0.4378**	**1.9676**	**0.4203**	**0.4026**	**0.8229**		**5,845.8489**	**5,845.8489**	**0.0393**		**5,846.6745**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6212	0.0000	2.6212	1.3233	0.0000	1.3233			0.0000			0.0000
Off-Road	2.7765	28.9217	19.5663	0.0213		1.6123	1.6123		1.4833	1.4833	0.0000	2,184.1400	2,184.1400	0.6692		2,198.1935
Total	**2.7765**	**28.9217**	**19.5663**	**0.0213**	**2.6212**	**1.6123**	**4.2334**	**1.3233**	**1.4833**	**2.8066**	**0.0000**	**2,184.1400**	**2,184.1400**	**0.6692**		**2,198.1935**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	2.4724	15.9022	36.9844	0.0543	1.3161	0.4003	1.7164	0.3612	0.3682	0.7293		5,348.3749	5,348.3749	0.0324		5,349.0549
Vendor	0.2302	1.5292	3.2232	4.3400e-003	0.1315	0.0370	0.1685	0.0373	0.0340	0.0713		425.6876	425.6876	2.5600e-003		425.7412
Worker	0.0315	0.0521	0.4720	9.1000e-004	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		71.7864	71.7864	4.3800e-003		71.8783
Total	**2.7341**	**17.4835**	**40.6796**	**0.0595**	**1.5298**	**0.4378**	**1.9676**	**0.4203**	**0.4026**	**0.8229**		**5,845.8489**	**5,845.8489**	**0.0393**		**5,846.6745**

3.8 Parkway Improvement/Misc - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9893	18.6722	11.8564	0.0168		1.1435	1.1435		1.0706	1.0706		1,691.3806	1,691.3806	0.4429		1,700.6810
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9893**	**18.6722**	**11.8564**	**0.0168**		**1.1435**	**1.1435**		**1.0706**	**1.0706**		**1,691.3806**	**1,691.3806**	**0.4429**		**1,700.6810**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0691	0.4588	0.9670	1.3000e-003	0.0395	0.0111	0.0506	0.0112	0.0102	0.0214		127.7063	127.7063	7.7000e-004		127.7224
Worker	0.0315	0.0521	0.4720	9.1000e-004	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		71.7864	71.7864	4.3800e-003		71.8783

Total	**0.1005**	**0.5108**	**1.4389**	**2.2100e-003**	**0.1216**	**0.0116**	**0.1332**	**0.0330**	**0.0107**	**0.0437**		**199.4926**	**199.4926**	**5.1500e-003**		**199.6007**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9893	18.6722	11.8564	0.0168		1.1435	1.1435		1.0706	1.0706	0.0000	1,691.3806	1,691.3806	0.4429		1,700.6810
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.9893**	**18.6722**	**11.8564**	**0.0168**		**1.1435**	**1.1435**		**1.0706**	**1.0706**	**0.0000**	**1,691.3806**	**1,691.3806**	**0.4429**		**1,700.6810**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0691	0.4588	0.9670	1.3000e-003	0.0395	0.0111	0.0506	0.0112	0.0102	0.0214		127.7063	127.7063	7.7000e-004		127.7224
Worker	0.0315	0.0521	0.4720	9.1000e-004	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		71.7864	71.7864	4.3800e-003		71.8783
Total	**0.1005**	**0.5108**	**1.4389**	**2.2100e-003**	**0.1216**	**0.0116**	**0.1332**	**0.0330**	**0.0107**	**0.0437**		**199.4926**	**199.4926**	**5.1500e-003**		**199.6007**

3.9 Rock Slope Protection 1 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4005	0.0000	0.4005	0.0606	0.0000	0.0606			0.0000			0.0000
Off-Road	1.2776	11.5929	9.6465	0.0150		0.7412	0.7412		0.7071	0.7071		1,482.5613	1,482.5613	0.3171		1,489.2199
Total	**1.2776**	**11.5929**	**9.6465**	**0.0150**	**0.4005**	**0.7412**	**1.1417**	**0.0606**	**0.7071**	**0.7677**		**1,482.5613**	**1,482.5613**	**0.3171**		**1,489.2199**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.8721	37.7677	87.8380	0.1289	3.1257	0.9507	4.0764	0.8577	0.8744	1.7321		12,702.3905	12,702.3905	0.0769		12,704.0054
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0252	0.0417	0.3776	7.3000e-004	0.0657	4.3000e-004	0.0662	0.0174	3.9000e-004	0.0178		57.4291	57.4291	3.5000e-003		57.5026
Total	**5.8972**	**37.8094**	**88.2156**	**0.1296**	**3.1914**	**0.9512**	**4.1426**	**0.8752**	**0.8748**	**1.7499**		**12,759.8196**	**12,759.8196**	**0.0804**		**12,761.5081**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					0.1562	0.0000	0.1562	0.0237	0.0000	0.0237			0.0000			0.0000
Off-Road	1.2776	11.5929	9.6465	0.0150		0.7412	0.7412		0.7071	0.7071	0.0000	1,482.5613	1,482.5613	0.3171		1,489.2199
Total	**1.2776**	**11.5929**	**9.6465**	**0.0150**	**0.1562**	**0.7412**	**0.8974**	**0.0237**	**0.7071**	**0.7307**	**0.0000**	**1,482.5613**	**1,482.5613**	**0.3171**		**1,489.2199**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.8721	37.7677	87.8380	0.1289	3.1257	0.9507	4.0764	0.8577	0.8744	1.7321		12,702.3905	12,702.3905	0.0769		12,704.0054
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0252	0.0417	0.3776	7.3000e-004	0.0657	4.3000e-004	0.0662	0.0174	3.9000e-004	0.0178		57.4291	57.4291	3.5000e-003		57.5026
Total	**5.8972**	**37.8094**	**88.2156**	**0.1296**	**3.1914**	**0.9512**	**4.1426**	**0.8752**	**0.8748**	**1.7499**		**12,759.8196**	**12,759.8196**	**0.0804**		**12,761.5081**

3.10 Fill and Recompaction 2 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.7022	0.0000	6.7022	3.3902	0.0000	3.3902			0.0000			0.0000
Off-Road	2.7706	28.7793	19.1634	0.0208		1.5936	1.5936		1.4661	1.4661		2,134.0389	2,134.0389	0.6539		2,147.7701
Total	**2.7706**	**28.7793**	**19.1634**	**0.0208**	**6.7022**	**1.5936**	**8.2958**	**3.3902**	**1.4661**	**4.8562**		**2,134.0389**	**2,134.0389**	**0.6539**		**2,147.7701**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.1977	14.1353	32.8750	0.0482	1.1699	0.3558	1.5257	0.3210	0.3273	0.6483		4,754.1111	4,754.1111	0.0288		4,754.7155
Vendor	0.0921	0.6117	1.2893	1.7300e-003	0.0526	0.0148	0.0674	0.0149	0.0136	0.0285		170.2750	170.2750	1.0200e-003		170.2965
Worker	0.0315	0.0521	0.4720	9.1000e-004	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		71.7864	71.7864	4.3800e-003		71.8783
Total	**2.3213**	**14.7990**	**34.6363**	**0.0509**	**1.3046**	**0.3711**	**1.6758**	**0.3578**	**0.3413**	**0.6991**		**4,996.1725**	**4,996.1725**	**0.0342**		**4,996.8903**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.6139	0.0000	2.6139	1.3222	0.0000	1.3222			0.0000			0.0000
Off-Road	2.7706	28.7793	19.1634	0.0208		1.5936	1.5936		1.4661	1.4661	0.0000	2,134.0389	2,134.0389	0.6539		2,147.7701
Total	**2.7706**	**28.7793**	**19.1634**	**0.0208**	**2.6139**	**1.5936**	**4.2074**	**1.3222**	**1.4661**	**2.7882**	**0.0000**	**2,134.0389**	**2,134.0389**	**0.6539**		**2,147.7701**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day											lb/day				
Hauling	2.1977	14.1353	32.8750	0.0482	1.1699	0.3558	1.5257	0.3210	0.3273	0.6483		4,754.1111	4,754.1111	0.0288		4,754.7155
Vendor	0.0921	0.6117	1.2893	1.7300e-003	0.0526	0.0148	0.0674	0.0149	0.0136	0.0285		170.2750	170.2750	1.0200e-003		170.2965
Worker	0.0315	0.0521	0.4720	9.1000e-004	0.0822	5.3000e-004	0.0827	0.0218	4.9000e-004	0.0223		71.7864	71.7864	4.3800e-003		71.8783
Total	**2.3213**	**14.7990**	**34.6363**	**0.0509**	**1.3046**	**0.3711**	**1.6758**	**0.3578**	**0.3413**	**0.6991**		**4,996.1725**	**4,996.1725**	**0.0342**		**4,996.8903**

3.11 Hauling 2 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1907	0.0000	6.1907	3.3358	0.0000	3.3358			0.0000			0.0000
Off-Road	2.7600	28.7420	19.4301	0.0212		1.6032	1.6032		1.4749	1.4749		2,170.8668	2,170.8668	0.6652		2,184.8350
Total	**2.7600**	**28.7420**	**19.4301**	**0.0212**	**6.1907**	**1.6032**	**7.7939**	**3.3358**	**1.4749**	**4.8107**		**2,170.8668**	**2,170.8668**	**0.6652**		**2,184.8350**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.4724	15.9022	36.9844	0.0543	1.4577	0.4003	1.8580	0.3959	0.3682	0.7641		5,348.3749	5,348.3749	0.0324		5,349.0549
Vendor	0.2302	1.5292	3.2232	4.3400e-003	0.1315	0.0370	0.1685	0.0373	0.0340	0.0713		425.6876	425.6876	2.5600e-003		425.7412
Worker	0.0252	0.0417	0.3776	7.3000e-004	0.0657	4.3000e-004	0.0662	0.0174	3.9000e-004	0.0178		57.4291	57.4291	3.5000e-003		57.5026

Total	**2.7278**	**17.4731**	**40.5852**	**0.0593**	**1.6550**	**0.4377**	**2.0927**	**0.4507**	**0.4025**	**0.8532**		**5,831.4916**	**5,831.4916**	**0.0384**		**5,832.2988**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.4144	0.0000	2.4144	1.3010	0.0000	1.3010			0.0000			0.0000
Off-Road	2.7600	28.7420	19.4301	0.0212		1.6032	1.6032		1.4749	1.4749	0.0000	2,170.8668	2,170.8668	0.6652		2,184.8350
Total	**2.7600**	**28.7420**	**19.4301**	**0.0212**	**2.4144**	**1.6032**	**4.0176**	**1.3010**	**1.4749**	**2.7759**	**0.0000**	**2,170.8668**	**2,170.8668**	**0.6652**		**2,184.8350**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.4724	15.9022	36.9844	0.0543	1.4577	0.4003	1.8580	0.3959	0.3682	0.7641		5,348.3749	5,348.3749	0.0324		5,349.0549
Vendor	0.2302	1.5292	3.2232	4.3400e-003	0.1315	0.0370	0.1685	0.0373	0.0340	0.0713		425.6876	425.6876	2.5600e-003		425.7412
Worker	0.0252	0.0417	0.3776	7.3000e-004	0.0657	4.3000e-004	0.0662	0.0174	3.9000e-004	0.0178		57.4291	57.4291	3.5000e-003		57.5026
Total	**2.7278**	**17.4731**	**40.5852**	**0.0593**	**1.6550**	**0.4377**	**2.0927**	**0.4507**	**0.4025**	**0.8532**		**5,831.4916**	**5,831.4916**	**0.0384**		**5,832.2988**

3.11 Hauling 2 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1907	0.0000	6.1907	3.3358	0.0000	3.3358			0.0000			0.0000
Off-Road	2.4255	25.1074	18.1792	0.0212		1.3720	1.3720		1.2622	1.2622		2,134.5188	2,134.5188	0.6645		2,148.4734
Total	**2.4255**	**25.1074**	**18.1792**	**0.0212**	**6.1907**	**1.3720**	**7.5627**	**3.3358**	**1.2622**	**4.5980**		**2,134.5188**	**2,134.5188**	**0.6645**		**2,148.4734**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.2879	14.3086	35.3321	0.0541	8.2572	0.3934	8.6505	2.0649	0.3618	2.4267		5,254.8546	5,254.8546	0.0322		5,255.5312
Vendor	0.2090	1.3738	3.0268	4.3300e-003	0.1315	0.0345	0.1661	0.0373	0.0318	0.0691		418.3101	418.3101	2.4900e-003		418.3624
Worker	0.0220	0.0375	0.3372	7.3000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.9000e-004	0.0178		55.2456	55.2456	3.2300e-003		55.3133
Total	**2.5189**	**15.7199**	**38.6961**	**0.0592**	**8.4544**	**0.4283**	**8.8828**	**2.1196**	**0.3940**	**2.5136**		**5,728.4103**	**5,728.4103**	**0.0379**		**5,729.2070**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Fugitive Dust					2.4144	0.0000	2.4144	1.3010	0.0000	1.3010			0.0000			0.0000
Off-Road	2.4255	25.1074	18.1792	0.0212		1.3720	1.3720		1.2622	1.2622	0.0000	2,134.5188	2,134.5188	0.6645		2,148.4734
Total	**2.4255**	**25.1074**	**18.1792**	**0.0212**	**2.4144**	**1.3720**	**3.7864**	**1.3010**	**1.2622**	**2.5632**	**0.0000**	**2,134.5188**	**2,134.5188**	**0.6645**		**2,148.4734**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.2879	14.3086	35.3321	0.0541	8.2572	0.3934	8.6505	2.0649	0.3618	2.4267		5,254.8546	5,254.8546	0.0322		5,255.5312
Vendor	0.2090	1.3738	3.0268	4.3300e-003	0.1315	0.0345	0.1661	0.0373	0.0318	0.0691		418.3101	418.3101	2.4900e-003		418.3624
Worker	0.0220	0.0375	0.3372	7.3000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.9000e-004	0.0178		55.2456	55.2456	3.2300e-003		55.3133
Total	**2.5189**	**15.7199**	**38.6961**	**0.0592**	**8.4544**	**0.4283**	**8.8828**	**2.1196**	**0.3940**	**2.5136**		**5,728.4103**	**5,728.4103**	**0.0379**		**5,729.2070**

3.12 Rock Slope Protection 2 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5523	0.0000	6.5523	3.3675	0.0000	3.3675			0.0000			0.0000
Off-Road	3.0027	29.9907	23.1380	0.0301		1.6238	1.6238		1.5160	1.5160		2,991.9788	2,991.9788	0.7846		3,008.4560
Total	**3.0027**	**29.9907**	**23.1380**	**0.0301**	**6.5523**	**1.6238**	**8.1761**	**3.3675**	**1.5160**	**4.8835**		**2,991.9788**	**2,991.9788**	**0.7846**		**3,008.4560**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0220	0.0375	0.3372	7.3000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.9000e-004	0.0178		55.2456	55.2456	3.2300e-003		55.3133
Total	**0.0220**	**0.0375**	**0.3372**	**7.3000e-004**	**0.0657**	**4.2000e-004**	**0.0661**	**0.0174**	**3.9000e-004**	**0.0178**		**55.2456**	**55.2456**	**3.2300e-003**		**55.3133**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.5554	0.0000	2.5554	1.3133	0.0000	1.3133			0.0000			0.0000
Off-Road	3.0027	29.9907	23.1380	0.0301		1.6238	1.6238		1.5160	1.5160	0.0000	2,991.9788	2,991.9788	0.7846		3,008.4560
Total	**3.0027**	**29.9907**	**23.1380**	**0.0301**	**2.5554**	**1.6238**	**4.1792**	**1.3133**	**1.5160**	**2.8293**	**0.0000**	**2,991.9788**	**2,991.9788**	**0.7846**		**3,008.4560**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0220	0.0375	0.3372	7.3000e-004	0.0657	4.2000e-004	0.0661	0.0174	3.9000e-004	0.0178		55.2456	55.2456	3.2300e-003		55.3133
Total	**0.0220**	**0.0375**	**0.3372**	**7.3000e-004**	**0.0657**	**4.2000e-004**	**0.0661**	**0.0174**	**3.9000e-004**	**0.0178**		**55.2456**	**55.2456**	**3.2300e-003**		**55.3133**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by

Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.446298	0.066796	0.175481	0.157351	0.043346	0.007350	0.008406	0.080779	0.001010	0.001390	0.007985	0.000539	0.003268

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.4175	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Unmitigated	2.4175	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Consumer Products	1.8644					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Architectural Coating	0.5532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.4175**	**0.0000**	**2.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**		**4.6000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Consumer Products	1.8644					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Architectural Coating	0.5532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.4175**	**0.0000**	**2.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**		**4.6000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Desert Knolls Wash Phase III Annual Construction Emissions

Mojave Desert AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	30
Climate Zone	10			**Operational Year**	2018
Utility Company	Statewide Average				
CO2 Intensity (lb/MWhr)	1001.57	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See Section 1.0 Project Characteristics. Operational 2018, consistent with construction schedule provided by the applicant.

Land Use - Based on applicant-provided site plan.

Construction Phase - See 3.0 Construction Detail. Based on applicant-provided construction schedule

Off-road Equipment - See Construction Detail 3.0. Based on applicant-provided construction equipment information. Service truck (1)

Off-road Equipment - See Construction 3.0 Detail. Based on applicant-provided equipment assumptions.

Off-road Equipment - See Construction Detail 3.0 Based on applicant-provided construction assumptions. Dump (3) and water trucks (1).

Off-road Equipment - See Construction 3.0 for Details. Based on applicant-supplied construction equipment information. Dump trucks (3) water trucks (1)

Off-road Equipment - See Construction 3.0 Detail. Based on applicant-provided equipment assumptions.

Off-road Equipment - See Construction 3.0 Detail. Based on applicant-provided equipment assumptions.

Off-road Equipment - See Construction Detail 3.0. Based on applicant supplied construction information. Service Truck (2) Water Truck (1)

Off-road Equipment - See Construction 3.0 for detail. Based on applicant-provided equipment information. water truck (1) and service truck (1)

Trips and VMT - Worker Trips rounded to even values, and water and service trucks were counted as vendor trucks. Due to the close proximity of nearby dump sites. Hauling distance was shorted to 10 miles.

Grading - See 3.0 Construction Detail. 72,000 CY of export (110,000 CY cut - 38,000 CY fill remaining onsite = 72,000 CY Shrink factor accounted for) X acres disturbed. Based on applicant-provided data.

Energy Use - None

Land Use Change - None

Sequestration - None

Construction Off-road Equipment Mitigation - None

Operational Off-Road Equipment - None

Off-road Equipment - None

Off-road Equipment - None

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	4.00	60.00
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tblConstructionPhase	NumDays	4.00	20.00
tblConstructionPhase	NumDays	4.00	20.00
tblConstructionPhase	NumDays	4.00	15.00
tblConstructionPhase	NumDays	10.00	5.00
tblConstructionPhase	NumDays	2.00	13.00
tblConstructionPhase	NumDays	4.00	40.00
tblConstructionPhase	NumDays	4.00	60.00
tblConstructionPhase	PhaseEndDate	11/1/2017	8/21/2017
tblConstructionPhase	PhaseEndDate	12/8/2017	11/10/2017
tblConstructionPhase	PhaseEndDate	9/14/2017	9/22/2017
tblConstructionPhase	PhaseEndDate	10/27/2017	10/20/2017
tblConstructionPhase	PhaseEndDate	9/4/2017	8/31/2017
tblConstructionPhase	PhaseEndDate	3/30/2018	3/23/2018
tblConstructionPhase	PhaseStartDate	10/12/2017	8/1/2017
tblConstructionPhase	PhaseStartDate	9/23/2017	9/25/2017

tblConstructionPhase	PhaseStartDate	10/21/2017	10/23/2017
tblConstructionPhase	PhaseStartDate	11/18/2017	10/23/2017
tblConstructionPhase	PhaseStartDate	9/1/2017	9/11/2017
tblConstructionPhase	PhaseStartDate	10/21/2017	10/16/2017
tblConstructionPhase	PhaseStartDate	8/22/2017	8/18/2017
tblConstructionPhase	PhaseStartDate	11/11/2017	11/13/2017
tblConstructionPhase	PhaseStartDate	1/6/2018	1/1/2018
tblGrading	AcresOfGrading	6.50	15.00
tblGrading	AcresOfGrading	20.00	0.00
tblGrading	MaterialExported	0.00	24,000.00
tblGrading	MaterialExported	0.00	48,000.00
tblGrading	MaterialImported	0.00	16,000.00
tblGrading	MaterialImported	0.00	57,000.00
tblGrading	MaterialImported	0.00	16,000.00
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.37	0.37
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Pumps
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
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tblOffRoadEquipment	UsageHours	8.00	6.00
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tblOffRoadEquipment	UsageHours	7.00	4.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblProjectCharacteristics	OperationalYear	2014	2018
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00

tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	8.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	6.00
tblTripsAndVMT	VendorTripNumber	0.00	20.00
tblTripsAndVMT	WorkerTripNumber	10.00	8.00
tblTripsAndVMT	WorkerTripNumber	13.00	8.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.4823	4.5078	4.9079	6.5200e-003	0.8664	0.1963	1.0627	0.4070	0.1813	0.5883	0.0000	589.7397	589.7397	0.0770	0.0000	591.3572
2018	0.1031	1.0032	0.8471	1.1300e-003	0.3430	0.0532	0.3963	0.1735	0.0496	0.2231	0.0000	100.8680	100.8680	0.0230	0.0000	101.3517
Total	**0.5853**	**5.5110**	**5.7550**	**7.6500e-003**	**1.2094**	**0.2496**	**1.4590**	**0.5805**	**0.2309**	**0.8114**	**0.0000**	**690.6077**	**690.6077**	**0.1001**	**0.0000**	**692.7090**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2017	0.4823	4.5078	4.9079	6.5200e-003	0.3981	0.1963	0.5945	0.1752	0.1813	0.3565	0.0000	589.7394	589.7394	0.0770	0.0000	591.3569

2018	0.1031	1.0032	0.8471	1.1300e-003	0.1476	0.0532	0.2008	0.0711	0.0496	0.1208	0.0000	100.8679	100.8679	0.0230	0.0000	101.3516
Total	**0.5853**	**5.5110**	**5.7550**	**7.6500e-003**	**0.5457**	**0.2496**	**0.7953**	**0.2464**	**0.2309**	**0.4773**	**0.0000**	**690.6073**	**690.6073**	**0.1001**	**0.0000**	**692.7086**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**54.88**	**0.00**	**45.49**	**57.56**	**0.00**	**41.18**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.4412	0.0000	2.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	0.0000	4.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.4412**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0000**	**4.0000e-005**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Area	0.4412	0.0000	2.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	0.0000	4.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.4412**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0000**	**4.0000e-005**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Mobilization, Clearning and Grubbing	Site Preparation	7/3/2017	7/19/2017	5	13	
2	Excavation	Grading	7/20/2017	10/11/2017	5	60	
3	Fill and Recompaction 1	Grading	8/1/2017	8/21/2017	5	15	
4	Sewer Relocation	Trenching	8/18/2017	8/31/2017	5	10	
5	Concrete Structure	Paving	9/11/2017	9/22/2017	5	10	
6	Hauling 1	Grading	9/25/2017	10/20/2017	5	20	
7	Parkway Improvement/Misc	Paving	10/16/2017	10/20/2017	5	5	
8	Rock Slope Protection 1	Grading	10/23/2017	11/17/2017	5	20	
9	Fill and Recompaction 2	Grading	10/23/2017	11/10/2017	5	15	
10	Hauling 2	Grading	11/13/2017	1/5/2018	5	40	
11	Rock Slope Protection 2	Grading	1/1/2018	3/23/2018	5	60	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Mobilization, Clearning and Grubbing	Concrete/Industrial Saws	1	8.00	81	0.73
Mobilization, Clearning and Grubbing	Crushing/Proc. Equipment	1	4.00	85	0.78
Mobilization, Clearning and Grubbing	Graders	1	8.00	174	0.41
Mobilization, Clearning and Grubbing	Rubber Tired Dozers	1	8.00	255	0.40
Mobilization, Clearning and Grubbing	Scrapers	0	8.00	361	0.48
Mobilization, Clearning and Grubbing	Tractors/Loaders/Backhoes	1	4.00	97	0.37
Excavation	Graders	0	8.00	174	0.41
Excavation	Rubber Tired Dozers	2	8.00	255	0.40
Excavation	Scrapers	2	8.00	361	0.48
Excavation	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Fill and Recompaction 1	Graders	1	8.00	174	0.41
Fill and Recompaction 1	Rollers	1	8.00	80	0.38
Fill and Recompaction 1	Rubber Tired Dozers	1	8.00	255	0.40
Fill and Recompaction 1	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Hauling 1	Graders	1	8.00	174	0.41
Hauling 1	Rubber Tired Dozers	1	8.00	255	0.40
Hauling 1	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Sewer Relocation	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Rock Slope Protection 1	Excavators	1	8.00	162	0.38
Rock Slope Protection 1	Graders	0	8.00	174	0.41
Rock Slope Protection 1	Pumps	1	8.00	84	0.74
Rock Slope Protection 1	Rubber Tired Dozers	0	8.00	255	0.40
Rock Slope Protection 1	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Fill and Recompaction 2	Graders	1	8.00	174	0.41

Fill and Recompaction 2	Rollers	1	8.00	80	0.38
Fill and Recompaction 2	Rubber Tired Dozers	1	8.00	255	0.40
Fill and Recompaction 2	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Concrete Structure	Cement and Mortar Mixers	1	6.00	9	0.56
Concrete Structure	Pavers	1	6.00	125	0.42
Concrete Structure	Paving Equipment	0	8.00	130	0.36
Concrete Structure	Pumps	1	6.00	84	0.74
Concrete Structure	Rollers	0	8.00	80	0.38
Concrete Structure	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Parkway Improvement/Misc	Air Compressors	1	8.00	78	0.48
Parkway Improvement/Misc	Cement and Mortar Mixers	0	8.00	9	0.56
Parkway Improvement/Misc	Graders	1	8.00	174	0.41
Parkway Improvement/Misc	Pavers	0	8.00	125	0.42
Parkway Improvement/Misc	Paving Equipment	1	8.00	130	0.36
Parkway Improvement/Misc	Rollers	1	8.00	80	0.38
Parkway Improvement/Misc	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Hauling 2	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Hauling 2	Rubber Tired Dozers	1	8.00	255	0.40
Rock Slope Protection 2	Excavators	1	8.00	162	0.38
Rock Slope Protection 2	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Rock Slope Protection 2	Pumps	1	8.00	84	0.74
Hauling 2	Graders	1	8.00	174	0.41
Rock Slope Protection 2	Graders	1	8.00	174	0.41
Rock Slope Protection 2	Rubber Tired Dozers	1	8.00	255	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Mobilization, Clearning and Grubbing	5	13.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Excavation	4	10.00	2.00	0.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT

Fill and Recompaction 1	4	10.00	8.00	2,000.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Hauling 1	4	10.00	20.00	3,000.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Sewer Relocation	1	3.00	4.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Rock Slope Protection 1	3	8.00	0.00	7,125.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Fill and Recompaction 2	4	10.00	8.00	2,000.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Concrete Structure	3	8.00	2.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Parkway Improvement/Misc	4	10.00	6.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Hauling 2	4	8.00	20.00	6,000.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT
Rock Slope Protection 2	5	8.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Mobilization, Clearning and Grubbing - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0471	0.0000	0.0471	0.0224	0.0000	0.0224	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0212	0.2021	0.1426	1.7000e-004		0.0115	0.0115		0.0108	0.0108	0.0000	15.5182	15.5182	3.5900e-003	0.0000	15.5936
Total	**0.0212**	**0.2021**	**0.1426**	**1.7000e-004**	**0.0471**	**0.0115**	**0.0586**	**0.0224**	**0.0108**	**0.0332**	**0.0000**	**15.5182**	**15.5182**	**3.5900e-003**	**0.0000**	**15.5936**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.5000e-004	1.0000e-003	2.0800e-003	0.0000	8.0000e-005	2.0000e-005	1.1000e-004	2.0000e-005	2.0000e-005	5.0000e-005	0.0000	0.2523	0.2523	0.0000	0.0000	0.2523
Worker	2.7000e-004	4.6000e-004	4.2900e-003	1.0000e-005	6.8000e-004	0.0000	6.9000e-004	1.8000e-004	0.0000	1.9000e-004	0.0000	0.5722	0.5722	3.0000e-005	0.0000	0.5729
Total	**4.2000e-004**	**1.4600e-003**	**6.3700e-003**	**1.0000e-005**	**7.6000e-004**	**2.0000e-005**	**8.0000e-004**	**2.0000e-004**	**2.0000e-005**	**2.4000e-004**	**0.0000**	**0.8244**	**0.8244**	**3.0000e-005**	**0.0000**	**0.8252**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0184	0.0000	0.0184	8.7300e-003	0.0000	8.7300e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0212	0.2021	0.1426	1.7000e-004		0.0115	0.0115		0.0108	0.0108	0.0000	15.5182	15.5182	3.5900e-003	0.0000	15.5936
Total	**0.0212**	**0.2021**	**0.1426**	**1.7000e-004**	**0.0184**	**0.0115**	**0.0299**	**8.7300e-003**	**0.0108**	**0.0196**	**0.0000**	**15.5182**	**15.5182**	**3.5900e-003**	**0.0000**	**15.5936**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Vendor	1.5000e-004	1.0000e-003	2.0800e-003	0.0000	8.0000e-005	2.0000e-005	1.1000e-004	2.0000e-005	2.0000e-005	5.0000e-005	0.0000	0.2523	0.2523	0.0000	0.0000	0.2523
Worker	2.7000e-004	4.6000e-004	4.2900e-003	1.0000e-005	6.8000e-004	0.0000	6.9000e-004	1.8000e-004	0.0000	1.9000e-004	0.0000	0.5722	0.5722	3.0000e-005	0.0000	0.5729
Total	**4.2000e-004**	**1.4600e-003**	**6.3700e-003**	**1.0000e-005**	**7.6000e-004**	**2.0000e-005**	**8.0000e-004**	**2.0000e-004**	**2.0000e-005**	**2.4000e-004**	**0.0000**	**0.8244**	**0.8244**	**3.0000e-005**	**0.0000**	**0.8252**

3.3 Excavation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4250	0.0000	0.4250	0.2055	0.0000	0.2055	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1494	1.7707	1.2083	1.4300e-003		0.0761	0.0761		0.0700	0.0700	0.0000	132.4505	132.4505	0.0406	0.0000	133.3027
Total	**0.1494**	**1.7707**	**1.2083**	**1.4300e-003**	**0.4250**	**0.0761**	**0.5010**	**0.2055**	**0.0700**	**0.2755**	**0.0000**	**132.4505**	**132.4505**	**0.0406**	**0.0000**	**133.3027**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.8000e-004	4.6200e-003	9.5800e-003	1.0000e-005	3.9000e-004	1.1000e-004	5.0000e-004	1.1000e-004	1.0000e-004	2.1000e-004	0.0000	1.1642	1.1642	1.0000e-005	0.0000	1.1644
Worker	9.7000e-004	1.6300e-003	0.0152	3.0000e-005	2.4200e-003	2.0000e-005	2.4400e-003	6.4000e-004	1.0000e-005	6.6000e-004	0.0000	2.0315	2.0315	1.2000e-004	0.0000	2.0340
Total	**1.6500e-003**	**6.2500e-003**	**0.0248**	**4.0000e-005**	**2.8100e-003**	**1.3000e-004**	**2.9400e-003**	**7.5000e-004**	**1.1000e-004**	**8.7000e-004**	**0.0000**	**3.1957**	**3.1957**	**1.3000e-004**	**0.0000**	**3.1983**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1657	0.0000	0.1657	0.0801	0.0000	0.0801	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1494	1.7707	1.2083	1.4300e-003		0.0761	0.0761		0.0700	0.0700	0.0000	132.4504	132.4504	0.0406	0.0000	133.3026
Total	**0.1494**	**1.7707**	**1.2083**	**1.4300e-003**	**0.1657**	**0.0761**	**0.2418**	**0.0801**	**0.0700**	**0.1501**	**0.0000**	**132.4504**	**132.4504**	**0.0406**	**0.0000**	**133.3026**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.8000e-004	4.6200e-003	9.5800e-003	1.0000e-005	3.9000e-004	1.1000e-004	5.0000e-004	1.1000e-004	1.0000e-004	2.1000e-004	0.0000	1.1642	1.1642	1.0000e-005	0.0000	1.1644
Worker	9.7000e-004	1.6300e-003	0.0152	3.0000e-005	2.4200e-003	2.0000e-005	2.4400e-003	6.4000e-004	1.0000e-005	6.6000e-004	0.0000	2.0315	2.0315	1.2000e-004	0.0000	2.0340
Total	**1.6500e-003**	**6.2500e-003**	**0.0248**	**4.0000e-005**	**2.8100e-003**	**1.3000e-004**	**2.9400e-003**	**7.5000e-004**	**1.1000e-004**	**8.7000e-004**	**0.0000**	**3.1957**	**3.1957**	**1.3000e-004**	**0.0000**	**3.1983**

3.4 Fill and Recompaction 1 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Category	tons/yr										MT/yr					
Fugitive Dust					0.0503	0.0000	0.0503	0.0254	0.0000	0.0254	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0208	0.2158	0.1437	1.6000e-004		0.0120	0.0120		0.0110	0.0110	0.0000	14.5198	14.5198	4.4500e-003	0.0000	14.6132
Total	**0.0208**	**0.2158**	**0.1437**	**1.6000e-004**	**0.0503**	**0.0120**	**0.0622**	**0.0254**	**0.0110**	**0.0364**	**0.0000**	**14.5198**	**14.5198**	**4.4500e-003**	**0.0000**	**14.6132**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0164	0.1067	0.2474	3.6000e-004	8.6400e-003	2.6600e-003	0.0113	2.3700e-003	2.4500e-003	4.8200e-003	0.0000	32.4380	32.4380	1.9000e-004	0.0000	32.4420
Vendor	6.8000e-004	4.6200e-003	9.5800e-003	1.0000e-005	3.9000e-004	1.1000e-004	5.0000e-004	1.1000e-004	1.0000e-004	2.1000e-004	0.0000	1.1642	1.1642	1.0000e-005	0.0000	1.1644
Worker	2.4000e-004	4.1000e-004	3.8100e-003	1.0000e-005	6.1000e-004	0.0000	6.1000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5079	0.5079	3.0000e-005	0.0000	0.5085
Total	**0.0173**	**0.1118**	**0.2608**	**3.8000e-004**	**9.6400e-003**	**2.7700e-003**	**0.0124**	**2.6400e-003**	**2.5500e-003**	**5.1900e-003**	**0.0000**	**34.1101**	**34.1101**	**2.3000e-004**	**0.0000**	**34.1149**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0196	0.0000	0.0196	9.9200e-003	0.0000	9.9200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0208	0.2158	0.1437	1.6000e-004		0.0120	0.0120		0.0110	0.0110	0.0000	14.5197	14.5197	4.4500e-003	0.0000	14.6132

Total	**0.0208**	**0.2158**	**0.1437**	**1.6000e-004**	**0.0196**	**0.0120**	**0.0316**	**9.9200e-003**	**0.0110**	**0.0209**	**0.0000**	**14.5197**	**14.5197**	**4.4500e-003**	**0.0000**	**14.6132**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0164	0.1067	0.2474	3.6000e-004	8.6400e-003	2.6600e-003	0.0113	2.3700e-003	2.4500e-003	4.8200e-003	0.0000	32.4380	32.4380	1.9000e-004	0.0000	32.4420
Vendor	6.8000e-004	4.6200e-003	9.5800e-003	1.0000e-005	3.9000e-004	1.1000e-004	5.0000e-004	1.1000e-004	1.0000e-004	2.1000e-004	0.0000	1.1642	1.1642	1.0000e-005	0.0000	1.1644
Worker	2.4000e-004	4.1000e-004	3.8100e-003	1.0000e-005	6.1000e-004	0.0000	6.1000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5079	0.5079	3.0000e-005	0.0000	0.5085
Total	**0.0173**	**0.1118**	**0.2608**	**3.8000e-004**	**9.6400e-003**	**2.7700e-003**	**0.0124**	**2.6400e-003**	**2.5500e-003**	**5.1900e-003**	**0.0000**	**34.1101**	**34.1101**	**2.3000e-004**	**0.0000**	**34.1149**

3.5 Sewer Relocation - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.5800e-003	0.0152	0.0120	2.0000e-005		1.1400e-003	1.1400e-003		1.0500e-003	1.0500e-003	0.0000	1.4436	1.4436	4.4000e-004	0.0000	1.4529
Total	**1.5800e-003**	**0.0152**	**0.0120**	**2.0000e-005**		**1.1400e-003**	**1.1400e-003**		**1.0500e-003**	**1.0500e-003**	**0.0000**	**1.4436**	**1.4436**	**4.4000e-004**	**0.0000**	**1.4529**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.3000e-004	1.5400e-003	3.1900e-003	0.0000	1.3000e-004	4.0000e-005	1.7000e-004	4.0000e-005	3.0000e-005	7.0000e-005	0.0000	0.3881	0.3881	0.0000	0.0000	0.3881
Worker	5.0000e-005	8.0000e-005	7.6000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1016	0.1016	1.0000e-005	0.0000	0.1017
Total	**2.8000e-004**	**1.6200e-003**	**3.9500e-003**	**0.0000**	**2.5000e-004**	**4.0000e-005**	**2.9000e-004**	**7.0000e-005**	**3.0000e-005**	**1.0000e-004**	**0.0000**	**0.4896**	**0.4896**	**1.0000e-005**	**0.0000**	**0.4898**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.5800e-003	0.0152	0.0120	2.0000e-005		1.1400e-003	1.1400e-003		1.0500e-003	1.0500e-003	0.0000	1.4436	1.4436	4.4000e-004	0.0000	1.4529
Total	**1.5800e-003**	**0.0152**	**0.0120**	**2.0000e-005**		**1.1400e-003**	**1.1400e-003**		**1.0500e-003**	**1.0500e-003**	**0.0000**	**1.4436**	**1.4436**	**4.4000e-004**	**0.0000**	**1.4529**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.3000e-004	1.5400e-003	3.1900e-003	0.0000	1.3000e-004	4.0000e-005	1.7000e-004	4.0000e-005	3.0000e-005	7.0000e-005	0.0000	0.3881	0.3881	0.0000	0.0000	0.3881
Worker	5.0000e-005	8.0000e-005	7.6000e-004	0.0000	1.2000e-004	0.0000	1.2000e-004	3.0000e-005	0.0000	3.0000e-005	0.0000	0.1016	0.1016	1.0000e-005	0.0000	0.1017
Total	**2.8000e-004**	**1.6200e-003**	**3.9500e-003**	**0.0000**	**2.5000e-004**	**4.0000e-005**	**2.9000e-004**	**7.0000e-005**	**3.0000e-005**	**1.0000e-004**	**0.0000**	**0.4896**	**0.4896**	**1.0000e-005**	**0.0000**	**0.4898**

3.6 Concrete Structure - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.8200e-003	0.0335	0.0262	4.0000e-005		1.9800e-003	1.9800e-003		1.9200e-003	1.9200e-003	0.0000	3.8631	3.8631	6.8000e-004	0.0000	3.8775
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.8200e-003**	**0.0335**	**0.0262**	**4.0000e-005**		**1.9800e-003**	**1.9800e-003**		**1.9200e-003**	**1.9200e-003**	**0.0000**	**3.8631**	**3.8631**	**6.8000e-004**	**0.0000**	**3.8775**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1000e-004	7.7000e-004	1.6000e-003	0.0000	6.0000e-005	2.0000e-005	8.0000e-005	2.0000e-005	2.0000e-005	4.0000e-005	0.0000	0.1940	0.1940	0.0000	0.0000	0.1941
Worker	1.3000e-004	2.2000e-004	2.0300e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2709	0.2709	2.0000e-005	0.0000	0.2712
Total	**2.4000e-004**	**9.9000e-004**	**3.6300e-003**	**0.0000**	**3.8000e-004**	**2.0000e-005**	**4.0000e-004**	**1.1000e-004**	**2.0000e-005**	**1.3000e-004**	**0.0000**	**0.4649**	**0.4649**	**2.0000e-005**	**0.0000**	**0.4653**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.8200e-003	0.0335	0.0262	4.0000e-005		1.9800e-003	1.9800e-003		1.9200e-003	1.9200e-003	0.0000	3.8631	3.8631	6.8000e-004	0.0000	3.8775
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**3.8200e-003**	**0.0335**	**0.0262**	**4.0000e-005**		**1.9800e-003**	**1.9800e-003**		**1.9200e-003**	**1.9200e-003**	**0.0000**	**3.8631**	**3.8631**	**6.8000e-004**	**0.0000**	**3.8775**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.1000e-004	7.7000e-004	1.6000e-003	0.0000	6.0000e-005	2.0000e-005	8.0000e-005	2.0000e-005	2.0000e-005	4.0000e-005	0.0000	0.1940	0.1940	0.0000	0.0000	0.1941
Worker	1.3000e-004	2.2000e-004	2.0300e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	9.0000e-005	0.0000	9.0000e-005	0.0000	0.2709	0.2709	2.0000e-005	0.0000	0.2712
Total	**2.4000e-004**	**9.9000e-004**	**3.6300e-003**	**0.0000**	**3.8000e-004**	**2.0000e-005**	**4.0000e-004**	**1.1000e-004**	**2.0000e-005**	**1.3000e-004**	**0.0000**	**0.4649**	**0.4649**	**2.0000e-005**	**0.0000**	**0.4653**

3.7 Hauling 1 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0672	0.0000	0.0672	0.0339	0.0000	0.0339	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0278	0.2892	0.1957	2.1000e-004		0.0161	0.0161		0.0148	0.0148	0.0000	19.8142	19.8142	6.0700e-003	0.0000	19.9417
Total	**0.0278**	**0.2892**	**0.1957**	**2.1000e-004**	**0.0672**	**0.0161**	**0.0833**	**0.0339**	**0.0148**	**0.0488**	**0.0000**	**19.8142**	**19.8142**	**6.0700e-003**	**0.0000**	**19.9417**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0246	0.1601	0.3711	5.4000e-004	0.0130	4.0000e-003	0.0170	3.5600e-003	3.6700e-003	7.2400e-003	0.0000	48.6570	48.6570	2.9000e-004	0.0000	48.6630
Vendor	2.2700e-003	0.0154	0.0319	4.0000e-005	1.3000e-003	3.7000e-004	1.6600e-003	3.7000e-004	3.4000e-004	7.1000e-004	0.0000	3.8807	3.8807	2.0000e-005	0.0000	3.8812
Worker	3.2000e-004	5.4000e-004	5.0700e-003	1.0000e-005	8.1000e-004	1.0000e-005	8.1000e-004	2.1000e-004	0.0000	2.2000e-004	0.0000	0.6772	0.6772	4.0000e-005	0.0000	0.6780
Total	**0.0272**	**0.1760**	**0.4080**	**5.9000e-004**	**0.0151**	**4.3800e-003**	**0.0194**	**4.1400e-003**	**4.0100e-003**	**8.1700e-003**	**0.0000**	**53.2148**	**53.2148**	**3.5000e-004**	**0.0000**	**53.2222**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0262	0.0000	0.0262	0.0132	0.0000	0.0132	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.0278	0.2892	0.1957	2.1000e-004		0.0161	0.0161		0.0148	0.0148	0.0000	19.8142	19.8142	6.0700e-003	0.0000	19.9417
Total	**0.0278**	**0.2892**	**0.1957**	**2.1000e-004**	**0.0262**	**0.0161**	**0.0423**	**0.0132**	**0.0148**	**0.0281**	**0.0000**	**19.8142**	**19.8142**	**6.0700e-003**	**0.0000**	**19.9417**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0246	0.1601	0.3711	5.4000e-004	0.0130	4.0000e-003	0.0170	3.5600e-003	3.6700e-003	7.2400e-003	0.0000	48.6570	48.6570	2.9000e-004	0.0000	48.6630
Vendor	2.2700e-003	0.0154	0.0319	4.0000e-005	1.3000e-003	3.7000e-004	1.6600e-003	3.7000e-004	3.4000e-004	7.1000e-004	0.0000	3.8807	3.8807	2.0000e-005	0.0000	3.8812
Worker	3.2000e-004	5.4000e-004	5.0700e-003	1.0000e-005	8.1000e-004	1.0000e-005	8.1000e-004	2.1000e-004	0.0000	2.2000e-004	0.0000	0.6772	0.6772	4.0000e-005	0.0000	0.6780
Total	**0.0272**	**0.1760**	**0.4080**	**5.9000e-004**	**0.0151**	**4.3800e-003**	**0.0194**	**4.1400e-003**	**4.0100e-003**	**8.1700e-003**	**0.0000**	**53.2148**	**53.2148**	**3.5000e-004**	**0.0000**	**53.2222**

3.8 Parkway Improvement/Misc - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.9700e-003	0.0467	0.0296	4.0000e-005		2.8600e-003	2.8600e-003		2.6800e-003	2.6800e-003	0.0000	3.8360	3.8360	1.0000e-003	0.0000	3.8571
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.9700e-003**	**0.0467**	**0.0296**	**4.0000e-005**		**2.8600e-003**	**2.8600e-003**		**2.6800e-003**	**2.6800e-003**	**0.0000**	**3.8360**	**3.8360**	**1.0000e-003**	**0.0000**	**3.8571**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.7000e-004	1.1600e-003	2.3900e-003	0.0000	1.0000e-004	3.0000e-005	1.2000e-004	3.0000e-005	3.0000e-005	5.0000e-005	0.0000	0.2911	0.2911	0.0000	0.0000	0.2911
Worker	8.0000e-005	1.4000e-004	1.2700e-003	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1693	0.1693	1.0000e-005	0.0000	0.1695
Total	**2.5000e-004**	**1.3000e-003**	**3.6600e-003**	**0.0000**	**3.0000e-004**	**3.0000e-005**	**3.2000e-004**	**8.0000e-005**	**3.0000e-005**	**1.0000e-004**	**0.0000**	**0.4603**	**0.4603**	**1.0000e-005**	**0.0000**	**0.4606**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.9700e-003	0.0467	0.0296	4.0000e-005		2.8600e-003	2.8600e-003		2.6800e-003	2.6800e-003	0.0000	3.8360	3.8360	1.0000e-003	0.0000	3.8571
Paving	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**4.9700e-003**	**0.0467**	**0.0296**	**4.0000e-005**		**2.8600e-003**	**2.8600e-003**		**2.6800e-003**	**2.6800e-003**	**0.0000**	**3.8360**	**3.8360**	**1.0000e-003**	**0.0000**	**3.8571**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	1.7000e-004	1.1600e-003	2.3900e-003	0.0000	1.0000e-004	3.0000e-005	1.2000e-004	3.0000e-005	3.0000e-005	5.0000e-005	0.0000	0.2911	0.2911	0.0000	0.0000	0.2911
Worker	8.0000e-005	1.4000e-004	1.2700e-003	0.0000	2.0000e-004	0.0000	2.0000e-004	5.0000e-005	0.0000	5.0000e-005	0.0000	0.1693	0.1693	1.0000e-005	0.0000	0.1695
Total	**2.5000e-004**	**1.3000e-003**	**3.6600e-003**	**0.0000**	**3.0000e-004**	**3.0000e-005**	**3.2000e-004**	**8.0000e-005**	**3.0000e-005**	**1.0000e-004**	**0.0000**	**0.4603**	**0.4603**	**1.0000e-005**	**0.0000**	**0.4606**

3.9 Rock Slope Protection 1 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.0000e-003	0.0000	4.0000e-003	6.1000e-004	0.0000	6.1000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0128	0.1159	0.0965	1.5000e-004		7.4100e-003	7.4100e-003		7.0700e-003	7.0700e-003	0.0000	13.4496	13.4496	2.8800e-003	0.0000	13.5100
Total	**0.0128**	**0.1159**	**0.0965**	**1.5000e-004**	**4.0000e-003**	**7.4100e-003**	**0.0114**	**6.1000e-004**	**7.0700e-003**	**7.6800e-003**	**0.0000**	**13.4496**	**13.4496**	**2.8800e-003**	**0.0000**	**13.5100**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0585	0.3803	0.8812	1.2900e-003	0.0308	9.4900e-003	0.0403	8.4600e-003	8.7300e-003	0.0172	0.0000	115.5603	115.5603	6.8000e-004	0.0000	115.5747
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6000e-004	4.3000e-004	4.0600e-003	1.0000e-005	6.5000e-004	0.0000	6.5000e-004	1.7000e-004	0.0000	1.8000e-004	0.0000	0.5417	0.5417	3.0000e-005	0.0000	0.5424
Total	**0.0587**	**0.3807**	**0.8853**	**1.3000e-003**	**0.0314**	**9.4900e-003**	**0.0409**	**8.6300e-003**	**8.7300e-003**	**0.0174**	**0.0000**	**116.1020**	**116.1020**	**7.1000e-004**	**0.0000**	**116.1170**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.5600e-003	0.0000	1.5600e-003	2.4000e-004	0.0000	2.4000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0128	0.1159	0.0965	1.5000e-004		7.4100e-003	7.4100e-003		7.0700e-003	7.0700e-003	0.0000	13.4496	13.4496	2.8800e-003	0.0000	13.5100
Total	**0.0128**	**0.1159**	**0.0965**	**1.5000e-004**	**1.5600e-003**	**7.4100e-003**	**8.9700e-003**	**2.4000e-004**	**7.0700e-003**	**7.3100e-003**	**0.0000**	**13.4496**	**13.4496**	**2.8800e-003**	**0.0000**	**13.5100**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0585	0.3803	0.8812	1.2900e-003	0.0308	9.4900e-003	0.0403	8.4600e-003	8.7300e-003	0.0172	0.0000	115.5603	115.5603	6.8000e-004	0.0000	115.5747
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.6000e-004	4.3000e-004	4.0600e-003	1.0000e-005	6.5000e-004	0.0000	6.5000e-004	1.7000e-004	0.0000	1.8000e-004	0.0000	0.5417	0.5417	3.0000e-005	0.0000	0.5424
Total	**0.0587**	**0.3807**	**0.8853**	**1.3000e-003**	**0.0314**	**9.4900e-003**	**0.0409**	**8.6300e-003**	**8.7300e-003**	**0.0174**	**0.0000**	**116.1020**	**116.1020**	**7.1000e-004**	**0.0000**	**116.1170**

3.10 Fill and Recompaction 2 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0503	0.0000	0.0503	0.0254	0.0000	0.0254	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0208	0.2158	0.1437	1.6000e-004		0.0120	0.0120		0.0110	0.0110	0.0000	14.5198	14.5198	4.4500e-003	0.0000	14.6132
Total	**0.0208**	**0.2158**	**0.1437**	**1.6000e-004**	**0.0503**	**0.0120**	**0.0622**	**0.0254**	**0.0110**	**0.0364**	**0.0000**	**14.5198**	**14.5198**	**4.4500e-003**	**0.0000**	**14.6132**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0164	0.1067	0.2474	3.6000e-004	8.6400e-003	2.6600e-003	0.0113	2.3700e-003	2.4500e-003	4.8200e-003	0.0000	32.4380	32.4380	1.9000e-004	0.0000	32.4420
Vendor	6.8000e-004	4.6200e-003	9.5800e-003	1.0000e-005	3.9000e-004	1.1000e-004	5.0000e-004	1.1000e-004	1.0000e-004	2.1000e-004	0.0000	1.1642	1.1642	1.0000e-005	0.0000	1.1644
Worker	2.4000e-004	4.1000e-004	3.8100e-003	1.0000e-005	6.1000e-004	0.0000	6.1000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5079	0.5079	3.0000e-005	0.0000	0.5085
Total	**0.0173**	**0.1118**	**0.2608**	**3.8000e-004**	**9.6400e-003**	**2.7700e-003**	**0.0124**	**2.6400e-003**	**2.5500e-003**	**5.1900e-003**	**0.0000**	**34.1101**	**34.1101**	**2.3000e-004**	**0.0000**	**34.1149**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0196	0.0000	0.0196	9.9200e-003	0.0000	9.9200e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.0208	0.2158	0.1437	1.6000e-004		0.0120	0.0120		0.0110	0.0110	0.0000	14.5197	14.5197	4.4500e-003	0.0000	14.6132
Total	**0.0208**	**0.2158**	**0.1437**	**1.6000e-004**	**0.0196**	**0.0120**	**0.0316**	**9.9200e-003**	**0.0110**	**0.0209**	**0.0000**	**14.5197**	**14.5197**	**4.4500e-003**	**0.0000**	**14.6132**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0164	0.1067	0.2474	3.6000e-004	8.6400e-003	2.6600e-003	0.0113	2.3700e-003	2.4500e-003	4.8200e-003	0.0000	32.4380	32.4380	1.9000e-004	0.0000	32.4420
Vendor	6.8000e-004	4.6200e-003	9.5800e-003	1.0000e-005	3.9000e-004	1.1000e-004	5.0000e-004	1.1000e-004	1.0000e-004	2.1000e-004	0.0000	1.1642	1.1642	1.0000e-005	0.0000	1.1644
Worker	2.4000e-004	4.1000e-004	3.8100e-003	1.0000e-005	6.1000e-004	0.0000	6.1000e-004	1.6000e-004	0.0000	1.6000e-004	0.0000	0.5079	0.5079	3.0000e-005	0.0000	0.5085
Total	**0.0173**	**0.1118**	**0.2608**	**3.8000e-004**	**9.6400e-003**	**2.7700e-003**	**0.0124**	**2.6400e-003**	**2.5500e-003**	**5.1900e-003**	**0.0000**	**34.1101**	**34.1101**	**2.3000e-004**	**0.0000**	**34.1149**

3.11 Hauling 2 - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1238	0.0000	0.1238	0.0667	0.0000	0.0667	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0483	0.5030	0.3400	3.7000e-004		0.0281	0.0281		0.0258	0.0258	0.0000	34.4641	34.4641	0.0106	0.0000	34.6859
Total	**0.0483**	**0.5030**	**0.3400**	**3.7000e-004**	**0.1238**	**0.0281**	**0.1519**	**0.0667**	**0.0258**	**0.0925**	**0.0000**	**34.4641**	**34.4641**	**0.0106**	**0.0000**	**34.6859**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0431	0.2802	0.6493	9.5000e-004	0.0251	6.9900e-003	0.0321	6.8300e-003	6.4300e-003	0.0133	0.0000	85.1497	85.1497	5.0000e-004	0.0000	85.1603
Vendor	3.9800e-003	0.0270	0.0559	8.0000e-005	2.2700e-003	6.4000e-004	2.9100e-003	6.4000e-004	5.9000e-004	1.2400e-003	0.0000	6.7912	6.7912	4.0000e-005	0.0000	6.7921
Worker	4.5000e-004	7.6000e-004	7.1000e-003	1.0000e-005	1.1300e-003	1.0000e-005	1.1400e-003	3.0000e-004	1.0000e-005	3.1000e-004	0.0000	0.9480	0.9480	6.0000e-005	0.0000	0.9492
Total	**0.0475**	**0.3079**	**0.7123**	**1.0400e-003**	**0.0285**	**7.6400e-003**	**0.0362**	**7.7700e-003**	**7.0300e-003**	**0.0148**	**0.0000**	**92.8890**	**92.8890**	**6.0000e-004**	**0.0000**	**92.9015**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0483	0.0000	0.0483	0.0260	0.0000	0.0260	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0483	0.5030	0.3400	3.7000e-004		0.0281	0.0281		0.0258	0.0258	0.0000	34.4641	34.4641	0.0106	0.0000	34.6858
Total	**0.0483**	**0.5030**	**0.3400**	**3.7000e-004**	**0.0483**	**0.0281**	**0.0764**	**0.0260**	**0.0258**	**0.0518**	**0.0000**	**34.4641**	**34.4641**	**0.0106**	**0.0000**	**34.6858**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					

Hauling	0.0431	0.2802	0.6493	9.5000e-004	0.0251	6.9900e-003	0.0321	6.8300e-003	6.4300e-003	0.0133	0.0000	85.1497	85.1497	5.0000e-004	0.0000	85.1603
Vendor	3.9800e-003	0.0270	0.0559	8.0000e-005	2.2700e-003	6.4000e-004	2.9100e-003	6.4000e-004	5.9000e-004	1.2400e-003	0.0000	6.7912	6.7912	4.0000e-005	0.0000	6.7921
Worker	4.5000e-004	7.6000e-004	7.1000e-003	1.0000e-005	1.1300e-003	1.0000e-005	1.1400e-003	3.0000e-004	1.0000e-005	3.1000e-004	0.0000	0.9480	0.9480	6.0000e-005	0.0000	0.9492
Total	**0.0475**	**0.3079**	**0.7123**	**1.0400e-003**	**0.0285**	**7.6400e-003**	**0.0362**	**7.7700e-003**	**7.0300e-003**	**0.0148**	**0.0000**	**92.8890**	**92.8890**	**6.0000e-004**	**0.0000**	**92.9015**

3.11 Hauling 2 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1238	0.0000	0.1238	0.0667	0.0000	0.0667	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.0600e-003	0.0628	0.0455	5.0000e-005		3.4300e-003	3.4300e-003		3.1600e-003	3.1600e-003	0.0000	4.8410	4.8410	1.5100e-003	0.0000	4.8727
Total	**6.0600e-003**	**0.0628**	**0.0455**	**5.0000e-005**	**0.1238**	**3.4300e-003**	**0.1272**	**0.0667**	**3.1600e-003**	**0.0699**	**0.0000**	**4.8410**	**4.8410**	**1.5100e-003**	**0.0000**	**4.8727**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.6800e-003	0.0360	0.0883	1.4000e-004	0.0202	9.8000e-004	0.0212	5.0600e-003	9.0000e-004	5.9700e-003	0.0000	11.9516	11.9516	7.0000e-005	0.0000	11.9531
Vendor	5.1000e-004	3.4600e-003	7.4700e-003	1.0000e-005	3.2000e-004	9.0000e-005	4.1000e-004	9.0000e-005	8.0000e-005	1.7000e-004	0.0000	0.9534	0.9534	1.0000e-005	0.0000	0.9535
Worker	6.0000e-005	1.0000e-004	9.1000e-004	0.0000	1.6000e-004	0.0000	1.6000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1303	0.1303	1.0000e-005	0.0000	0.1304
Total	**6.2500e-003**	**0.0396**	**0.0967**	**1.5000e-004**	**0.0207**	**1.0700e-003**	**0.0218**	**5.1900e-003**	**9.8000e-004**	**6.1800e-003**	**0.0000**	**13.0353**	**13.0353**	**9.0000e-005**	**0.0000**	**13.0370**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0483	0.0000	0.0483	0.0260	0.0000	0.0260	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.0600e-003	0.0628	0.0455	5.0000e-005		3.4300e-003	3.4300e-003		3.1600e-003	3.1600e-003	0.0000	4.8410	4.8410	1.5100e-003	0.0000	4.8727
Total	**6.0600e-003**	**0.0628**	**0.0455**	**5.0000e-005**	**0.0483**	**3.4300e-003**	**0.0517**	**0.0260**	**3.1600e-003**	**0.0292**	**0.0000**	**4.8410**	**4.8410**	**1.5100e-003**	**0.0000**	**4.8727**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	5.6800e-003	0.0360	0.0883	1.4000e-004	0.0202	9.8000e-004	0.0212	5.0600e-003	9.0000e-004	5.9700e-003	0.0000	11.9516	11.9516	7.0000e-005	0.0000	11.9531
Vendor	5.1000e-004	3.4600e-003	7.4700e-003	1.0000e-005	3.2000e-004	9.0000e-005	4.1000e-004	9.0000e-005	8.0000e-005	1.7000e-004	0.0000	0.9534	0.9534	1.0000e-005	0.0000	0.9535
Worker	6.0000e-005	1.0000e-004	9.1000e-004	0.0000	1.6000e-004	0.0000	1.6000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1303	0.1303	1.0000e-005	0.0000	0.1304
Total	**6.2500e-003**	**0.0396**	**0.0967**	**1.5000e-004**	**0.0207**	**1.0700e-003**	**0.0218**	**5.1900e-003**	**9.8000e-004**	**6.1800e-003**	**0.0000**	**13.0353**	**13.0353**	**9.0000e-005**	**0.0000**	**13.0370**

3.12 Rock Slope Protection 2 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1966	0.0000	0.1966	0.1010	0.0000	0.1010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0901	0.8997	0.6941	9.0000e-004		0.0487	0.0487		0.0455	0.0455	0.0000	81.4283	81.4283	0.0214	0.0000	81.8768
Total	**0.0901**	**0.8997**	**0.6941**	**9.0000e-004**	**0.1966**	**0.0487**	**0.2453**	**0.1010**	**0.0455**	**0.1465**	**0.0000**	**81.4283**	**81.4283**	**0.0214**	**0.0000**	**81.8768**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.7000e-004	1.1700e-003	0.0109	2.0000e-005	1.9400e-003	1.0000e-005	1.9500e-003	5.1000e-004	1.0000e-005	5.3000e-004	0.0000	1.5635	1.5635	9.0000e-005	0.0000	1.5653
Total	**6.7000e-004**	**1.1700e-003**	**0.0109**	**2.0000e-005**	**1.9400e-003**	**1.0000e-005**	**1.9500e-003**	**5.1000e-004**	**1.0000e-005**	**5.3000e-004**	**0.0000**	**1.5635**	**1.5635**	**9.0000e-005**	**0.0000**	**1.5653**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0767	0.0000	0.0767	0.0394	0.0000	0.0394	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Off-Road	0.0901	0.8997	0.6941	9.0000e-004		0.0487	0.0487		0.0455	0.0455	0.0000	81.4282	81.4282	0.0214	0.0000	81.8767
Total	**0.0901**	**0.8997**	**0.6941**	**9.0000e-004**	**0.0767**	**0.0487**	**0.1254**	**0.0394**	**0.0455**	**0.0849**	**0.0000**	**81.4282**	**81.4282**	**0.0214**	**0.0000**	**81.8767**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	6.7000e-004	1.1700e-003	0.0109	2.0000e-005	1.9400e-003	1.0000e-005	1.9500e-003	5.1000e-004	1.0000e-005	5.3000e-004	0.0000	1.5635	1.5635	9.0000e-005	0.0000	1.5653
Total	**6.7000e-004**	**1.1700e-003**	**0.0109**	**2.0000e-005**	**1.9400e-003**	**1.0000e-005**	**1.9500e-003**	**5.1000e-004**	**1.0000e-005**	**5.3000e-004**	**0.0000**	**1.5635**	**1.5635**	**9.0000e-005**	**0.0000**	**1.5653**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.446298	0.066796	0.175481	0.157351	0.043346	0.007350	0.008406	0.080779	0.001010	0.001390	0.007985	0.000539	0.003268

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4412	0.0000	2.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	0.0000	4.0000e-005

Unmitigated	0.4412	0.0000	2.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	0.0000	4.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1010					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3403					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	2.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	0.0000	4.0000e-005
Total	**0.4412**	**0.0000**	**2.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0000**	**4.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Consumer Products	0.3403					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	2.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	0.0000	4.0000e-005
Architectural Coating	0.1010					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.4412**	**0.0000**	**2.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0000**	**4.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e

Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000

Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Desert Knolls Wash Phase III Maintenance, Winter Emissions

Mojave Desert AQMD Air District, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	30
Climate Zone	10			**Operational Year**	2018
Utility Company	Statewide Average				
CO2 Intensity (lb/MWhr)	1001.57	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See Section 1.0 Project Characteristics. Operational 2018, consistent with construction schedule provided by the applicant.

Land Use - Based on applicant-provided site plan.

Construction Phase - See 3.0 Construction Detail. Based on applicant-provided construction schedule.

Off-road Equipment - See Construction Detail 3.0. Based on applicant-provided construction equipment information. Service truck (1)

Trips and VMT - Worker Trips rounded to even values, and water and service trucks were counted as vendor trucks. Due to the close proximty of nearby dump sites. Hauling distance was shorted to 10 miles.

Grading - See 3.0 Construction. Based on maintenance assumptions for similar maintenance projects

Land Use Change - None

Sequestration - None

Construction Off-road Equipment Mitigation - None

Operational Off-Road Equipment - None

Off-road Equipment - None

Off-road Equipment - None

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	4.00	60.00
tblGrading	MaterialImported	0.00	16,200.00
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2018
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	2.2546	23.4024	20.0690	0.0297	6.9488	0.9471	7.8960	3.4713	0.8714	4.3426	0.0000	2,935.1512	2,935.1512	0.5297	0.0000	2,946.2742
Total	**2.2546**	**23.4024**	**20.0690**	**0.0297**	**6.9488**	**0.9471**	**7.8960**	**3.4713**	**0.8714**	**4.3426**	**0.0000**	**2,935.1512**	**2,935.1512**	**0.5297**	**0.0000**	**2,946.2742**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	2.2546	23.4024	20.0690	0.0297	2.9288	0.9471	3.8759	1.4136	0.8714	2.2850	0.0000	2,935.1512	2,935.1512	0.5297	0.0000	2,946.2742
Total	**2.2546**	**23.4024**	**20.0690**	**0.0297**	**2.9288**	**0.9471**	**3.8759**	**1.4136**	**0.8714**	**2.2850**	**0.0000**	**2,935.1512**	**2,935.1512**	**0.5297**	**0.0000**	**2,946.2742**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**57.85**	**0.00**	**50.91**	**59.28**	**0.00**	**47.38**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.4175	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**2.4175**	**0.0000**	**2.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**	**0.0000**	**4.6000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.4175	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**2.4175**	**0.0000**	**2.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**	**0.0000**	**4.6000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Maintenance 2018	Grading	4/1/2018	6/22/2018	5	60	2018 Debris Clean Up/Maintenance

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor

Maintenance 2018	Crawler Tractors	1	8.00	208	0.43
Maintenance 2018	Graders	0	0.00	174	0.41
Maintenance 2018	Rubber Tired Dozers	1	8.00	255	0.40
Maintenance 2018	Tractors/Loaders/Backhoes	0	0.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Maintenance 2018	2	6.00	2.00	2,025.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Maintenance 2018 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.5903	0.0000	6.5903	3.3732	0.0000	3.3732			0.0000			0.0000
Off-Road	1.7024	20.0174	11.5637	0.0166		0.8549	0.8549		0.7865	0.7865		1,669.5437	1,669.5437	0.5198		1,680.4585
Total	**1.7024**	**20.0174**	**11.5637**	**0.0166**	**6.5903**	**0.8549**	**7.4452**	**3.3732**	**0.7865**	**4.1597**		**1,669.5437**	**1,669.5437**	**0.5198**		**1,680.4585**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.5148	3.2194	7.9497	0.0122	0.2961	0.0885	0.3846	0.0813	0.0814	0.1627		1,182.3423	1,182.3423	7.2500e-003		1,182.4945
Vendor	0.0209	0.1374	0.3027	4.3000e-004	0.0132	3.4500e-003	0.0166	3.7300e-003	3.1800e-003	6.9100e-003		41.8310	41.8310	2.5000e-004		41.8362
Worker	0.0165	0.0282	0.2529	5.4000e-004	0.0493	3.1000e-004	0.0496	0.0131	2.9000e-004	0.0134		41.4342	41.4342	2.4200e-003		41.4850
Total	**0.5522**	**3.3850**	**8.5053**	**0.0132**	**0.3586**	**0.0923**	**0.4508**	**0.0981**	**0.0849**	**0.1829**		**1,265.6075**	**1,265.6075**	**9.9200e-003**		**1,265.8158**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					2.5702	0.0000	2.5702	1.3156	0.0000	1.3156			0.0000			0.0000
Off-Road	1.7024	20.0174	11.5637	0.0166		0.8549	0.8549		0.7865	0.7865	0.0000	1,669.5437	1,669.5437	0.5198		1,680.4585
Total	**1.7024**	**20.0174**	**11.5637**	**0.0166**	**2.5702**	**0.8549**	**3.4251**	**1.3156**	**0.7865**	**2.1020**	**0.0000**	**1,669.5437**	**1,669.5437**	**0.5198**		**1,680.4585**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					

Hauling	0.5148	3.2194	7.9497	0.0122	0.2961	0.0885	0.3846	0.0813	0.0814	0.1627		1,182.3423	1,182.3423	7.2500e-003		1,182.4945
Vendor	0.0209	0.1374	0.3027	4.3000e-004	0.0132	3.4500e-003	0.0166	3.7300e-003	3.1800e-003	6.9100e-003		41.8310	41.8310	2.5000e-004		41.8362
Worker	0.0165	0.0282	0.2529	5.4000e-004	0.0493	3.1000e-004	0.0496	0.0131	2.9000e-004	0.0134		41.4342	41.4342	2.4200e-003		41.4850
Total	**0.5522**	**3.3850**	**8.5053**	**0.0132**	**0.3586**	**0.0923**	**0.4508**	**0.0981**	**0.0849**	**0.1829**		**1,265.6075**	**1,265.6075**	**9.9200e-003**		**1,265.8158**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.446298	0.066796	0.175481	0.157351	0.043346	0.007350	0.008406	0.080779	0.001010	0.001390	0.007985	0.000539	0.003268

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	2.4175	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Unmitigated	2.4175	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.8644					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Total	**2.4175**	**0.0000**	**2.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**		**4.6000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.5532					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.8644					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.0000e-005	0.0000	2.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		4.4000e-004	4.4000e-004	0.0000		4.6000e-004
Total	**2.4175**	**0.0000**	**2.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**4.4000e-004**	**4.4000e-004**	**0.0000**		**4.6000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Desert Knolls Wash Phase III Annual Maintenance Emissions

Mojave Desert AQMD Air District, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	2.00	Acre	2.00	87,120.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.6	**Precipitation Freq (Days)**	30
Climate Zone	10			**Operational Year**	2018
Utility Company	Statewide Average				
CO2 Intensity (lb/MWhr)	1001.57	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - See Section 1.0 Project Characteristics. Operational 2018, consistent with construction schedule provided by the applicant.

Land Use - Based on applicant-provided site plan.

Construction Phase - See 3.0 Construction Detail. Based on applicant-provided construction schedule

Off-road Equipment - See Construction Detail 3.0. Based on applicant-provided construction equipment information. Service truck (1)

Trips and VMT - Worker Trips rounded to even values, and water and service trucks were counted as vendor trucks. Due to the close proximity of nearby dump sites. Hauling distance was shorted to 10 miles.

Grading - See 3.0 Construction. Based on maintenance assumptions for similar maintenance projects

Energy Use - None

Land Use Change - None

Sequestration - None

Construction Off-road Equipment Mitigation - None

Operational Off-Road Equipment - None

Off-road Equipment - None

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	4.00	60.00
tblGrading	MaterialImported	0.00	16,200.00
tblOffRoadEquipment	LoadFactor	0.43	0.43
tblOffRoadEquipment	OffRoadEquipmentType		Crawler Tractors
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblOffRoadEquipment	UsageHours	7.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2018
tblTripsAndVMT	HaulingTripLength	20.00	10.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripNumber	5.00	6.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0675	0.7028	0.6024	8.9000e-004	0.2083	0.0284	0.2367	0.1041	0.0261	0.1302	0.0000	80.0235	80.0235	0.0144	0.0000	80.3261
Total	**0.0675**	**0.7028**	**0.6024**	**8.9000e-004**	**0.2083**	**0.0284**	**0.2367**	**0.1041**	**0.0261**	**0.1302**	**0.0000**	**80.0235**	**80.0235**	**0.0144**	**0.0000**	**80.3261**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0675	0.7028	0.6024	8.9000e-004	0.0877	0.0284	0.1161	0.0424	0.0261	0.0685	0.0000	80.0234	80.0234	0.0144	0.0000	80.3260
Total	**0.0675**	**0.7028**	**0.6024**	**8.9000e-004**	**0.0877**	**0.0284**	**0.1161**	**0.0424**	**0.0261**	**0.0685**	**0.0000**	**80.0234**	**80.0234**	**0.0144**	**0.0000**	**80.3260**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**57.90**	**0.00**	**50.95**	**59.30**	**0.00**	**47.40**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.4412	0.0000	2.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	0.0000	4.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total	**0.4412**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0000**	**4.0000e-005**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.4412	0.0000	2.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	0.0000	4.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.4412**	**0.0000**	**2.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0000**	**4.0000e-005**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Maintenance 2018	Grading	4/1/2018	6/22/2018	5	60	2018 Debris Clean Up/Maintenance

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Maintenance 2018	Crawler Tractors	1	8.00	208	0.43
Maintenance 2018	Graders	0	0.00	174	0.41
Maintenance 2018	Rubber Tired Dozers	1	8.00	255	0.40
Maintenance 2018	Tractors/Loaders/Backhoes	0	0.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Maintenance 2018	2	6.00	2.00	2,025.00	10.80	7.30	10.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

Clean Paved Roads

3.2 Maintenance 2018 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1977	0.0000	0.1977	0.1012	0.0000	0.1012	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0511	0.6005	0.3469	5.0000e-004		0.0257	0.0257		0.0236	0.0236	0.0000	45.4375	45.4375	0.0142	0.0000	45.7346

Total	**0.0511**	**0.6005**	**0.3469**	**5.0000e-004**	**0.1977**	**0.0257**	**0.2234**	**0.1012**	**0.0236**	**0.1248**	**0.0000**	**45.4375**	**45.4375**	**0.0142**	**0.0000**	**45.7346**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0153	0.0972	0.2384	3.7000e-004	8.7500e-003	2.6500e-003	0.0114	2.4000e-003	2.4400e-003	4.8400e-003	0.0000	32.2693	32.2693	1.9000e-004	0.0000	32.2733
Vendor	6.2000e-004	4.1500e-003	8.9600e-003	1.0000e-005	3.9000e-004	1.0000e-004	4.9000e-004	1.1000e-004	9.0000e-005	2.1000e-004	0.0000	1.1441	1.1441	1.0000e-005	0.0000	1.1442
Worker	5.1000e-004	8.8000e-004	8.1600e-003	2.0000e-005	1.4500e-003	1.0000e-005	1.4600e-003	3.9000e-004	1.0000e-005	3.9000e-004	0.0000	1.1726	1.1726	7.0000e-005	0.0000	1.1740
Total	**0.0165**	**0.1023**	**0.2555**	**4.0000e-004**	**0.0106**	**2.7600e-003**	**0.0134**	**2.9000e-003**	**2.5400e-003**	**5.4400e-003**	**0.0000**	**34.5859**	**34.5859**	**2.7000e-004**	**0.0000**	**34.5915**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0771	0.0000	0.0771	0.0395	0.0000	0.0395	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0511	0.6005	0.3469	5.0000e-004		0.0257	0.0257		0.0236	0.0236	0.0000	45.4375	45.4375	0.0142	0.0000	45.7345
Total	**0.0511**	**0.6005**	**0.3469**	**5.0000e-004**	**0.0771**	**0.0257**	**0.1028**	**0.0395**	**0.0236**	**0.0631**	**0.0000**	**45.4375**	**45.4375**	**0.0142**	**0.0000**	**45.7345**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0153	0.0972	0.2384	3.7000e-004	8.7500e-003	2.6500e-003	0.0114	2.4000e-003	2.4400e-003	4.8400e-003	0.0000	32.2693	32.2693	1.9000e-004	0.0000	32.2733
Vendor	6.2000e-004	4.1500e-003	8.9600e-003	1.0000e-005	3.9000e-004	1.0000e-004	4.9000e-004	1.1000e-004	9.0000e-005	2.1000e-004	0.0000	1.1441	1.1441	1.0000e-005	0.0000	1.1442
Worker	5.1000e-004	8.8000e-004	8.1600e-003	2.0000e-005	1.4500e-003	1.0000e-005	1.4600e-003	3.9000e-004	1.0000e-005	3.9000e-004	0.0000	1.1726	1.1726	7.0000e-005	0.0000	1.1740
Total	**0.0165**	**0.1023**	**0.2555**	**4.0000e-004**	**0.0106**	**2.7600e-003**	**0.0134**	**2.9000e-003**	**2.5400e-003**	**5.4400e-003**	**0.0000**	**34.5859**	**34.5859**	**2.7000e-004**	**0.0000**	**34.5915**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.446298	0.066796	0.175481	0.157351	0.043346	0.007350	0.008406	0.080779	0.001010	0.001390	0.007985	0.000539	0.003268

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4412	0.0000	2.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	0.0000	4.0000e-005
Unmitigated	0.4412	0.0000	2.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	0.0000	4.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1010					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3403					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	2.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	0.0000	4.0000e-005
Total	**0.4412**	**0.0000**	**2.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0000**	**4.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1010					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.3403					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	2.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	4.0000e-005	4.0000e-005	0.0000	0.0000	4.0000e-005
Total	**0.4412**	**0.0000**	**2.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**4.0000e-005**	**4.0000e-005**	**0.0000**	**0.0000**	**4.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

APPENDIX C

Biological Resources Technical Report

Biological Resources Report
Desert Knolls Wash
Phase III Flood Control
Improvement Project
Apple Valley, San Bernardino County, California

Prepared for:

San Bernardino County Flood Control District
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1 INTRODUCTION

The proposed project ("project") consists of flood control improvements to the Desert Knolls Wash located in San Bernardino County within the town of Apple Valley. The purpose of the flood improvements is to stabilize the current wash while providing flood control protection to properties adjacent to the Desert Knolls Wash.

The purpose of this report is to (1) describe the conditions of biological resources within the project in terms of vegetation, flora, wetlands, wildlife, and wildlife habitats; (2) quantify potential direct and indirect impacts to biological resources that will result from the project; (3) discuss those impacts in terms of biological significance in view of federal, state, and local laws; and (4) specify mitigation measures to reduce any significant impacts that would occur to biological resources.

1.1 Project Location

The proposed project is generally located south of Highway 18 and west of Apple Valley Parkway. The project site is in the process of being acquired by the San Bernardino County Flood Control District (District), but is currently located on the Lewis Center's property within the San Bernardino County town of Apple Valley (Figure 1; all figures are provided in Appendix A). The project site is found on the U.S. Geological Survey (USGS) 7.5-minute Victorville quadrangle, Township 5 North, Range 5 West, Sections 11 and 12 (Figure 2). The project site encompasses the wash located between Apple Valley Road on the west and Tao Road on the east.

1.2 Project Description

The proposed project involves the construction of flood control improvements along a 0.6-mile segment of the Desert Knolls Wash alignment. The work limits extend from an existing concrete trapezoidal channel in Desert Knolls Wash and terminate near the confluence of the wash with the Mojave River. The intent of the proposed project is to provide flood control protection to adjacent existing residential development.

The proposed flood control improvements include the grading of 2:1 channel side slopes and the placement of grouted and/or ungrouted rock along both sides of the channel to provide slope protection. The channel bottom would be left earthen with a base width that varies from 30 to 150 feet. In order to avoid erosion of the earthen channel bottom, a series of grade stabilization structures will be constructed using large diameter grouted rock surrounded by ungrouted rock as splash pads. A rock invert will be added to sections that may be subject to higher velocity flows and increased erosion. In order to offset potential erosion to the Mojave River, a rock-stilling basin with an internal weir will be installed near the confluence of the wash and the Mojave River.

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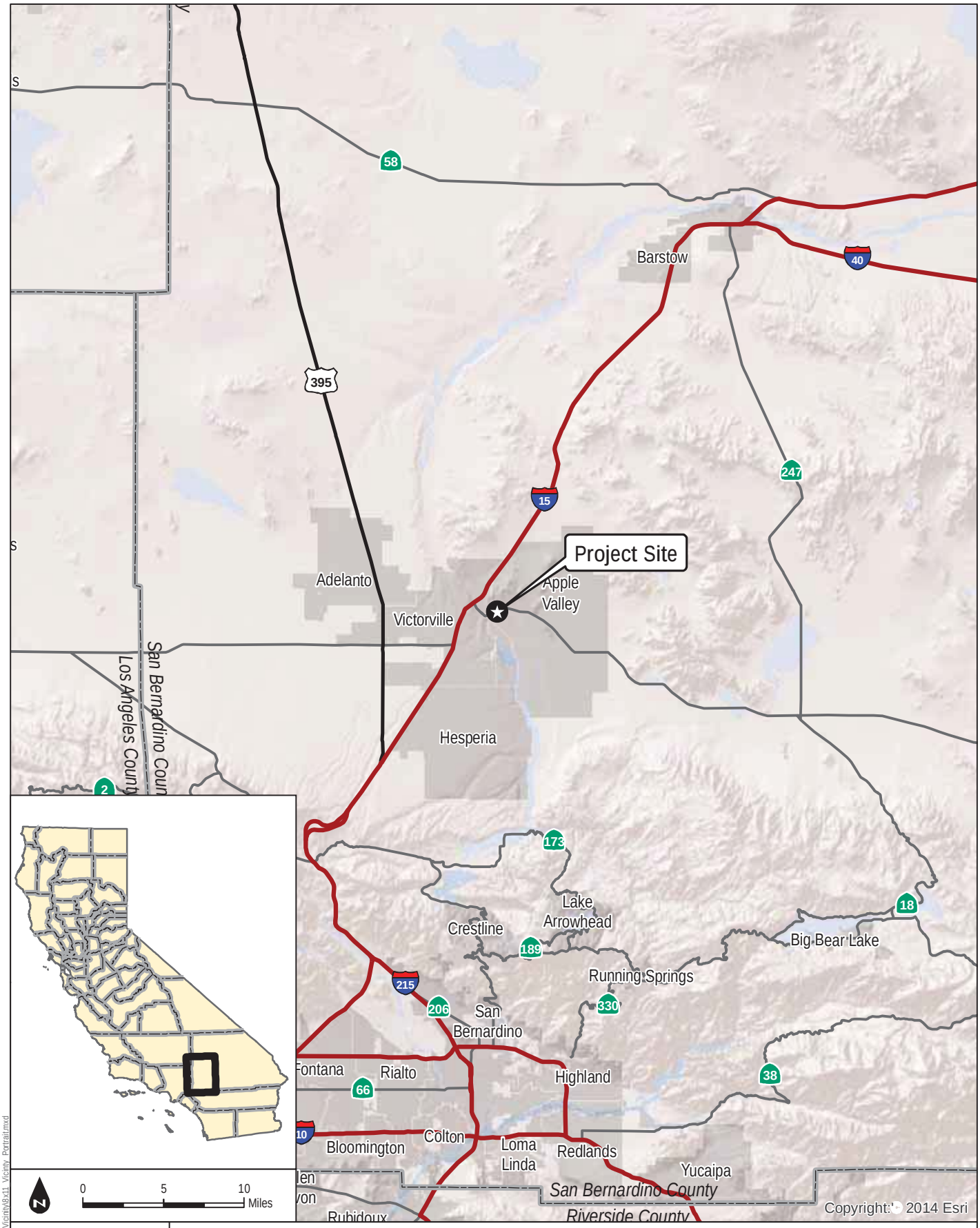

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FIGURE 1

Regional Map

Desert Knolls Wash Phase III Flood Control Improvement Project

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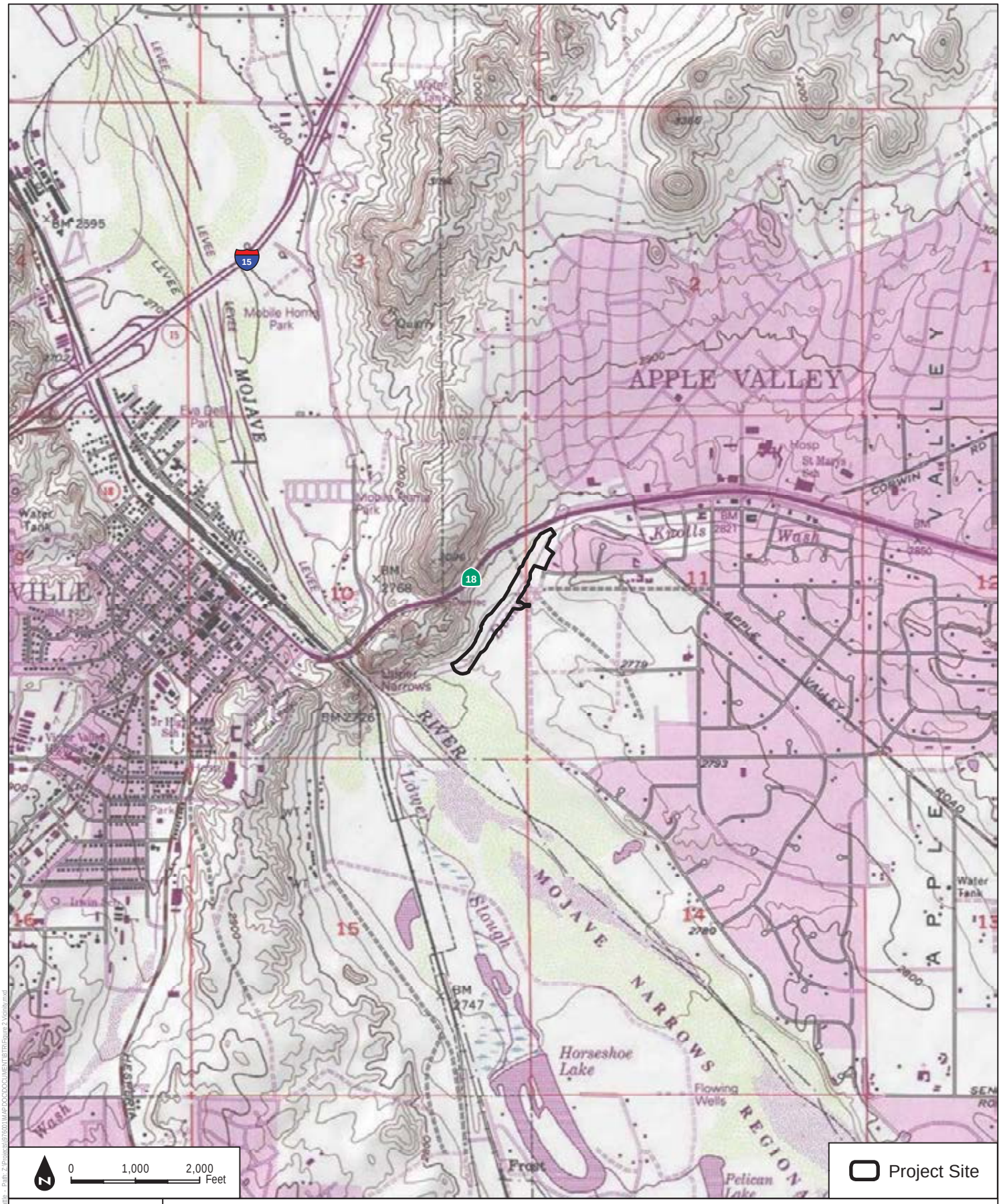

SOURCE: USGS 7.5-Minute Series Victorville Quadrangle

FIGURE 2
Vicinity Map

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Desert Knolls Wash Phase III Flood Control Improvement Project

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2 REGULATORY SETTING

This section outlines the federal, state, and local regulations pertinent to the biological resources located in the proposed project area.

2.1 Federal

Federal Endangered Species Act

The federal Endangered Species Act (FESA) of 1973 (16 U.S.C. 1531 et seq.), as amended, is administered by the U.S. Fish and Wildlife Service (USFWS) for most plant and animal species, and by the National Oceanic and Atmospheric Administration National Marine Fisheries Service for certain marine species. This legislation is intended to provide a means to conserve the ecosystems upon which endangered and threatened species depend and provide programs for the conservation of those species, thus preventing extinction of plants and wildlife. FESA defines an endangered species as "any species that is in danger of extinction throughout all or a significant portion of its range." A threatened species is defined as "any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." Under FESA, it is unlawful to "take" any listed species, and "take" is defined as to, "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

FESA allows for the issuance of incidental take permits for listed species under Section 7, which is generally available for projects that also require other federal agency permits or other approvals, and under Section 10, which provides for the approval of habitat conservation plans (HCPs) on private property without any other federal agency involvement. Upon development of an HCP, the USFWS can issue incidental take permits for listed species where the HCP specifies, at a minimum, the following:

- The level of impact that will result from the taking;
- Steps that will minimize and mitigate the impacts;
- Funding necessary to implement the HCP
- Alternative actions to the taking considered by the applicant and the reasons why such alternatives were not chosen; and
- Such other measures that the Secretary of the Interior may require as being necessary or appropriate for the HCP.

The Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (BGEPA) prohibits "take," which is defined as to "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, disturb, or otherwise harm eagles, their nests, or their eggs." Under the BGEPA, "disturb" means to agitate or bother a bald eagle (*Haliaeetus leucocephalus*) or golden eagle (*Aquila chrysaetos*) to a degree that causes, or is likely to cause, based on the best scientific information available: (1) injury to an eagle; (2) decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior. On September 11, 2009, the USFWS set in place rules (50 CFR parts 13 and 22) establishing two new permit types: (1) take of bald and golden eagles that is associated with, but is not the purpose of, the activity; and (2) purposeful take of eagle nests that pose a threat to human or eagle safety. Specifically, the BGEPA authorizes intentional take of eagle nests where necessary to alleviate a safety hazard to people or eagles; where necessary to ensure public health and safety; when the nest prevents the use of a human-engineered structure; and/or when the activity, or mitigation for the activity, will provide a net benefit to eagles; and allows inactive nests to be taken only in the case of safety emergencies.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act was originally passed in 1918 as four bilateral treaties, or conventions, for the protection of a shared migratory bird resource. The primary motivation for the international negotiations was to stop the "indiscriminate slaughter" of migratory birds by market hunters and others. Each of the treaties protects selected species of birds and provides for closed and open seasons for hunting game birds. The Migratory Bird Treaty Act protects over 800 species of birds.

2.2 State

State of California Endangered Species Act

The California Department of Fish and Wildlife (CDFW) administers the California Endangered Species Act (CESA), which prohibits the "take" of plant and animal species designated by the Fish and Game Commission as endangered or threatened in the State of California. Under CESA Section 86, "take" is defined as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA Section 2053 stipulates that state agencies may not approve projects that will "jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat essential to the

continued existence of those species, if there are reasonable and prudent alternatives available consistent with conserving the species or its habitat which would prevent jeopardy."

CESA defines an endangered species as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease." CESA defines a threatened species as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by this chapter. Any animal determined by the Commission as rare on or before January 1, 1985, is a threatened species." Candidate species are defined as "a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the Commission has formally noticed as being under review by the department for addition to either the list of endangered species or the list of threatened species, or a species for which the Commission has published a notice of proposed regulation to add the species to either list." CESA does not list invertebrate species.

CESA authorizes the taking of threatened, endangered, or candidate species if take is incidental to otherwise lawful activity and if specific criteria are met. These provisions also require CDFW to coordinate consultations with the USFWS for actions involving federally listed species that are also state-listed species. In certain circumstances, CESA allows CDFW to adopt a CESA incidental take authorization as satisfactory for the California Environmental Quality Act (CEQA) purposes based on finding that the federal permit adequately protects the species and is consistent with state law.

A CESA permit may not authorize the take of "fully protected" species that are protected in other provisions of the Fish and Game Code, discussed further below.

California Native Plant Protection Act

The Native Plant Protection Act of 1977 directed the CDFW to carry out the California Legislature's intent to "preserve, protect and enhance rare and endangered plants in this State." The Native Plant Protection Act gave the California Fish and Game Commission the power to designate native plants as "endangered" or "rare" and protect endangered and rare plants from take. CESA expanded on the original Native Plant Protection Act and enhanced legal protection for plants, but the Native Plant Protection Act remains part of the Fish and Game Code. To align with federal regulations, CESA created the categories of "threatened" and "endangered" species. It converted all "rare" animals in the act as threatened species, but did not do so for rare plants. Thus, there are three listing categories for plants in California: rare, threatened, and endangered.

Because rare plants are not included in CESA, mitigation measures for impacts to rare plants are specified in a formal agreement between CDFW and the project proponent.

Other Sections of Fish and Game Code

According to Sections 3511 and 4700 of the Fish and Game Code, which regulate birds and mammals, respectively, a "fully protected" species may not be taken or possessed without a permit from the Fish and Game Commission, and "incidental takes" of these species are not authorized.

Pursuant to Section 3503.5 of the Fish and Game Code, it is also unlawful to take, possess, or destroy any birds of prey; or to take, possess, or destroy any nest or eggs of such birds. "Birds of prey" refer to species in the orders Falconiformes and Strigiformes.

Nests of all other birds (except English sparrow (*Passer domesticus*) and European starling (*Sturnus vulgaris*)) are also protected under Sections 3503 and 3513 of the Fish and Game Code.

California Environmental Quality Act

CEQA requires identification of a project's potentially significant impacts on biological resources and ways that such impacts can be avoided, minimized, or mitigated. The act also provides guidelines and thresholds for use by lead agencies for evaluating the significance of proposed impacts.

CEQA Guidelines Section 15380(b)(1) defines endangered animals or plants as species or subspecies whose "survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, disease, or other factors." A rare animal or plant is defined in Section 15380(b)(2) as a species that, although not presently threatened with extinction, exists "in such small numbers throughout all or a significant portion of its range that it may become endangered if its environment worsens; or … [t]he species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range and may be considered 'threatened' as that term is used in the federal Endangered Species Act." Additionally, an animal or plant may be presumed to be endangered, rare, or threatened if it meets the criteria for listing, as defined further in CEQA Guidelines Section 15380(c).

CDFW has developed a list of "Special Species" as "a general term that refers to all of the taxa the California Natural Diversity Database (CNDDB) is interested in tracking, regardless of their legal or protection status." This is a broader list than those species that are protected under FESA, CESA, and other Fish and Game Code provisions, and includes lists developed by other organizations, such as the Audubon Watch List Species. Guidance documents prepared by other

agencies, including the Bureau of Land Management Sensitive Species and USFWS Birds of Special Concern, are also included on this CDFW Special Species list. Additionally, CDFW has concluded that plant species included on the California Native Plant Society (CNPS) California Rare Plant Rank (CRPR) 1 and 2, and potentially some CRPR 3 plants, are covered by CEQA Guidelines Section 15380.

Appendix G (Environmental Checklist Form), of the CEQA Guidelines requires an evaluation of impacts to "any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or the U.S. Fish and Wildlife Service." (Note: The California Department of Fish and Game is now the California Department of Fish and Wildlife.)

2.3 Local

County of San Bernardino General Plan

The following County of San Bernardino General Plan Conservation Element policies are relevant to the Project.

- **CO 2.1** The County will coordinate with state and federal agencies and departments to ensure that their programs to preserve rare and endangered species and protect areas of special habitat value, as well as conserve populations and habitats of commonly occurring species, are reflected in reviews and approvals of development programs.
- **CO 2.3** In addition to conditions of approval that may be required for specific future development proposals, the County shall establish long-term comprehensive plans for the County's role in the protection of native species because preservation and conservation of biological resources are statewide, regional, and local issues that directly affect development rights.
- **D/CO 1.1** Encourage the greater retention of existing native vegetation for new development projects to help conserve water, retain soil in place and reduce air pollutants.
- **D/CO 1.2** Require future land development practices to be compatible with the existing topography and scenic vistas, and protect the natural vegetation.
- **D/CO 1.3** Require retention of existing native vegetation for new development projects, particularly Joshua trees, Mojave yuccas and creosote rings, and other species protected by the Development Code and other regulations.

County of San Bernardino Development Code, Division 8, Resource Management and Conservation

The provisions in this code apply to the removal or relocation of regulated trees or plants and to any encroachment (for example, grading) within the protected zone of a regulated tree or plant on all private land within the unincorporated areas of the County of San Bernardino (County) and on public lands owned by the County, unless otherwise specified. Plants protected by the ordinance include all species of mesquites (*Prosopis* spp.), creosote rings (10 feet or greater in diameter), all Joshua trees (*Yucca brevifolia*), smoke tree (*Psorothamnus spinosa*), and all species of the family Agavaceae (i.e., century plants, nolinas, yuccas). Under Section 88.01.030 part (b), government-owned lands are exempt from this ordinance.

2.4 Jurisdictional Wetlands and Waters of the United States/State

There are three primary agencies that regulate activities within inland streams, wetlands, and riparian areas in California: the U.S. Army Corps of Engineers (ACOE) Regulatory Program regulates activities pursuant to Section 404 of the federal Clean Water Act (CWA); the California Regional Water Quality Control Board (RWQCB) regulates activities under Section 401 of the CWA and the Porter–Cologne Water Quality Control Act; and the CDFW regulates activities under Sections 1600–1616 of the Fish and Game Code. The following discussion provides information on each agency's regulatory program. In addition, Section IV, Appendix G (Environmental Checklist Form), of the CEQA Guidelines requires an evaluation of impacts to "federally protected wetlands as defined by Section 404 of the Clean Water Act (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means."

2.4.1 U.S. Army Corps of Engineers

Pursuant to Section 404 of the CWA, the ACOE regulates the discharge of dredged and/or fill material into waters of the United States. The term "waters of the United States" is defined in the Definition of Waters of the United States in the ACOE regulations (33 CFR 328.3(a)) as:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters including interstate wetlands;

3. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect foreign commerce including any such waters:
    a. Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
    b. From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
    c. Which are used or could be used for industrial purpose by industries in interstate commerce;
4. All impoundments of waters otherwise defined as waters of the United States under the definition;
5. Tributaries of waters identified in paragraphs (a) (1) through (4) of this section;
6. The territorial seas;
7. Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a)(1) through (6) of this section.

The term "wetlands" (a subset of waters) is defined in 33 CFR 328.3(b) as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands are jurisdictional if they meet this definition as well as the definition of waters of the United States. ACOE predominantly uses the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (ACOE 2008a). Wetlands also generally include swamps, marshes, bogs, and similar areas (33 CFR 328.3(b).

On June 5, 2007, the ACOE and U.S. Environmental Protection Agency (EPA) released guidance ("ACOE/EPA Rapanos Guidance") on the geographic extent of jurisdiction under the federal CWA, based on the U.S. Supreme Court's interpretation of the CWA in *Rapanos v. United States* and *Carabell v. Army Corps of Engineers*, 126 S. Ct. 2208 (Rapanos v. United States 2006). The ACOE/EPA Rapanos Guidance states that the ACOE will regulate traditional navigable waters (TNWs), adjacent wetlands (directly abutting TNWs), and relatively permanent waters tributary to TNWs and adjacent wetlands (ACOE and EPA 2008). Non-navigable tributaries that are not relatively permanent and wetlands adjacent to such tributaries will be assessed on a case-by-case basis to determine whether they have a "significant nexus" to a TNW. A significant nexus occurs when waters, including adjacent wetlands, affect the chemical,

physical, or biological integrity of TNWs. Factors considered during the significant nexus evaluation include:

1. Flow characteristics and functions of the tributary itself in combination with the functions performed by any wetlands adjacent to the tributary
2. Hydrologic characteristics, including but not limited to volume, duration, and frequency of flow; proximity to TNW; size of the watershed; average annual rainfall; and average annual winter snow pack
3. Ecological characteristics including but not limited to the ability of tributaries to carry pollutants and flood waters to TNWs, provide aquatic habitat that support TNW, trap and filter pollutants or store flood waters, and maintain water quality.

The discharge of dredge or fill material into waters, including wetlands, requires authorization from the ACOE prior to impacts.

2.4.2 California Regional Water Quality Control Board

Pursuant to Section 401 of the federal CWA, the RWQCB regulates discharging waste, or proposing to discharge waste, within any region that could affect a "water of the state" (California Water Code, Section 13260(a)), pursuant to provisions of the Porter–Cologne Water Quality Control Act. Waters of the state are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (California Water Code, Section 13050(e)). Before the ACOE will issue a CWA Section 404 permit, applicants must receive a CWA Section 401 Water Quality Certification from the RWQCB. If a CWA Section 404 permit is not required for the project, the RWQCB may still require a permit (i.e., Waste Discharge Requirement) under the Porter–Cologne Water Quality Control Act.

2.4.3 California Department of Fish and Wildlife

Pursuant to Section 1602 of the Fish and Wildlife Code, the CDFW regulates all diversions, obstructions, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake that supports fish or wildlife.

CDFW defines a "stream" (including creeks and rivers) as "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life. This includes watercourses having surface or subsurface flow that supports or has supported riparian vegetation" (14 CCR 1.72).

CDFW's definition of "lake" includes "natural lakes or man-made reservoirs" (14 CCR 1.56). Diversion, obstruction, or changes to the natural flow or bed, channel, or bank of any river, stream, or lake that supports fish or wildlife requires authorization from CDFW by means of entering into an agreement pursuant to Section 1602 of the Fish and Wildlife Code.

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3 ENVIRONMENTAL SETTING

3.1 Land Use

The project is located on the Lewis Center's property, west of Apple Valley Road, east of the Mojave River, and 500 feet directly south of Highway 18. The Lewis Center, rural residential developments, and vacant lots are located to the south, and developed and undeveloped land is located to the east. The project site itself is undeveloped. Open space occurs to the west and north; however, Highway 18 bisects this area. A hiking trail runs parallel to the wash on the northern side. There is also a maintenance shed located on the north side of the wash within the northeastern section of the project area. While the District is in the process of acquiring the property for Desert Knolls Wash from the Lewis Center, the Lewis Center also has plans to develop the surrounding lands around the upstream portion of the project site in order to expand their educational facilities. The Lewis Center for Educational Research Specific Plan has been analyzed under CEQA as a mitigated negative declaration (Town of Apple Valley 2010).

3.2 Topography

The project is located north of the San Bernardino Mountains within the Mojave Desert. The area generally slopes from the northeast to the southwest, with surface and subsurface flows trending towards the Mojave River, which flows north. The project site is at approximately 2,800 feet (853 meters) above mean sea level (amsl) in elevation at the southwest end and 2,860 feet (871 meters) amsl at the northeast end. Rolling hills are located to the west and north.

3.3 Soils

Four soil series are located within the project site: Kimberlina, Helendale, Cajon, and Lithic torriorthents rock outcrops (Figure 3) and are described in more detail below (USDA 2016a).

- **Kimberlina series** are very deep, well-drained soils found within flood plains and alluvial fans and formed predominantly from igneous and/or sedimentary rocks. They occur at elevations from 1,800 to 4,100 feet amsl within the Mojave Desert, though this soil type also occurs within the San Joaquin Valley. Uncultivated areas yield annual grasses and saltbush species. This soil series makes up much of Desert Knolls Wash, as well as a portion of the upland area south of the wash.
- **Helendale series** are very deep, well-drained soils derived predominantly from granitoid rocks. They occur in terraces and alluvial fans at elevations from 2,000 to 3,935 feet amsl. These soils have negligible to low runoff and high and high saturated hydraulic

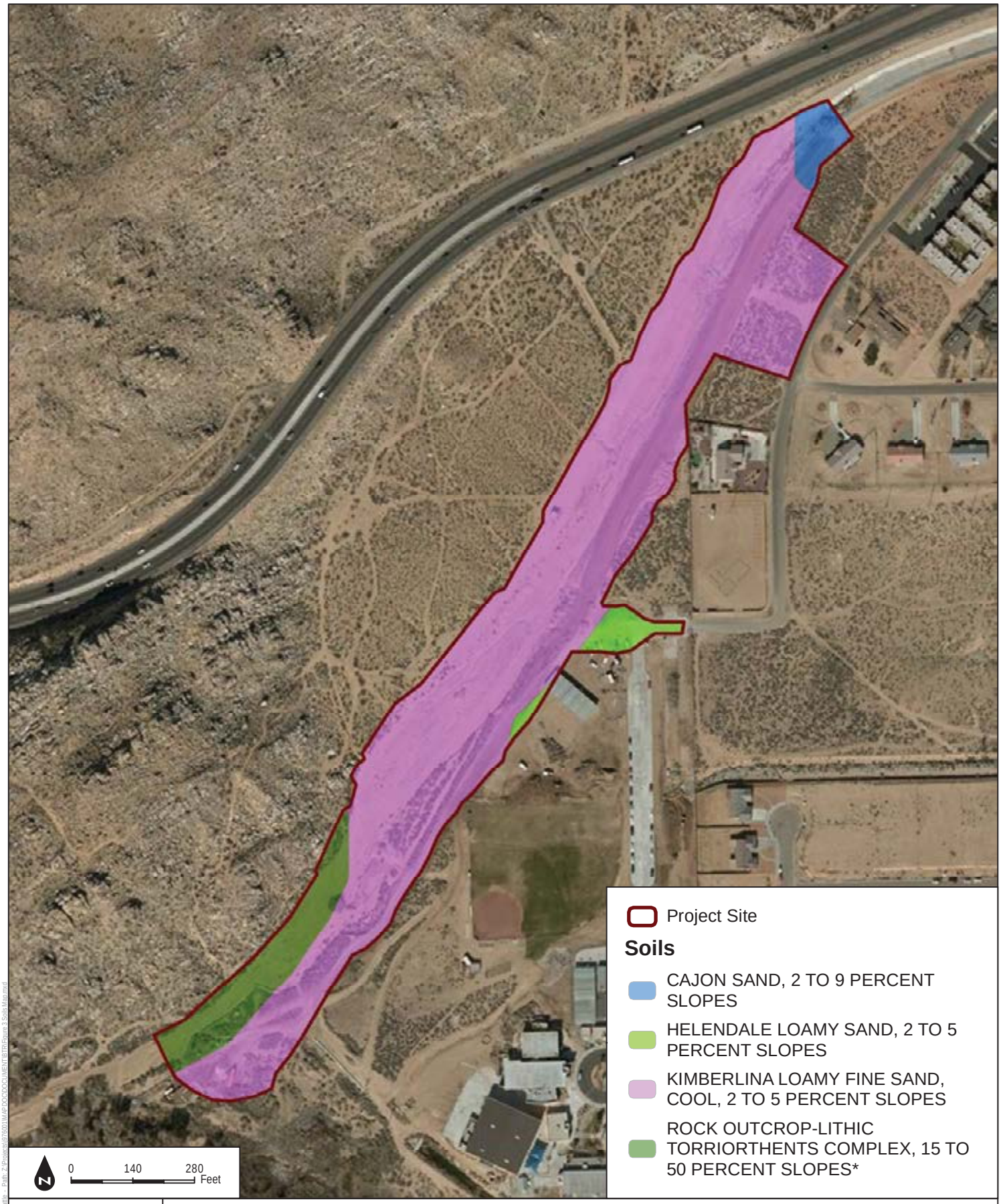
conductivity. Uncultivated areas yield creosote bush, Joshua trees, and annual forbs and grasses. This soil series makes up a portion of the upland area south of the wash.

- **Cajon series** are very deep, somewhat excessively drained soils derived predominantly from granitic rocks. They occur in river terraces and alluvial fans at elevations from 200 to 4,300 feet amsl. These soils have moderate to rapid permeability and negligible to low runoff. Uncultivated areas yield annual grasses creosote bush, saltbush, and Joshua trees. This soil series makes up portions of the upland area within the northeastern portion of the project site.
- **Lithic torriorthents rock outcrops** are rock piles with basalt origin comprised of well-drained material with medium runoff. This rock type makes up the southwestern portion of the wash, as well as a part of the upland area north of the wash.

3.4 Hydrology and Watersheds

The project site is within the Upper Mojave Hydrologic Area (HA) of the Mojave Hydrologic Unit (HU) (Figure 4). The Hydrologic Basin Number is 628.20. The Mojave River is the main feature found within the Upper Mojave HA and is located just 0.18 mile west of the project site. The Mojave River flows north towards Barstow, ultimately terminating at Soda Dry Lake approximately 100 miles to the northeast. The majority of the Mojave River is ephemeral, although portions of the Mojave River, primarily in the southern end, are intermittent.

Rolling hills located to the west and north as part of the Mojave River watershed provide runoff to Desert Knolls Wash. The wash flows westward, terminating at the Mojave River.



SOURCE: Bing Maps, 2016; County of San Bernardino, 2016

FIGURE 3

Soils Map

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Desert Knolls Wash Phase III Flood Control Improvement Project

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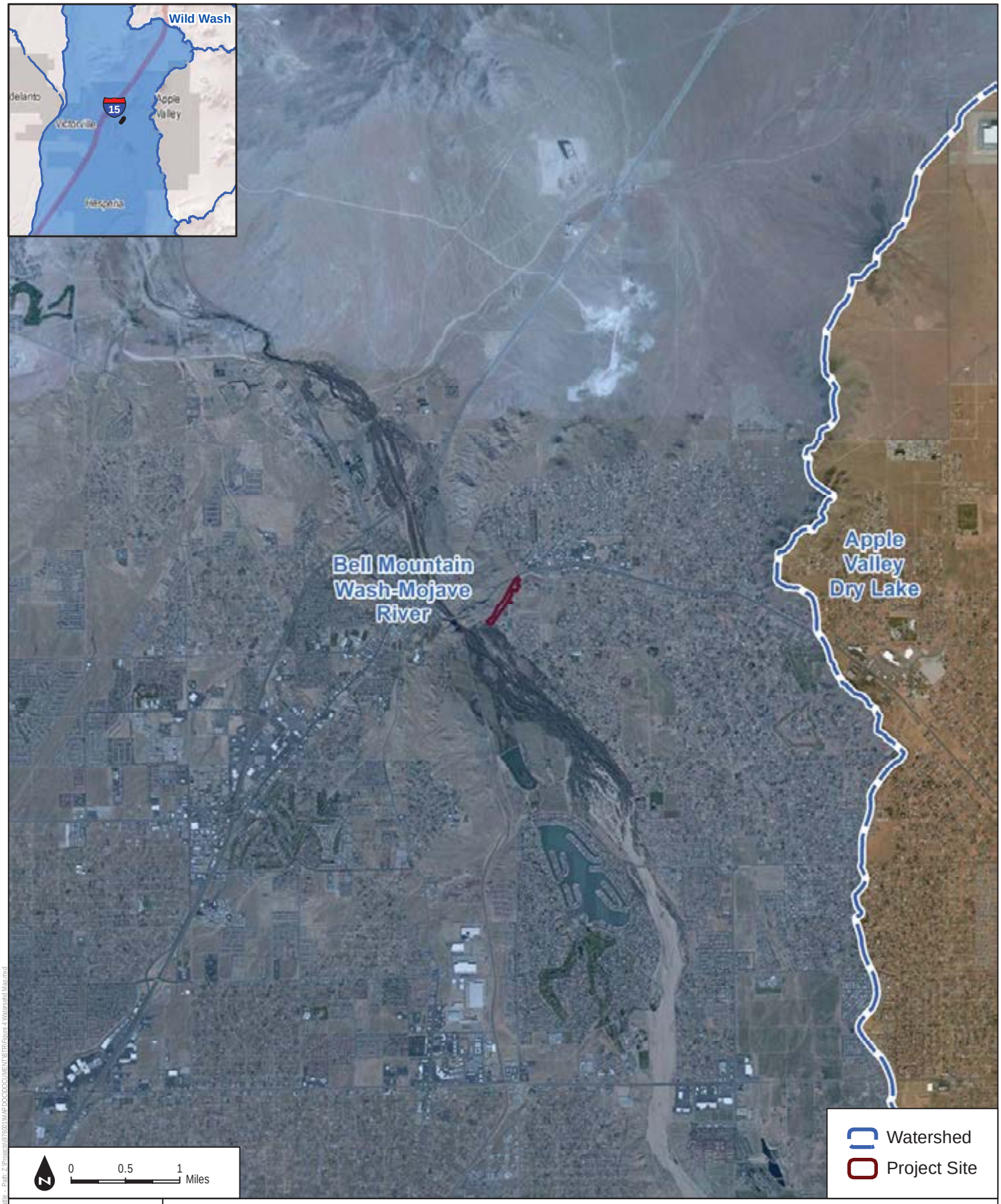

SOURCE: Bing Maps, 2016; County of San Bernardino, 2016

FIGURE 4

Watershed Map

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Desert Knolls Wash Phase III Flood Control Improvement Project

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4 METHODS

Data regarding biological resources present in the project area (project site and 100-foot buffer) were obtained through a review of pertinent literature and field reconnaissance; both are described in detail in this section.

4.1 Definitions

Special-status biological resources are defined as follows:

- Special-status vegetation communities are those communities identified as high priority for inventory in the *List of Vegetation Alliances and Associations* (CDFG 2010) by a state rarity ranking of S1, S2, or S3 or provided protection under the County's Development Code.
- Special-status plant species are those plant species that are:
  - Listed as threatened or endangered or candidates for future listing as threatened or endangered under FESA or CESA;
  - Considered by CNPS to be "rare, threatened, or endangered in California" (CRPR 1A, 1B, and 2);
  - Listed as rare under the California Native Plant Protection Act;
  - Considered a locally significant species, that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as within a county or region or is so designated in local or regional plans, policies, or ordinances;
- Special-status wildlife species are those wildlife species that are:
  - Listed as threatened or endangered or candidates for future listing as threatened or endangered under FESA or CESA;
  - Designated as a species of concern by CDFW;
  - Fully protected species protected under Fish and Game Code Sections 3511, 4700, 5050, and 5515;
  - Protected under other regulations (e.g., Migratory Bird Treaty Act, BGEPA, nesting birds protected under Fish and Game Code Sections 3503 and 3513).

4.2 Literature Review

Special-status biological resources present or potentially present in the project area were identified through a literature search, conducted in 2016. The following sources were used during the literature review process.

- USFWS Critical Habitat and Occurrence Data (USFWS 2016a, USFWS 2016b) was queried to identify any USFWS Critical Habitat or special-status species occurrences within 5 miles of the project area.
- CNDDB (CDFW 2016) was queried to compile a list of potentially occurring flora and fauna in the Victorville quadrangle and surrounding eight quadrangles: Adelanto, Victorville, Apple Valley North, Apple Valley South, Baldy Mesa, Silverwood Lake, Lake Arrowhead, and Cajon.
- CNPS Inventory of Rare, Threatened, and Endangered Plants of California, 8th online edition (CNPS 2016), was searched to compose a list of potentially occurring flora in the Victorville quadrangle and surrounding eight quadrangles.

4.3 Field Surveys

In July 2016, Dudek biologists conducted vegetation mapping, a jurisdictional delineation update, and a habitat assessment within the project area. Table 1 lists the date, condition, and survey summary.

Table 1
Schedule of Surveys

Date	Type of Survey	Survey Conditions	Personnel*
07/22/2016	Vegetation Mapping Jurisdictional Delineation Habitat Assessment	06:35–11:15 a.m., 70°–96° degrees Fahrenheit, 1–3 miles per hour wind, 0% cloud cover	MTR, APC

* MTR = Mikael T. Romich; APC = Anna P. Cassady

4.3.1 Vegetation Community and Land Cover Mapping

Vegetation communities and land uses within the study area were mapped in the field directly onto a 300-foot-scale (1 inch = 300 feet), aerial photograph-based field map of the project site. Following completion of the fieldwork, all vegetation polygons were digitized using ArcGIS and GIS coverage was created. Once in ArcGIS, the acreage of each vegetation community and land cover present on site was determined.

Vegetation community classifications used in this report follow the *A Manual of California Vegetation*, second edition (Sawyer et al. 2009). Any vegetation communities or land covers not represented by the manual were classified using Holland types from "Preliminary Descriptions of the Terrestrial Natural Communities of California" (Oberbauer et al. 2008).

Flora

All plant species encountered during the field surveys were identified and recorded. Those species that could not be identified immediately were brought into the laboratory for further investigation. Latin and common names for plant species with a CRPR (formerly CNPS List) follow the CNPS *On-Line Inventory of Rare, Threatened, and Endangered Plants of California* (CNPS 2016). For plant species without a CRPR, Latin names follow the *Jepson Interchange List of Currently Accepted Names of Native and Naturalized Plants of California* (Jepson Flora Project 2012), and common names follow the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service PLANTS Database (USDA 2016b).

4.3.2 Habitat Assessment

Fauna

Wildlife species observed or detected during field surveys by sight, calls, tracks, scat, or other signs were recorded. In addition to species actually observed, expected wildlife usage of the site was determined according to known habitat preferences of regional wildlife species and knowledge of their relative distributions in the area. No trapping or focused surveys for special-status or nocturnal species was conducted.

4.3.3 Jurisdictional Delineation

Dudek biologists updated an existing jurisdictional delineation prepared in 2013. In doing so, Dudek conducted a delineation of jurisdictional waters within the project site for the following types of features:

- Waters of the United States, including wetlands, under the jurisdiction of ACOE, pursuant to Section 404 of the federal CWA.
- Waters of the state under the jurisdiction of the California RWQCB, pursuant to Section 401 of the federal CWA and the Porter–Cologne Act.
- Streambeds under the jurisdiction of CDFW, pursuant to Section 1602 of the California Fish and Game Code.

Non-wetland waters of the United States are delineated based on the presence of an ordinary high water mark (OHWM) as determined utilizing the methodology in *A Field Guide to the Identification of the Ordinary High Water Mark* (OHWM) *in the Arid West Region of the Western United States* (ACOE 2008b).

All surface flows are waters of the state and are delineated at the OHWM, at outer limits of hydrophytic vegetation, or at the outer rim of depressional features if relevant.

In accordance with the California Fish and Game Code, streambeds are determined based on the presence of a definable bed and bank and are delineated from top of bank to top of bank or the extent of associated riparian vegetation.

Drainage features were delineated using a Global Positioning System (GPS) handheld unit with sub-meter accuracy. The delineation was completed in support of a Preliminary Approved Determination from the ACOE.

4.3.4 Survey Limitations

Limitations of the survey include a diurnal bias and the absence of trapping for small mammals, reptiles, and amphibians. The survey was conducted during the daytime to maximize the detection of most animals. Birds represent the largest component of the vertebrate fauna, and because most birds are active in the daytime, diurnal surveys maximize the number of bird observations. Conversely, diurnal surveys usually result in few observations of mammals, many of which may only be active at night. In addition, many species of reptiles and amphibians are secretive in their habits and are difficult to observe using standard meandering transects.

The survey was conducted during the summer season, which resulted in detection and identification of many (but not all) annual and perennial plant species that occur in the area. The purpose of the field survey was to determine the likelihood of occurrence of any special-status plant or wildlife species based on the presence/absence of suitable habitat and other natural history elements that might predict their occurrence.

5 RESULTS

5.1 Natural Communities, Land Covers, and Floral Diversity

Native vegetation communities on site include allscale scrub alliance, creosote bush scrub alliance, Fremont cottonwood forest alliance, Joshua tree woodland alliance, and red willow thickets alliance. Land cover types occurring within the project area are developed, disturbed, non-vegetated floodplain, parks and ornamental, and rock outcrop. These vegetation communities and land cover types are described below; their acreages are presented in Table 2; their spatial distributions are presented on Figure 5; and representative photographs can be found in Appendix B. There are no special-status vegetation communities within the project site.

Table 2
Vegetation Communities and Land Covers

Vegetation Communities/Land Covers	Code[1]	Study Area Acreage[2]
Native Vegetation Communities		
Allscale Scrub	AS	9.84
Creosote Bush Scrub	CRBS	1.30
Fremont Cottonwood Forest[3]	FCF	0.04
Joshua Tree Woodland[3, 4]	JTW	0.37
Red Willow Thickets[3]	RWT	0.08
	Subtotal	*11.63*
Land Covers		
Developed	DEV	4.42
Disturbed	DS	6.88
Non-vegetated Floodplain	NVC	4.42
Parks and Ornamental	ORN	0.18
Rock Outcrop	RO	1.56
	Subtotal	*17.46*
	Total	**29.1**

Notes:
1 Source: CDFG 2010.
2 Totals may not add due to rounding.
3 Sensitive vegetation community per CDFG 2010.
4 Sensitive vegetation community per San Bernardino County General Plan.

5.1.1 Allscale Scrub Alliance

Allscale scrub is dominated by allscale (*Atriplex polycarpa*) and is widespread throughout the Mojave, Sonoran, and Colorado Deserts. Common species found within this community include

white bursage (*Ambrosia dumosa*), creosote bush (*Larrea tridentata*), and other saltbush species like four-winged saltbush (*Atriplex canescens*).

This alliance typically occurs within washes and terraces, but is also found associated with alluvial fans, rolling hills, and playa lakebeds. This alliance may have carbonate rich and sandy, alkaline, or sandy clay loam soils (Sawyer et al. 2009).

Within the project area, allscale scrub is the most prevalent vegetation community, covering the majority of the area south of the wash. It is also interspersed amongst rocky outcrops north of the wash. Species found associated include white bursage and other saltbush species.

The allscale scrub alliance is ranked by CDFG (2010) as a G5S4 alliance. This ranking indicates that globally the alliance is widespread, abundant, and is considered secure (CDFG 2010, NatureServe 2009) and within California the alliance is apparently secure.

5.1.2 Creosote Bush Scrub Alliance

Creosote bush scrub is dominated by creosote (*Larrea tridentata*) and is widespread throughout the Mojave, Sonoran, and Colorado Deserts. Common species found within this community include white bursage (*Ambrosia dumosa*), honey mesquite (*Prosopis glandulosa*), and Joshua tree (*Yucca brevifolia*). This community is open with little structural diversity and reaches heights of 5 to 10 feet.

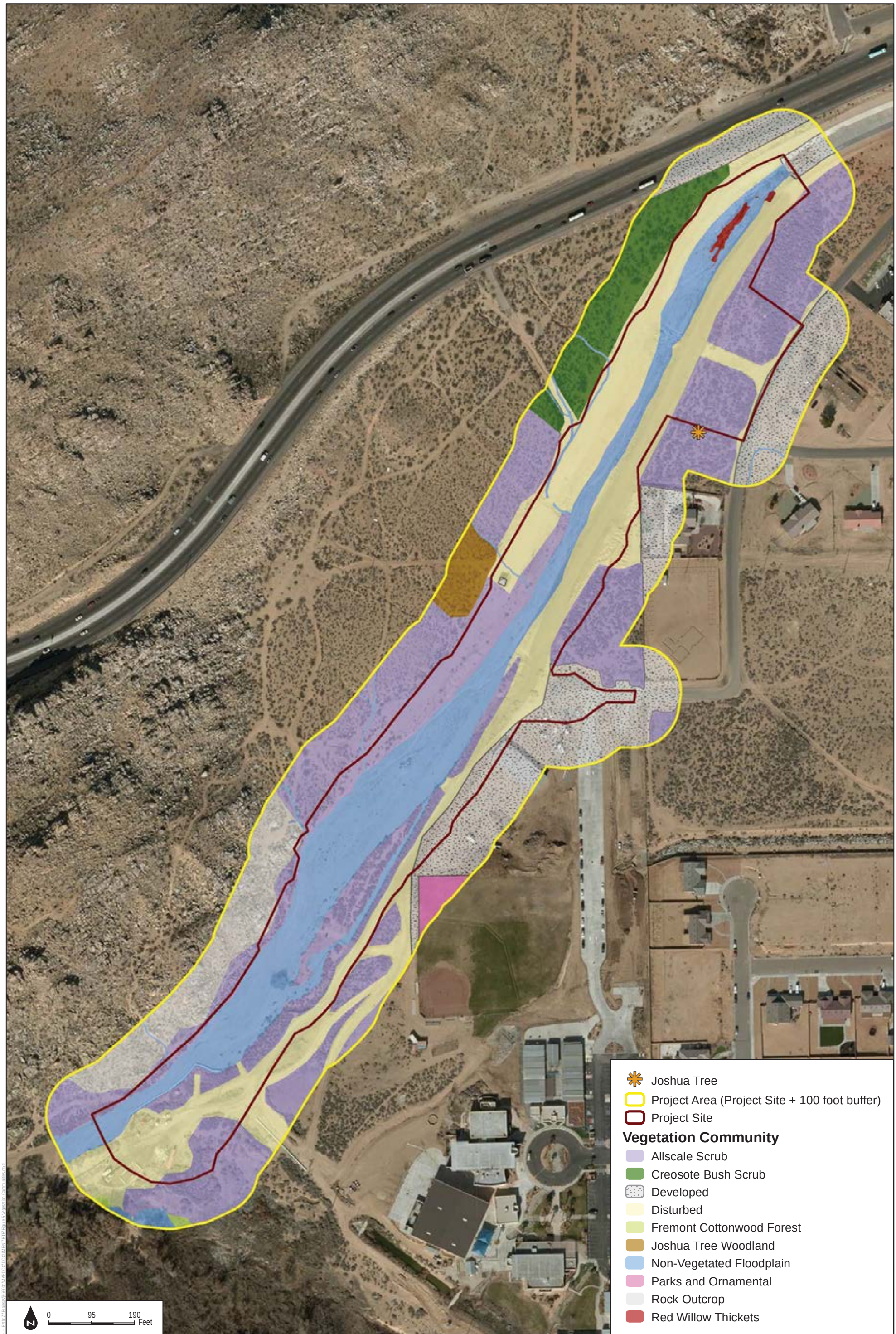
This alliance typically occurs along minor washes and upland slopes, but is also found associated with alluvial fans and bajadas. This alliance may have well-drained soils or be associated with a pavement surface (Sawyer et. al. 2009).

Within the project area, this community is found in the northwestern corner of the project buffer. The dominant species is creosote bush, but there are several saltbush species (*Atriplex* sp.) found within the area as well.

The creosote bush scrub alliance is ranked by CDFG (2010) as a G5S5 alliance. This ranking indicates that globally the alliance is common, widespread, abundant, and secure (CDFG 2010, NatureServe 2009) and within California the alliance is secure.

5.1.3 Fremont Cottonwood Forest Alliance

Fremont cottonwood forest is dominated by Fremont cottonwood (*Populus fremontii*) and is a widespread riparian community. Common species found within this community include black walnut (*Juglans hindsii*), California sycamore (*Platanus racemosa*), and many willow species, including black willow (*Salix gooddingii*), red willow (*Salix laevigata*), and sandbar willow (*Salix exigua*).



DUDEK

SOURCE: Bing Maps, 2016

FIGURE 5

Vegetation Communities

Desert Knolls Wash Phase III Flood Control Improvement Project

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This alliance typically occurs along rivers and intermittent streams, but is also associated with alluvial fans and lower canyons within desert mountains (Sawyer et al. 2009).

Within the project area, this community is found in the very southern portion of the buffer that overlaps with the Mojave River. It is dominated by Fremont cottonwood, but is also comprised of various willow species (*Salix* sp.).

Fremont cottonwood forest alliance is ranked by CDFG (2010) as a G4S3 alliance. This ranking indicates that globally the alliance is uncommon, but not rare, with some cause for long-term concern due to declines or other factors (CDFG 2010, NatureServe 2009). Within California, the alliance is vulnerable due to restricted range.

5.1.4 Joshua Tree Woodland Alliance

Joshua tree woodland is dominated by Joshua tree (*Yucca brevifolia*) and is widespread throughout the Mojave, Sonoran, and Colorado Deserts. Common species found within this community include creosote bush (*Larrea tridentata*), buckwheat (*Eriogonum fasciculatum*), and white bursage (*Ambrosia dumosa*).

This alliance typically occurs along gentle alluvial fans with soils that include coarse sands, very fine silts, gravel, or sandy loams (Sawyer et al. 2009).

Within the project area there is one area mapped as Joshua tree woodland to the north of the wash. Joshua tree woodland alliance is ranked by CDFG (2010) as a G4S3 alliance. This ranking indicates that globally the alliance is uncommon, but not rare with some cause for long-term concern due to declines or other factors (CDFG 2010, NatureServe 2009) and within California, the alliance is vulnerable due to restricted range. This alliance is also a sensitive vegetation community by San Bernardino County due to its limited regional distribution and changing population size due to sensitivity to climate change.

5.1.5 Red Willow Thickets

Red willow thickets alliance is dominated or co-dominated by red willow (*Salix laevigata*). This alliance is found along ditches, floodplains, lake edges, and low-gradient depositions along streams and has an open to continuous canopy less than 66 feet (20 meters) with a variable herbaceous layer. Associated species include box elder (*Acer negundo*), white alder (*Alnus rhombifolia*), California sycamore (*Platanus racemosa*), Fremont cottonwood (*Populus fremontii*), California live oak (*Quercus agrifolia*), and various willows (*Salix exigua*, *S. gooddingii*, *S. laevigata*, and *S. lasiolepis*) (Sawyer et al. 2009).

Within the project area, red willow thickets occur in a patch at the most upstream portion of the wash and is dominated by red willow, but also with immature Fremont cottonwood and mulefat (*Baccharis salicifolia*).

Fremont cottonwood forest alliance is ranked by CDFG (2010) as a G5S3 alliance. This ranking indicates that globally the alliance is common, widespread, abundant, and secure (CDFG 2010, NatureServe 2009) and within California, the alliance is vulnerable due to restricted range.

5.1.6 Developed

Developed land refers to areas supporting man-made structures, including homes, yards, roadways, sidewalks, and other highly modified lands supporting structures associated with dwellings or other permanent structures.

Within the project area, developed land refers to existing roads, parking areas, and buildings within the buffer area south of the wash.

5.1.7 Disturbed Habitat

Disturbed land includes areas that experience or have experienced high levels of human disturbance and as a result are generally lacking vegetation. Areas mapped as disturbed land may include unpaved roads, trails, and graded areas. Vegetation in these areas, if present at all, is usually sparse and dominated by non-native weedy herbaceous species.

Within the project area, disturbed habitat is comprised of unpaved access roads south of the wash. Additionally, the banks and slopes of the northern portion of the wash are graded for maintenance vehicle access.

5.1.8 Non-vegetated Floodplain

Areas mapped as non-vegetated floodplain are commonly found within major desert washes. These areas are nearly permanently unvegetated due to variable water flow, though some weedy species may be found along wash edges. Cover by these species will make up less than 10% of total cover within the area.

Within the project area, the bottom of Desert Knolls Wash is mostly non-vegetated and runs through the extent of the project area.

5.1.9 Parks and Ornamental Plantings

Areas mapped as parks and ornamental plantings include planted areas where ornamental landscaping has been installed as part of a recreational park, development, or roadway landscaping.

Within the project area, parks and ornamental plantings includes landscaping associated with the baseball field south of the wash.

5.1.10 Rock Outcrops

This land cover type includes areas primarily made up of boulders with interspersed vegetation, including California croton (*Croton californicus*) and various lichens.

Within the project area, rock outcrops dominate the southwestern portion of the project area and are interspersed with saltbush species, a single Joshua tree, and hedgehog cactus (*Echinocereus engelmannii*).

5.1.11 Floral Diversity

A total of 17 species of vascular plants, 14 native (82%) and 3 non-native (18%), was recorded within the project areas (Appendix C). The recorded flora of the site is limited because surveys were conducted during summer so early blooming spring annuals would not have been observed, and vegetation communities within the project area are limited in diversity and extent.

5.2 Zoology

A list of the wildlife species observed within the study area during the survey is provided in Appendix C. There were 16 common wildlife species observed.

5.3 Special-Status Plant Species

All special-status plant species reported in the USGS 7.5-minute Victorville quadrangle and the surrounding eight topographic quadrangles (CNPS and CNDDB occurrences) were analyzed based on known range, habitat associations, preferred soil substrate, life form, elevation, and blooming period. A list of all special-status plant species detected or with a moderate to high potential to occur within the project area is provided in Table 3. Appendix D includes the special-status plant species that are either not expected to occur or have a low potential to occur; these species are not further analyzed in this report because no direct, indirect, or cumulative impacts are expected. There is no USFWS-designated critical habitat for listed plant species within the project area (USFWS 2016b).

Table 3
Special-Status Plant Species Detected or with Moderate to High Potential to Occur in the Project Area

Scientific Name	Common Name	Status (Federal/ State/ CRPR)	Primary Habitat Associations/Life Form/Blooming Period/Elevation Range (feet)	Potential to Occur
Cymopterus deserticola	desert cymopterus	None/None/ 1B.2	Joshua tree woodland, Mojavean desert scrub/sandy/perennial herb/Mar–May/2,067–4,921	Moderate potential to occur. The site contains suitable sandy soils, both Joshua tree woodland and Mojavean desert scrub vegetation communities, and is within the appropriate elevation range to support this species. There is one documented occurrence within 5 miles of the project area (CDFW 2016).
Mimulus mohavensis	Mojave monkeyflower	None/None/ 1B.2	Joshua tree woodland, Mojavean desert scrub/sandy or gravelly, often in washes/annual herb/Apr–Jun/1,969–3937	Moderate potential to occur. The site is within appropriate elevation range, has suitable sandy soil, and is located within a desert wash with appropriate Mojavean desert scrub. Several extant populations of this species occur between the Mojave River and Interstate 15 between Victorville and Barstow (CDFW 2016). The project area is at the southern edge of that range; however, there are no documented occurrences within 5 miles of the project area. The nearest occurrence is approximately 5.5 miles northwest of the project area (CDFW 2016).
Pediomelum castoreum	Beaver Dam breadroot	None/None/ 1B.2	Joshua tree woodland, Mojavean desert scrub/sandy, washes and roadcuts/perennial herb/Apr–May/2,001–5,003	Moderate potential to occur. The site is within appropriate elevation range, has suitable sandy soil, and is located within a desert wash with suitable Mojavean desert scrub. There are two documented occurrences within 5 miles of the project area (CDFW 2016).

Table 3
Special-Status Plant Species Detected or with Moderate to High Potential to Occur in the Project Area

Scientific Name	Common Name	Status (Federal/ State/ CRPR)	Primary Habitat Associations/Life Form/Blooming Period/Elevation Range (feet)	Potential to Occur
Symphyotrichum defoliatum	San Bernardino aster	None/None/ 1B.2	Cismontane woodland, Coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, valley and foothill grassland (vernally mesic)/near ditches, streams, springs/ perennial rhizomatous herb/Jul–Nov/7–6,693	Moderate potential to occur in project buffer area. Not expected to occur within project site. The Mojave River, which contains suitable marsh habitat and is within the appropriate elevation range, abuts the southeastern portion of the wash. Additionally, there is a documented occurrence within 5 miles of the project area, within the Mojave River (CDFW 2016).

This table includes all CNDDB species within an 8-quad search of the surrounding quadrangles: Victorville NW, Helendale, Turtle Valley, Adelanto, Victorville, Apple Valley North, Apple Valley South, Hesperia, Baldy Mesa.

Status Legend
None: No state or federal status assigned.
CRPR: California Rare Plant Rank
1B (formerly List 1B): Plants Rare, Threatened, or Endangered in California and Elsewhere

Threat Rank
.2 – Fairly threatened in California (20%–80% occurrences threatened/moderate degree and immediacy of threat) \

Focused surveys were not conducted for special-status plant species, and no special-status plant species were observed during the 2016 field surveys. However, four special-status species have a moderate potential to occur within the project site and are further discussed below.

5.3.1 Desert Cymopterus

Desert cymopterus (*Cymopterus deserticola*) is a CRPR 1B.2 species, indicating that it is a rare, threatened, or endangered species within California with a moderate degree/immediacy of threat.

This species is a perennial herb in the carrot family (*Apiaceae*) with purple flowers that occurs within Joshua tree woodland and Mojavean desert scrub. This species occurs in Kern, Los Angeles, and San Bernardino Counties between 2,066 and 4,921 feet (CNPS 2016). It grows within sandy areas in the western Mojave Desert and typically blooms in April (Jepson Flora Project 2012).

The project area contains sandy soils, both Joshua tree woodland and Mojavean desert scrub vegetation communities, and is within the appropriate elevation range to support this species. There is one documented occurrence within 5 miles of the project area (CDFW 2016). There is a moderate potential of finding this species within the project area.

5.3.2 Mojave Monkeyflower

Mojave monkeyflower (*Mimulus mohavensis*) is a CRPR 1B.2 species, indicating that it is a rare, threatened, or endangered species within California with a moderate degree/immediacy of threat.

This species is an annual herb in the monkeyflower family (*Phrymaceae*) with purple to white flowers that occurs within Joshua tree woodland and Mojavean desert scrub. This species occurs in San Bernardino County between 1,968 and 3,937 feet (CNPS 2012). It grows within gravelly banks of desert washes within the Mojave Desert (west-central San Bernardino County) and typically blooms from April to May (Jepson Flora Project 2012).

The project area is within appropriate elevation range, has suitable sandy soil, and is located within a desert wash with appropriate Mojavean desert scrub. Several extant populations of this species occur between the Mojave River and interstate 15 between Victorville and Barstow (CDFW 2016). The project area is at the southern edge of that range; however, there are no documented occurrences within 5 miles of the project area. The nearest occurrence is approximately 5.5 miles northwest of the project area (CDFW 2016). There is moderate potential for this species to occur within the project area.

5.3.3 Beaver Dam Breadroot

Beaver Dam breadroot (*Pediomelum castoreum*) is a CRPR 1B.2 species, indicating that it is a rare, threatened, or endangered species within California with a moderate degree/immediacy of threat.

This species is perennial herb in the legume family (*Fabaceae*) that occurs within sandy soils, washes, and road cuts within Joshua tree woodland and Mojavean desert scrub. This species occurs in San Bernardino County between 2,001 and 5,003 feet (CNPS 2012). It grows within open areas and road cuts within the Mojave Desert, and occurs within Nevada and Arizona. This species typically blooms from April to May (Jepson Flora Project 2012).

The project area is within appropriate elevation range, has suitable sandy soil, and is located within a desert wash with suitable Mojavean desert scrub. There are two documented occurrences within 5 miles of the project area (CDFW 2016). There is moderate potential for this species to occur within the project area.

5.3.4 San Bernardino Aster

San Bernardino aster (*Symphyotrichum defoliatum*), is a CRPR 1B.2 species, indicating that it is a rare, threatened, or endangered species within California with a moderate degree/immediacy of threat.

This species is a perennial, rhizomatous herb in the sunflower family (*Asteraceae*) that occurs near ditches, streams, and springs. Surrounding vegetation communities include cismontane woodland, meadows and seeps, marshes and swamps, and valley and foothill grassland that is vernally mesic. This species occurs in San Bernardino County between 7 and 6,693 feet (CNPS 2016).

The project buffer contains the Mojave River, which contains suitable marsh habitat and is within the appropriate elevation range, abuts the southeastern portion of the wash. Additionally, there is a documented occurrence within 5 miles of the project area, within the Mojave River (CDFW 2016). There is a moderate potential for this species to occur within the project buffer; however, there is no potential for this species to occur within the project site.

5.4 Special-Status Wildlife Species

All special-status wildlife species reported in the USGS 7.5-minute Victorville quadrangle and the surrounding eight topographic quadrangles (CNDDB occurrences) were analyzed based on known range, habitat associations, and elevation (Appendix D). A list of all special-status wildlife species detected or with a moderate to high potential to occur within the portions of the project area is provided in Table 4. Table 4 also includes threatened and endangered species with a low or greater potential to occur in the project area. There is no USFWS-designated critical habitat for listed wildlife species within the project site (USFWS 2016a); however, critical habitat for southwestern willow flycatcher exists within the Mojave River, which overlaps the project buffer at the southernmost corner.

Table 4
Special-Status Wildlife Species Observed, Protected, or Potentially Occurring in the Project Area

Common Name	Scientific Name	Status (Federal/ State)	Habitat	Potential to Occur
Reptiles				
Mojave desert tortoise	*Gopherus agassizii*	FT/ST	Arid and semi-arid habitats in Mojave and Sonoran Deserts, including sandy or gravelly locations along riverbanks, washes sandy dunes, canyon bottoms, desert oases, rocky hillsides, creosote flats and hillsides.	Low potential to occur. The project site is located within a desert wash surrounded by desert scrub vegetation, including creosote bush. Additionally, there are suitable burrows within the project area that could support this species.

Table 4
Special-Status Wildlife Species Observed, Protected, or Potentially Occurring in the Project Area

Common Name	Scientific Name	Status (Federal/ State)	Habitat	Potential to Occur
				There are several documented occurrences of this species within 5 miles of the project area (CDFW 2016); however, these occurrences are within a large swath of suitable habitat north of Highway 18, which lies north of the project area. Due to the small extent of suitable, contiguous habitat within the project area and with Highway 18 acting as a barrier for potentially existing populations to cross, it is unlikely to find this species present.
Birds				
burrowing owl	*Athene cunicularia* (burrow sites & some wintering sites)	None/SSC	Nests and forages in grassland, open scrub, and agriculture, particularly with ground squirrel burrows.	Moderate potential to occur. The project area contains open scrub and disturbed habitat suitable for this species. Additionally, there are suitable burrows both within the banks and in the terrace regions of the project area; however, no active signs of this species were observed during the site visit. There are many documented occurrences of this species within 5 miles of the project area (CDFW 2016).
loggerhead shrike	*Lanius ludovicianus* (nesting)	None/SSC	Nests and forages in open habitats with scattered shrubs, trees, or other perches.	Moderate potential to occur. The project area contains open desert scrub comprised of saltbush and creosote. There are several documented occurrences of this species within 5 miles of the project area (CDFW 2016).
yellow warbler	*Setophaga petechia* (nesting)	None/SSC	Nests and forages in riparian and oak woodlands, montane chaparral, open ponderosa pine and mixed conifer habitats.	High potential to occur in buffer. Not expected to occur within project site. The project buffer includes a very small portion of the Mojave River, which contains riparian hardwood vegetation suitable for nesting and foraging for this species. There are occurrences of this species

Table 4
Special-Status Wildlife Species Observed, Protected, or Potentially Occurring in the Project Area

Common Name	Scientific Name	Status (Federal/ State)	Habitat	Potential to Occur
				within 5 miles of the project area (CDFW 2016 and eBird 2016).
least Bell's vireo	*Vireo bellii pusillus* (nesting)	FE/SE	Nests and forages in low, dense riparian thickets along water or along dry parts of intermittent streams; forages in riparian and adjacent shrubland late in nesting season.	Moderate potential to occur within buffer. There is no potential for this species within the project site. The project buffer includes a very small portion of the Mojave River, which contains dense riparian thickets suitable for nesting and foraging for this species. There are documented occurrences of this species within 5 miles of the project area (CDFW 2016, USFWS 2016b). This species was confirmed present during July 2016 survey; however, the individual was approximately 150 feet outside of the buffer.
southwestern willow flycatcher	*Empidonax traillii extimus* (nesting)	FE/SE	Nests in dense riparian habitats along streams, reservoirs, or wetlands; uses variety of riparian and shrubland habitats during migration.	Low potential to occur within buffer. Not expected to occur within project site. The project buffer includes a very small portion of the Mojave River, which contains dense riparian habitat suitable for the nesting and foraging of this species. There is one recent occurrence of this species within 5 miles of the project area (USFWS 2016b).
yellow-breasted chat	*Icteria virens* (nesting)	None/SSC	Nests and forages in dense, relatively wide riparian woodlands and thickets of willows, vine tangles and dense brush.	Moderate potential to occur within project buffer. Not expected to occur within project site. The project buffer includes a very small portion of the Mojave River, which contains dense riparian thickets suitable for the nesting and foraging of this species. There are occurrence of this species within 5 miles of the project area (CDFW 2016 and eBird 2016).
golden eagle	*Aquila chrysaetos* (nesting &	None/FP	Nests and winters in hilly, open/semi-open areas,	Low foraging potential, no nesting potential to occur. The project

Table 4
Special-Status Wildlife Species Observed, Protected, or Potentially Occurring in the Project Area

Common Name	Scientific Name	Status (Federal/ State)	Habitat	Potential to Occur
	wintering)		including shrublands, grasslands, pastures, riparian areas, mountainous canyon land, open desert rimrock terrain; nests in large trees and on cliffs in open areas and forages in open habitats.	area contains open foraging habitat in the form of saltbush and creosote bush scrub; however, there is high development around the small swath of suitable habitat and this species is sensitive to disturbance. There are no suitable cliffs or very tall trees for nesting within the project area. There is only a historic occurrence of this species within 5 miles of the project area (CDFW 2016).
summer tanager	*Piranga rubra* (nesting)	None/SSC	Nests and forages in mature desert riparian habitats dominated by cottonwoods and willows.	Moderate potential to occur in buffer. Not expected to occur within project site. The project buffer abuts the Mojave River and contains cottonwood and willow species suitable for the nesting and foraging of this species. There are occurrences of this species within 5 miles of the project area (CDFW 2016 and eBird 2016).
Mammals				
Mojave river vole	*Microtus californicus mohavensis*	None/SSC	Wet, weedy, herbaceous areas along the Mojave River.	Moderate potential to occur with buffer. Not expected within project site. The project buffer abuts the Mojave River, which contains herbaceous scrub suitable for this species. Additionally, there are documented occurrences of this species within the project area (CDFW 2016).
Townsend's big-eared bat	*Corynorhinus townsendii*	None/ SCT	Mesic habitats characterized by coniferous and deciduous forests and riparian habitat, but also xeric areas; roosts in limestone caves and lava tubes, also man-made structures and tunnels.	Moderate foraging potential within project site and buffer. They are not expected to roost in the project site due to the lack of preferred roosts and close proximity to existing residential and a school. The project area abuts the Mojave River, which contains riparian habitat suitable for foraging of this species. There

Table 4
Special-Status Wildlife Species Observed, Protected, or Potentially Occurring in the Project Area

Common Name	Scientific Name	Status (Federal/ State)	Habitat	Potential to Occur
				are no documented occurrences of this species within the project area (CDFW 2016).

This table includes all CNDDB species within an 8-quad search of the surrounding quadrangles: Victorville NW, Helendale, Turtle Valley, Adelanto, Victorville, Apple Valley North, Apple Valley South, Hesperia, Baldy Mesa.

Federal Designations:
FE Federally listed as Endangered
FT Federally listed as Threatened

State Designations:
SSC California Species of Special Concern
FP CDFW Protected and Fully Protected Species
SE State-listed as Endangered
ST State-listed as Threatened
SCT State candidate for state listing as Threatened

Twelve special-status wildlife species either have a moderate to high potential to occur on site, or have low potential to occur but are federally or state listed as threatened or endangered and are further discussed below.

5.4.1 Desert Tortoise

Desert tortoise is a federally and state-listed threatened species. The typical habitat for the desert tortoise in the Mojave Desert is creosote bush scrub where precipitation ranges from 2 to 8 inches, with relatively high diversity of perennial plants, and high productivity of ephemeral plants. Throughout most of the Mojave Desert, desert tortoises occur most commonly on gently sloping terrain with sandy gravel soils with sparse cover of low-growing shrubs, which allows for the establishment of herbaceous plants. Soils must be friable enough for digging of burrows, but firm enough so that burrows do not collapse (USFWS 2008). Although populations of desert tortoise are not generally known to inhabit elevations much above 4,000 feet, this species can occur from below sea level to an elevation of 7,300 feet. Occupied habitat varies from flats and slopes dominated by creosote bush scrub at low elevations, to rocky slopes in blackbrush and juniper woodland ecotones at higher elevations (USFWS 2008).

The project site is within the known range of the desert tortoise and contains suitable habitat (desert wash with saltbush scrub and creosote bush scrub), including soils, for desert tortoise. The nearest occurrence of desert tortoise is documented in 2005 approximately 1.1 miles north of the project site

(CDFW 2016). The next nearest occurrence was documented in 2005, located approximately 1.6 miles northeast of the project site. These occurrences are themselves 0.8 mile apart and located within the hills north of the development boundary of the town of Apple Valley. The project site is separated from the contiguous habitat area where these tortoises were recorded by Highway 18, which is expected to hinder movement onto the project site. Additionally, the project site and other undeveloped areas south of Highway 18 are limited and extent and increasingly fragmented with existing development. Focused surveys with negative findings for desert tortoise were conducted for the project region in May 2002 (MBA), April 2008 (John Wear), and in 2007 as part of the biological technical report prepared for the Lewis Center for Educational Research Specific Plan. Overall, the desert tortoise has a low potential to occur.

5.4.2 Burrowing Owl

Burrowing owl is a California species of special concern. With a relatively wide-ranging distribution throughout the west, burrowing owls are considered to be habitat generalists (Lantz et al. 2004). In California, burrowing owls are yearlong residents of open, dry grassland and desert habitats, and in grass, forb and open shrub stages of pinyon-juniper and ponderosa pine habitats (Zeiner et al. 1990). Preferred habitat is generally typified by short, sparse vegetation with few shrubs, level to gentle topography, and well-drained soils (Haug et al. 1993).

The presence of burrows is the most essential component of burrowing owl habitat as they are required for nesting, roosting, cover, and caching prey (Coulombe 1971, Martin 1973, Green and Anthony 1989, Haug et al. 1993). In California, western burrowing owls most commonly live in burrows created by California ground squirrels (*Spermophilus beecheyi*). Burrowing owls may occur in human-altered landscapes such as agricultural areas, ruderal grassy fields, vacant lots, and pastures if the vegetation structure is suitable (i.e., open and sparse), useable burrows are available, and foraging habitat occurs in close proximity (Gervais et al. 2008). Debris piles, riprap, culverts, and pipes can be used for nesting and roosting.

The project area is comprised of a desert wash with saltbush scrub, creosote bush scrub, and rocky outcrops making up the upland vegetation communities. Ground squirrel burrows were found throughout the site, including within the banks of the wash. There are many documented occurrences (CDFW 2016) on both sides of the Mojave River within 5 miles of the project area. The closest of these occurrences is from 2005 and located approximately 2.1 miles northwest of the project area. Focused surveys for this species were conducted in May 2002 by MBA and in 2008 by John Wear within a region upstream of the proposed project. These surveys were negative (MBA 2002, Wear 2008). Though there are no documented occurrences of this species within the project area, the area has suitable habitat and their potential to occur is moderate.

5.4.3 Loggerhead Shrike

The loggerhead shrike is a California species of special concern. It is widespread throughout the United States, Mexico, and portions of Canada (Humple 2008). In California, while shrikes are widespread at the lower elevations in the state, the largest breeding populations are located in portions of the Central Valley, the Coast Ranges, and the southeastern deserts (Humple 2008).

Preferred habitats for the loggerhead shrike are open areas that include scattered shrubs, trees, posts, fences, utility lines, or other structures that provide hunting perches with views of open ground, as well as nearby spiny vegetation or man-made structures (such as the top of chain-link fences or barbed wire) that provide a location to impale prey items for storage or manipulation (Humple 2008). Loggerhead shrikes occur most frequently in riparian areas along the woodland edge, grasslands with sufficient perch and butcher sites, scrublands, and open canopied woodlands, although they can be quite common in agricultural and grazing areas, and can sometimes be found in mowed roadsides, cemeteries, and golf courses. Loggerhead shrikes occur only rarely in heavily urbanized areas. For nesting, the height of shrubs and presence of canopy cover are most important (Yosef 1996).

The saltbush scrub and creosote bush scrub provide suitable nesting habitat for this species on the project site. The nearest documented occurrence of this species is from 2006 and is approximately 0.5 mile to the northeast of the project area, along the Mojave River. In conclusion, there is moderate potential to find this species within the project area.

5.4.4 Yellow Warbler

The yellow warbler is a California species of special concern. It occurs near rivers, streams, lakes, or wet meadows that contain riparian vegetation (Lowther et al. 1999,; Heath 2008) and nests in wet, deciduous thickets, especially those dominated by cottonwoods (*Populus* spp.), alders (*Alnus* spp.), or willows, and other small trees and shrubs typical of low, open-canopy riparian woodland (Garrett and Dunn 1981).

The riparian hardwood vegetation found within the Mojave River is suitable nesting and foraging habitat for this species. There are documented occurrences of this species within 5 miles of the project area (CDFW 2016, eBird 2016). In conclusion, there is high potential to find this species within the project buffer area that overlaps the Mojave River; however, there is no potential for finding this species within the project site due to the lack of suitable riparian habitat.

5.4.5 Least Bell's Vireo

Least Bell's vireo is a state and federal fully protected species and listed as an endangered species. It primarily occupies riverine riparian habitats along water, including dry portions of intermittent

streams that typically provide dense cover within 1 to 2 meters (3.3 to 6.6 feet) off the ground, often adjacent to a complex, stratified canopy. Least Bell's vireo nesting habitats include southern willow scrub, mulefat scrub, arroyo willow riparian forest edge, wild blackberry thickets, and cottonwood forest (51 FR 16474–16482, Small 1994).

The dense riparian thickets found within the Mojave River portion of the project buffer area is suitable nesting and foraging habitat for this species. There are documented occurrences of this species within 5 miles of the project area (CDFW 2016, USFWS 2016b). This species was also confirmed present during the 2016 site visit; however, the individual was approximately 150 feet outside of the project buffer. There is moderate potential for this species to occur within the project buffer area due to its overlap with the Mojave River. There is no potential for finding this species within the project site because of the lack of suitable riparian habitat.

5.4.6 Southwestern Willow Flycatcher

The southwestern willow flycatcher is listed as a federal and state endangered species. This species typically inhabits dense patches of riparian vegetation that is accompanied by frequent small openings, running water, and a well-developed herbaceous layer (Sogge et al. 1997). Willow flycatcher habitat can vary from small, infrequent patches to large contiguous swaths, though it has been found that southwestern willow flycatchers usually do not nest in narrow, linear riparian habitats less than 10 meters (33 feet) wide (Sogge et al. 1997). Southwestern willow flycatcher nests typically occur in areas with multilayered vegetation and fairly high tree canopy cover (Craig and Williams 1998).

The project buffer includes a very small portion of the Mojave River, which contains dense, riparian habitat suitable for the nesting and foraging of this species. In addition, there is one recent occurrence of this species within 5 miles of the project area (USFWS 2016b). Focused surveys for this species were conducted in May 2002 by MBA within a region upstream of the proposed project. These surveys were negative (MBA 2002). In conclusion, there is a low potential for finding this species within the project buffer area due to the limited extent of the Mojave River within the area. There is no potential for finding this species within the project site due to a lack of suitable nesting and foraging habitat.

5.4.7 Yellow-Breasted Chat

The yellow-breasted chat is a California species of special concern. It nests in early successional riparian habitat with a dense understory for nesting and an open canopy (Comrack 2008). In Southern California, the yellow-breasted chat nests in dense, relatively wide riparian woodlands and thickets of willows, vine tangles, and dense brush with well-developed understories. Nesting areas are associated with the narrow border streams, creeks, sloughs, and rivers (Comrack 2008).

Within the project buffer area, the Mojave River contains dense riparian habitat suitable for the nesting and foraging of this species. In addition, there are documented occurrences of this species within 5 miles of the project area (CDFW 2016, eBird 2016). In conclusion, there is a moderate potential for finding this species within the project buffer area due to its overlap with a very small portion of the Mojave River, but there is no potential for finding this species within the project site because of its lack of suitable riparian habitat.

5.4.8 Summer Tanager

Summer tanager is a California species of special concern. This species typically occupies riparian woodlands dominated by willows (*Salix* spp.) and cottonwoods (*Populus* spp.) at lower elevations (Robinson 1996; Rosenberg et al. 1982, 1991), and mesquite (*Prosopis* spp.) and tamarisk (*Tamarix* spp.) habitats at higher elevations.

The project buffer contains the Mojave River, which has cottonwood and willow species suitable for the nesting and foraging of this species. In addition, there are documented occurrences of this species within 5 miles of the project area (CDFW 2016, eBird 2016). In conclusion, there is a moderate potential for finding this species within the project buffer area due to its overlap with the Mojave River. There is no potential for find this species within the project site because of the lack of suitable riparian habitat.

5.4.9 Mojave River Vole

The Mojave River vole is a California species of special concern. This species has a limited range located in spaces along the Mojave River. It typically inhabits weedy, herbaceous growth in the damp portions of the Mojave River. The reach known to be occupied by this species extends along the Mojave River between Highway 18 and Interstate 15 and supported cottonwood–willow riparian forest with a dense, shrubby understory and emergent wetland (CDFW 2013).

The project buffer is within the known occupied range of this species and contain herbaceous scrub suitable for this species. In addition, there are documented occurrences of this species within 5 miles of the project area (CDFW 2016). In conclusion, there is moderate potential for finding this species within the project buffer area. There is no potential for finding this species within the project site due to the lack of suitable riparian habitat.

5.4.10 Townsend's Big-Eared Bat

The Townsend's big-eared bat is a California species of special concern; however, it is currently under review by CDFW and is a candidate for listing under CESA. This species occurs through most of the western United States, with continuous distribution through all of the western states.

This species occurs primarily within mesic habitats characterized by riparian habitat and coniferous and deciduous forests, though it is also known to occur within more xeric habitat (Kunz and Martin 1982). Roosting habitat for this species is typically comprised of lava tubes and limestone caves, but more recently is comprised of man-made structures and tunnels.

Big-eared bats are not known to migrate or disperse large distances, instead remaining relatively sedentary and exhibiting high fidelity to primary roost sites (Kunz and Martin 1982).This species exhibits high sensitivity to human disturbance; a single disturbance to a maternity roost or hibernation site could cause abandonment (Zeiner et. al. 1990).

Within the project area, Townsend's big-eared bat has a moderate foraging potential within the Mojave River portion of the project buffer, but is not expected to roost. There are several buildings in the project area that could provide roosting potential; however, during the 2016 site visit, no bat sign was observed associated with these structures, which occur adjacent to Highway 18, residential homes, and a school. This species is not expected to roost in an area subject to such a high degree of disturbance. There are no documented occurrences of this species within 5 miles of the project area (CDFW 2016).

5.4.11 Golden Eagle

Golden eagles are listed as Fully Protected in California and are protected by BGEPA (16 U.S.C. 668 et seq.).

Golden eagle nesting habitat typically is comprised of steep cliffs or large trees. Preferred territory sites include those that have a favorable nest site, a dependable food supply, and broad expanses of open country for foraging. Foraging habitat typically includes grasslands and shrublands with access to small mammals (i.e., ground squirrels, rabbits, marmots) (Kochert et al. 2002). Golden eagles breed from late January through August with peak breeding occurring in March through July. Nest construction in Southern California occurs in late fall and continues through winter (Dixon 1937). It is common for the golden eagle to use alternative nest sites, and old nests are generally reused.

Within the project area, there is low potential for golden eagle foraging. While there is open habitat in the form of saltbush and creosote bush that could support foraging, these areas are surrounded by development. The project area does not contain any cliff faces or high trees that would be suitable nesting habitat for golden eagles. There is only one historic occurrence from 1927 of this species within 5 miles of the project area (CDFW 2016).

5.5 Wildlife Corridors and Habitat Linkages

Wildlife corridors are linear features that connect large patches of natural open space and provide avenues for the migration of animals. Wildlife corridors contribute to population viability by assuring continual exchange of genes between populations, providing access to adjacent habitat areas for foraging and mating, and providing routes for recolonization of habitat after local extirpation or ecological catastrophes (e.g., fires).

Habitat linkages are small patches that join larger blocks of habitat and help reduce the adverse effects of habitat fragmentation. Habitat linkages provide a potential route for gene flow and long-term dispersal of plants and animals and may also serve as primary habitat for smaller animals, such as reptiles and amphibians. Habitat linkages may be continuous habitat or discrete habitat islands that function as stepping stones for dispersal.

The project area does not function as a regional wildlife corridor or habitat linkage as it does not link two open space areas together. In addition, the upstream portion of Desert Knolls Wash in the project area occurs as a concrete-lined channel, and therefore even small-scale movement of terrestrial species through the project area may be limited.

5.6 Jurisdictional Delineation

A jurisdictional delineation update was conducted on July 22, 2016, and will be prepared under a separate cover. Preliminary results show that Desert Knolls Wash meets the definition of wetlands and waters of the United States under the jurisdiction of the ACOE and RWQCB, and an unvegetated streambed and riparian under the jurisdiction of CDFW. For more details regarding the jurisdictional waters, refer to the jurisdictional delineation update report that has been submitted for this project (Dudek 2016).

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6 PROJECT IMPACTS

The purpose of this section is to describe the direct and indirect impacts of the proposed project on special-status or regulated biological resources. The significance determinations for proposed or potential impacts are described in Section 7.0. As described in Section 1.2, the proposed project includes the construction of flood control improvements along 0.6-mile segment of the Desert Knolls Wash alignment. This will include the grading of 2:1 channel side slopes and placement of grouted rock along both sides of the channel for slope protection. Based upon this project description, direct (permanent) and indirect (short-term and long-term) impacts are defined below.

6.1 Direct Impacts

Direct impacts are impacts that result from direct ground-disturbing activities. For the proposed project, this includes the proposed construction footprint of the improvements to the Desert Knolls Wash alignment. Direct impacts were quantified by overlaying the proposed construction limits on biological resources utilizing geographic information system (GIS) software as depicted in Figure 6.

6.1.1 Permanent Direct Impacts

Permanent direct impacts consist of new concrete structures, grouted rock, grade stabilization structures, rock invert, and a rock-stilling basin with an internal weir. It also includes associated inlet and outlet structures, channels and/or closed conduits, transition structures, headwalls, wingwalls, embankments, access roads along tops of the embankments and around the alignment, and access ramps to the alignment bottom.

6.1.2 Temporary Direct Impacts

Temporary direct impacts consist of ground disturbance associated with construction activities that would not result in a permanent structure and that would be restored to existing conditions after construction is complete. Temporary impacts may result from equipment staging, equipment turn-around areas, and construction access.

6.2 Indirect Impacts

Indirect impacts are reasonably foreseeable effects to biological resources caused by the proposed project on remaining or adjacent biological resources. Indirect impacts may be short-term construction-related impacts due to noise and dust or longer-term operational impacts, such as changes in hydrology or degradation of adjacent habitat. Examples of indirect impacts are described in the following paragraphs.

6.2.1 Permanent Indirect Impacts

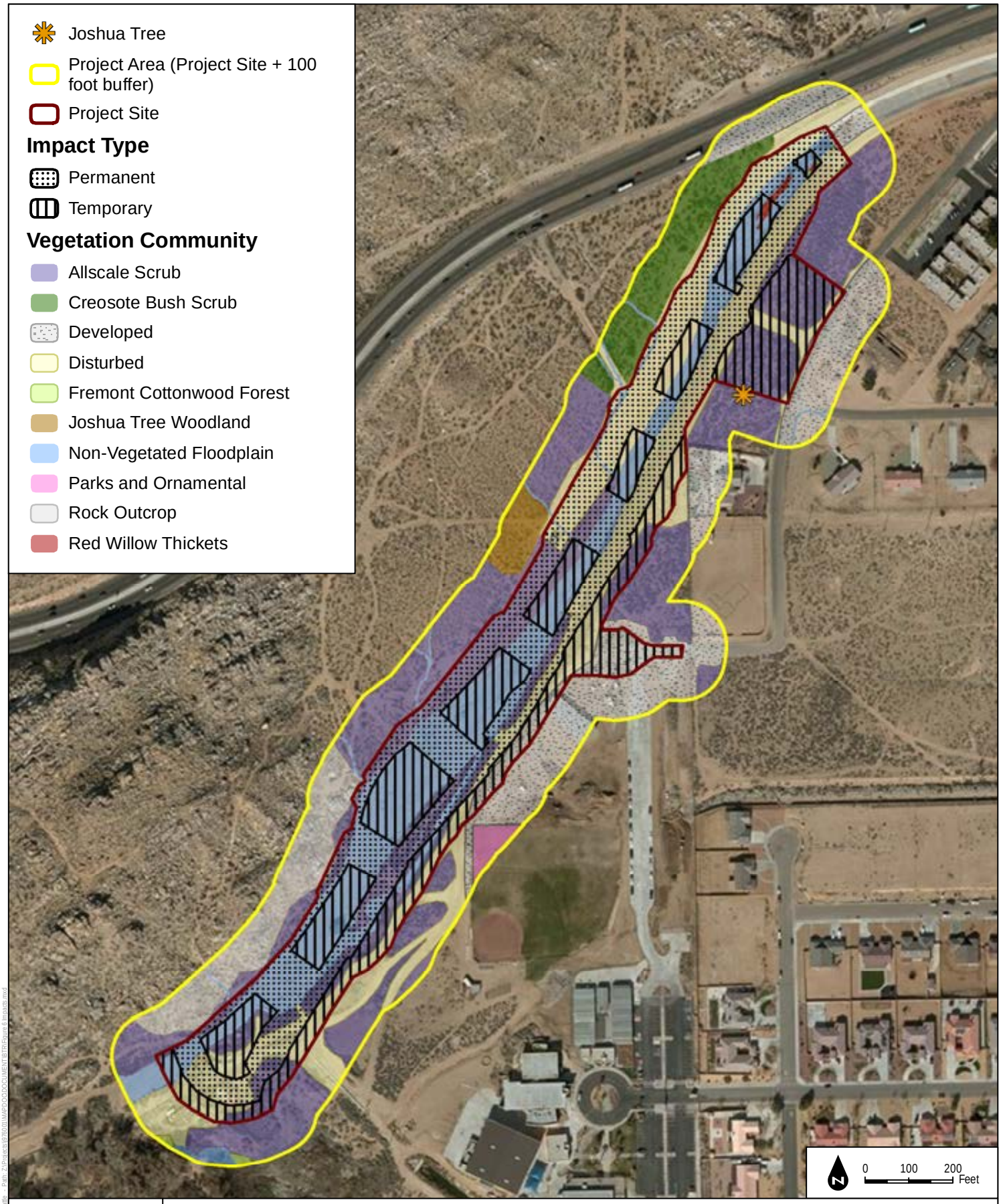
Potential long-term indirect impacts to special-status wildlife species include altered hydrology and hydraulics. A hydraulic analysis prepared in 2011 by Rivertech Inc. and URS examined the effects of different channel designs on sediment transport to the Mojave River downstream (Rivertech Inc. and URS 2011).

6.2.2 Temporary Indirect Impacts

Construction activities can result in a number of potential indirect impacts to the biological resources surrounding the project site. These include fugitive dust, which can cover plants and change structure and function. Project-related noise could occur from equipment used during construction activities and can have a variety of indirect impacts on wildlife species, including increased stress, weakened immune systems, altered foraging behavior, displacement due to startle, degraded communication with conspecifics (e.g., masking), damaged hearing from extremely loud noises, and increased vulnerability to predators (Lovich and Ennen 2011). The project is within a wash, and spills of hazardous chemicals could contaminate surface waters and indirectly impact wildlife species through direct or secondary poisoning and other sub-lethal effects (e.g., endocrine impacts), reduced prey availability, or altering suitable habitat. Construction activities result in increased human activity and can deter wildlife from using habitat areas near or adjacent to the project site. Food trash from Project-related activities could attract predators, such as ravens, that could impact wildlife species in the project area.

6.3 Explanation of Findings of Significance

Impacts to special-status vegetation communities, plants, and wildlife species, and jurisdictional waters, including wetlands, must be quantified and analyzed to determine whether such impacts are significant under CEQA. CEQA Guidelines Section 15064(b) states that an ironclad definition of “significant” effect is not possible because the significance of an activity may vary with the setting. Appendix G of the CEQA Guidelines, however, does provide “examples of consequences which may be deemed to be a significant effect on the environment” (CEQA Guidelines, Section 15064[e]). These effects include substantial effects on rare or endangered species of animal or plant or the habitat of the species. CEQA Guidelines Section 15065(a) is also helpful in defining whether a project may have “a significant effect on the environment.” Under that section, a proposed project may have a significant effect on the environment if the project has the potential to: (1) substantially degrade the quality of the environment, (2) substantially reduce the habitat of a fish or wildlife species, (3) cause a fish or wildlife population to drop below self-sustaining levels, (4) threaten to eliminate a plant or animal community, (5) reduce the number or restrict the range of a rare or endangered plant or animal, or (6) eliminate important examples of a major period of California history or prehistory.



SOURCE: Bing Maps, 2016

FIGURE 6

Biological Resource Impacts

DUDEK

Desert Knolls Wash Phase III Flood Control Improvement Project

Date: 12/1/2016 – Last saved by: cbattle – Path: Z:\Projects\07560\MAPDOCDOCUMENT\BTR\Figure 6 Impacts.mxd

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The following are the significance thresholds for biological resources provided in the CEQA Guidelines Appendix G Environmental Checklist, which states that a project could potentially have a significant affect if it:

- **Impact Bio-1.** Has a substantial adverse effect, either directly or through habitat modifications, on any species identified as being a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS
- **Impact Bio-2.** Has a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS
- **Impact Bio-3.** Has a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means
- **Impact Bio-4.** Interferes substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impedes the use of native wildlife nursery sites
- **Impact Bio-5.** Conflicts with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance
- **Impact Bio-6.** Conflicts with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or state habitat conservation plan.

The evaluation of whether or not an impact to a particular biological resource is significant must consider both the resource itself and the role of that resource in a regional context. Substantial impacts are those that contribute to, or result in, permanent loss of an important resource, such as a population of a rare plant or animal. Impacts may be important locally because they result in an adverse alteration of existing site conditions, but considered not significant because they do not contribute substantially to the permanent loss of that resource regionally. The severity of an impact is the primary determinant of whether or not that impact can be mitigated to a level below significance.

6.4 Impact Bio-1: Special-Status Species

6.4.1 Impacts to Special-Status Plant Species

No special-status plants were observed during the 2016 survey. Four special-status plant species have a moderate potential to occur within the project area: desert cymopterus, Mojave monkeyflower, Beaver Dam breadroot, and San Bernardino aster.

Desert Cymopterus

Desert cymopterus has a moderate potential to occur within the project area. Approximately 2.05 acres of suitable habitat will be permanently impacted and 1.91 acres will be temporarily impacted by the proposed project.

Impacts to desert cymopterus are considered potentially significant without appropriate mitigation. Implementation of MM-BIO-1 would reduce impacts to less than significant.

Mojave Monkeyflower

Mojave monkeyflower has a moderate potential to occur within the project area. Approximately 3.89 acres of suitable habitat will be permanently impacted and 4.24 acres will be temporarily impacted by the proposed project.

Impacts to Mojave monkeyflower are considered potentially significant without appropriate mitigation. Implementation of MM-BIO-1 would reduce impacts to less than significant.

Beaver Dam Breadroot

Beaver Dam breadroot has a moderate potential to occur within the project area. Approximately 3.89 acres of suitable habitat will be permanently impacted and 4.24 acres will be temporarily impacted by the proposed project.

Impacts to Beaver Dam breadroot are considered potentially significant without appropriate mitigation. Implementation of MM-BIO-1 would reduce impacts to less than significant.

San Bernardino Aster

San Bernardino aster has a moderate potential to occur within the project buffer area. There is no suitable habitat expected to be impacted by the proposed project. Therefore, impacts to San Bernardino aster are considered less than significant.

6.4.2 Impacts to Special-Status Wildlife Species

6.4.2.1 Direct Impacts

Desert Tortoise

Desert tortoise has a low potential to occur within the wash and the native vegetation communities present within the project area. Approximately 3.89 acres of low-quality habitat will be permanently impacted and 4.24 acres will be temporarily impacted by the proposed project.

Potential harm to desert tortoise as a result of project implementation would be considered a significant impact without appropriate mitigation. Implementation of MM-BIO-2 would reduce impacts to less than significant.

Townsend's Big-Eared Bat

Townsend's big-eared bat has a moderate foraging potential, but is not expected to roost. Project impacts to this species are considered less than significant due to the presence of high-quality foraging habitat in the surrounding areas associated with the Mojave River.

Burrowing Owl

Burrowing owl has a moderate potential to occur within the wash and the surrounding native vegetation communities present within the project area. Approximately 7.34 acres of suitable habitat will be permanently impacted and 5.89 acres of suitable habitat will be temporarily impacted by the proposed project.

Potential harm to burrowing owl as a result of project implementation would be considered a significant impact without appropriate mitigation. Implementation of MM-BIO-3 would reduce impacts to less than significant.

Southwestern Willow Flycatcher

Southwestern willow flycatcher does not have potential to occur within the project area; however, USFWS critical habitat for this species is within 0.10 mile of the project area. No USFWS critical habitat will be impacted by the proposed project.

Loggerhead Shrike

Loggerhead shrike has a moderate potential to occur within the wash and the surrounding native vegetation communities present within the project area. Approximately 2.05 acres of suitable habitat will be permanently impacted and 1.91 acres of suitable habitat will be temporarily impacted by the proposed project. This small loss of potentially suitable habitat is not expected to result in decreased loggerhead shrike numbers locally or regionally, and the potential impact is considered less than significant.

Loggerhead shrike nests could be present on the project site and are protected by the Migratory Bird Treaty Act and California Fish and Game Code. Potential impacts to loggerhead shrike nests and other bird nests would be a violation of the Migratory Bird Treaty Act and California

Fish and Game Code and considered significant without appropriate mitigation. Implementation of MM-BIO-4 would reduce impacts to less than significant.

Mojave River Vole

Mojave River vole has a moderate potential to occur within the project buffer. No portion of the Mojave River is expected to be impacted with the proposed project; therefore, impacts to Mojave River vole will not occur with project implementation.

Golden Eagle

Golden eagle has a low potential to forage within the wash and the surrounding native vegetation communities present within the project area. Approximately 3.89 acres of suitable habitat will be permanently impacted and 4.24 acres of suitable habitat will be temporarily impacted by the proposed project. Due to the low potential of the habitat being used by golden eagle and lack of recorded nests in the area, this impact is considered less than significant.

6.4.2.2 Indirect Impacts

Short-Term Indirect Impacts

Project construction activities in the southwestern portion of the project site are adjacent to riparian habitat that is suitable for a number of special-status bird species, including least Bell's vireo, southwestern willow flycatcher, yellow-breasted chat, summer tanager, and yellow warbler. Because least Bell's vireo and southwestern willow flycatcher are federally and state endangered, potential indirect effects, such as construction noise above baseline and human presence/motion, could result in impacts to nesting individuals and would be considered significant without appropriate mitigation. Implementation of MM-BIO-5 would reduce potential indirect impacts to nesting least Bell's vireo, southwestern willow flycatcher, yellow-breasted chat, summer tanager, and yellow warbler.

Project construction activities have the potential to significantly impact downstream special status biological resources such as wetlands, riparian areas, and associated species through release of chemical pollutants from fuels, oil, lubricants, or other substances. Implementation of MM-BIO-6 would reduce impacts to less than significant.

Long-Term Indirect Impacts

Long-term indirect impacts include potential downstream effects on riparian bird species habitat, including least Bell's vireo and southwestern willow flycatcher, as well as to Mojave River vole

habitat as a result of hydrologic differences from the change in stream flow. The hydrology report prepared by Rivertech Inc. and URS determined that average velocity as a result of project implementation would be lower than baseline (Rivertech Inc. and URS 2011). Therefore, it is assumed that project implementation is not expected to reduce the quantity of suitable habitat for species using the Mojave River, and impacts are considered less than significant.

6.5 Impact Bio-2: Vegetation Communities and Land Covers

6.5.1 Direct Impacts

6.5.1.1 Permanent Direct Impacts

Figure 6 and Table 5 shows the acreage of permanent direct impacts to vegetation communities and land covers in the project site. One sensitive vegetation community, red willow thickets, will be permanently impacted by the proposed project. Permanent direct impacts to 0.03 acre of red willow thickets is considered significant without appropriate mitigation. Implementation of MM-BIO-7 would reduce impacts to less than significant.

Table 5
Permanent Impacts to Vegetation Communities within the Project Site

Vegetation Community/ Land Cover Type	Total Impacts Acreage (acres)
Allscale Scrub	2.05
Creosote Bush Scrub	<0.01
Red Willow Thickets*	0.03
Non-vegetated Floodplain	1.84
Rock Outcrop	0.02
Disturbed	3.43
Developed	0.02
Total**	**7.40**

Notes:
* Sensitive vegetation community per CDFG 2010.
** Totals may not sum due to rounding.

6.5.1.2 Temporary Direct Impacts

Table 6 and Figure 6 show the acreage of temporary direct impacts to vegetation communities and land covers in the project area. No sensitive plant communities will be temporarily impacted.

Table 6
Temporary Impacts to Vegetation Communities within the Project Site

Vegetation Community/ Land Cover Type	Total Impacts Acreage (square feet)
Allscale Scrub	1.91
Red Willow Thickets	0.05
Non-vegetated Floodplain	2.33
Disturbed	1.65
Developed	0.60
Total *	**6.55**

Note:
* Totals may not sum due to rounding.

6.5.2 Indirect Impacts

Potential short-term indirect impacts to riparian communities in the buffer of the project site would primarily result from the potential generation of fugitive dust. Excessive dust can decrease the vigor and productivity of vegetation through effects on light, penetration, photosynthesis, respiration, transpiration, increased penetration of phytotoxic gaseous pollutants, and increased incidence of pests and diseases. Implementation of MM-BIO-6 would reduce impacts to less than significant.

6.6 Impact Bio-3: Jurisdictional Waters

For the purposes of this analysis, this threshold has been expanded to include all jurisdictional waters regulated by the CWA and Fish and Game Code. There is 0.11 acre of CDFW riparian habitat within the footprint that will be impacted (0.03 acre permanent and 0.08 acre temporary). Of this CDFW riparian habitat, 0.08 acre is also considered ACOE/RWQCB wetlands that will be impacted (0.03 acre permanent and 0.05 acre temporary). These impacts are considered significant and require mitigation.

Permanent direct impacts to 1.85 acres and temporary direct impacts to 2.33 acres of nonwetland waters of the United States, and 3.12 acres of permanent impacts and 2.81 acres of temporary impacts to streambed are considered significant, requiring mitigation. Implementation of MM-BIO-7 would reduce impacts to less than significant.

For a full discussion of impacts to jurisdictional waters, see the jurisdictional delineation update report that has been submitted for this project (Dudek 2016), as well as Table 7 below.

Table 7
Jurisdictional Waters Delineation Impacts Summary

Jurisdiction	Vegetation Community	Temporary Impact Acreage	Permanent Impact Acreage	Total Impact Acreage
ACOE/RWQCB Wetland Waters	Red Willow Thickets	0.05	0.03	0.08
	Non-vegetated Floodplain	<0.01	0.00	<0.01
ACOE/RWQCB Wetland Waters Subtotal		*0.05*	*0.03*	*0.08*
ACOE/RWQCB Non-Wetland Waters	Non-vegetated Floodplain	2.33	1.84	4.14
	Developed	0.00	0.01	0.01
ACOE/RWQCB Non-wetland Waters Subtotal		*2.33*	*1.85*	*4.18*
CDFW Unvegetated Streambed	Allscale Scrub	0.32	0.52	0.84
	Non-vegetated Floodplain	2.30	1.84	4.14
	Disturbed	0.19	0.74	0.93
	Developed	0.00	0.02	0.02
CDFW Unvegetated Streambed Subtotal		*2.81*	*3.12*	*5.93*
CDFW Riparian	Red Willow Thickets	0.05	0.03	0.08
	Non-vegetated Floodplain	0.03	<0.01	0.03
CDFW Riparian Subtotal		*0.08*	*0.03*	*0.11*

Note: * Acreage may not total due to rounding.

6.7 Impact Bio-4: Wildlife Corridors

The project site does not function as a wildlife corridor and no potential impacts will occur.

6.8 Impact Bio-5: Local Policies or Ordinances

The project site has been acquired by the District and owned in fee title, which would exempt the project from the native desert plant protection ordinance. However, it has been the District's practice to identify healthy, salvageable native desert plant specimens and relocate them prior to construction. The project would not be in conflict with any local policies or ordinances. One Joshua tree occurs immediately adjacent to the project footprint, but it will be protected in place by implementation of MM-BIO-6.

6.9 Impact Bio-6: Habitat Conservation Plan

The project is not within the boundaries of the in-progress multi-species HCP for the town of Apple Valley. This plan has not been approved, and therefore the Desert Knolls Wash Phase III Flood Control Improvement Project would not be in conflict with this plan, nor any other approved local, regional, or state HCP.

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7 RECOMMENDED AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES

7.1 Impact BIO-1

Significant direct and indirect impacts to special-status species can be mitigated to below a level of significance with implementation of the following measures.

MM-BIO-1 Special-Status Plants

Surveys shall be conducted for special-status plant species the season prior to construction. Surveys shall occur at the appropriate time to capture the characteristics necessary to identify the taxon. Surveys shall be conducted consistent with CDFW protocols and by a qualified botanist knowledgeable of the local flora. If special-status plants are not observed during focused surveys, no additional mitigation is required.

If a special-status plant species is detected, the outer extent of each occurrence shall be flagged at the time of the survey and the following avoidance measures implemented:

- **Establish Environmentally Sensitive Areas (ESAs)**. Prior to the start of any ground- or vegetation-disturbing activities, a qualified biologist shall establish ESAs to protect and avoid special-status plants that occur outside of the project disturbance areas and within 100 feet of project disturbance areas. The locations of ESAs shall be clearly depicted on construction drawings, which shall also include all avoidance and minimization measures on the margins of the construction plans. ESAs shall be clearly delineated in the field with temporary construction fencing to ensure that avoided plants are not inadvertently harmed during construction.
- **Monitoring.** A qualified biologist shall conduct weekly monitoring of the ESAs that protect special-status plant occurrences. The monitor shall have the authority to stop construction activities in the vicinity (within 100 feet) of an ESA if it is determined as a result of monitoring that corrective actions are necessary to avoid and protect the ESA.

For direct permanent impacts, the loss of the occurrence shall be assessed in the context of the regional population for that species. If the loss of the occurrence would result in a greater than 10% loss of the population, mitigation shall be implemented for direct impacts to special-status plants through one or a combination of the following strategies.

- **Off-site compensation**. Compensation lands with occupied habitat at a 1:1 ratio for any habitat occupied by special-status plants impacted by the project. Occupied habitat will

be calculated on the project site and on the compensation lands as including each special-status plant occurrence and a surrounding 100-foot buffer area.

- **Salvage**. The County shall consult with the Rancho Santa Ana Botanic Gardens or another qualified entity, to develop an appropriate experimental salvage and relocation strategy, based on the life history of the species permanently impacted. The plan shall include at minimum: (a) collection/salvage measures for plants or seed banks, to retain intact soil conditions and maximize success likelihood; (b) details regarding storage of plants or seed banks; (c) location of the proposed recipient site, and detailed site preparation and plant introduction techniques details for top soil storage, as applicable; (d) time of year that the salvage and replanting or seeding will occur and the methodology of the replanting; (e) a description of the irrigation, if used; (f) success criteria; and (g) a detailed monitoring program, commensurate with the plan's goals.

MM-BIO-2 Desert Tortoise

A preconstruction desert tortoise survey shall be conducted in accordance with current USFWS protocol. If the survey is negative, no additional mitigation is required.

If the survey is positive, an incidental take permit (ITP) shall be obtained from the USFWS and CDFW. Occupied habitat shall be mitigated at a minimum 1:1 ratio or as specified in the ITP. Avoidance and minimization measures shall be implemented in accordance with provisions of the ITP and shall include, at a minimum:

- Environmental awareness training for all construction personnel to educate them on desert tortoise, protective status, and avoidance measures to be implemented by all personnel, including looking under vehicles and equipment prior to moving;
- Presence of a qualified biological monitor during initial grading activities and as needed to document compliance with the conditions of the ITP, the biological monitor will have the authority to stop work as needed to avoid direct impact to desert tortoise;
- Should a desert tortoise be found during construction activities, activities shall cease until either the tortoise moves out of harm's way or a qualified biologist authorized under the project's ITP ("authorized biologist") relocates the tortoise.

MM-BIO-3 Burrowing Owl

A preconstruction survey shall be conducted in accordance with the latest CDFW guidelines. If the survey is negative, no additional mitigation is required. If the survey is positive, a burrowing owl management plan will be prepared that describes the nature and significance of the impact

and then sets mitigation goals as described in the CDFW Staff Report on Burrowing Owl Mitigation (CDFG 2012). The burrowing owl management plan would be approved by CDFW. At a minimum, the burrowing owl management plan would include on-site measures to avoid harm to burrowing owls, as well as burrow creation and habitat enhancement.

MM-BIO-4 Loggerhead Shrike and other Nesting Bird Species

Ground-disturbance activities shall be avoided during nesting bird season, from approximately February 1 through August 31. If ground-disturbing activities cannot be completed outside the nesting bird season, the following measures shall be implemented:

Surveys shall be conducted within 300 feet of disturbance areas (500 feet for raptors, least Bell's vireo, and southwestern willow flycatcher) no earlier than 3 days prior to the commencement of disturbance. If ground-disturbance activities are delayed, then additional pre-disturbance surveys shall be conducted such that no more than 3 days will have elapsed between the survey and ground-disturbance activities.

If active nests are found, clearing and construction shall be postponed or halted within a buffer area established by the qualified biologist that is suitable to the particular bird species and location of the nest until the nest is vacated and juveniles have fledged, as determined by the qualified biologist. The construction avoidance area shall be clearly demarcated in the field with highly visible construction fencing or flagging, and construction personnel shall be instructed on the sensitivity of nest areas. A qualified biologist shall serve as a construction monitor during those periods if construction activities must occur within active nest buffer area to ensure that no inadvertent impacts on these nests occur. The results of the survey, including graphics showing the locations of any active nests detected, and documentation of any recommended avoidance measures, shall be submitted to the County within 24 hours.

MM-BIO-5 Least Bell's Vireo and other Special-Status Riparian Bird Species

Ground-disturbance activities shall be avoided during the riparian bird nesting season, from approximately April 1 through August 15. If ground-disturbing activities cannot be completed outside the nesting bird season, the following measures shall be implemented:

If construction activities begin between March 15 and September 15, two preconstruction surveys shall be conducted within riparian habitat found within 500 feet of the disturbance areas. One survey shall occur no earlier than 7 days prior to the commencement of activity, with the second occurring within 3 days of activity commencement. If ground-disturbance activities are delayed, then additional pre-disturbance surveys shall be conducted such that no more than 3 days will have elapsed between

the last survey and ground-disturbance activities. The survey shall be completed by a biologist who holds a USFWS permit for southwestern willow flycatcher.

If active nests of least Bell's vireo, southwestern willow flycatcher, yellow-breasted chat, summer tanager, or yellow warbler are found, the qualified biologist would monitor and determine if construction noise levels or motion are potential sources for nest failure, and avoidance buffers would be established accordingly. Additional follow-up weekly visits by the qualified biologist would be required if active nests occur within 300 feet of the project construction activities.

MM-BIO-6 Indirect Impacts to Special-Status Species

Best management practices shall be implemented to minimize indirect impacts to special-status species.

1. **Minimize construction impacts.** The construction limits shall be flagged prior to ground-disturbance activities and all construction activities, including equipment staging and maintenance, shall be conducted within the flagged disturbance limits.
2. **Avoid Toxic Substances on Road Surfaces.** Soil bonding and weighting agents used on unpaved surfaces shall be non-toxic to wildlife and plants.
3. **Avoid Wildlife Entrapment:**
    a. ***Backfill trenches.*** At the end of each workday, check that all potential wildlife pitfalls (trenches, bores, and other excavations) have been backfilled, covered, or sloped to allow wildlife egress. Should wildlife become trapped, a qualified biologist shall remove and relocate it.
    b. ***Avoid entrapment of nesting or migratory birds.*** All pipes or other construction materials or supplies will be covered or capped in storage or laydown areas at the end of each workday. No pipes or tubing of sizes or inside diameters ranging from 1 to 10 inches will be left open either temporarily or permanently.
4. **Minimize Spills of Hazardous Materials.** All vehicles and equipment shall be maintained in proper condition to minimize the potential for fugitive emissions of motor oil, antifreeze, hydraulic fluid, grease, or other hazardous materials. Hazardous spills shall be immediately cleaned up, and the contaminated soil shall be properly handled or disposed of at a licensed facility. Servicing of construction equipment shall take place only at a designated staging area.
5. **Worker Guidelines.** All trash and food-related waste shall be placed in self-closing containers and removed regularly from the site to prevent overflow. Workers shall not feed wildlife or bring pets to the project site.

6. **Invasive Weeds.** The spread of invasive weeds shall be minimized through removal of non-native weed species and remedial measures as determined during routine monitoring.
7. **Dust Minimization**. The spread of dust shall be minimized through periodic watering of actively disturbed soils or previously disturbed soils.

7.2 Impact BIO-3

Significant direct and indirect impacts to jurisdictional waters can be mitigated to below a level of significance with implementation of the following mitigation measure.

MM-BIO-7 Avoidance, Minimization, and Mitigation for Jurisdictional Waters

Appropriate permits shall be obtained from the regulatory agencies, including a CWA Section 404 permit from the ACOE (an Individual Permit will be required), a Water Quality Certification from the RWQCB, and a Streambed Alteration Agreement from the CDFW.

All mitigation measures and conditions contained within the permits shall be implemented. At a minimum, the following shall be completed for mitigation for impacts to waters of the United States and jurisdictional streambed:

1. **Compensation for Permanent Impacts:** Permanent impacts to waters of the United States and jurisdictional streambed shall be offset by compensation at a minimum 1:1 ratio, or as otherwise required by the respective permits. Permanent impacts to ACOE/RWQCB wetland and CDFW riparian vegetation will be offset by compensation at a 2:1 ratio, or as otherwise required by the respective permits. CDFW riparian vegetation is made up of red willow thickets, a sensitive plant community, and therefore this mitigation ratio will also compensate for impacts to sensitive plant communities.
2. **Temporary Impacts:** All areas temporarily impacted shall be restored to native grade and contour.
3. **Best Management Practices**. Avoided jurisdictional waters shall be fenced or flagged as an ESA. Best management practices shall be implemented to avoid indirect impacts to jurisdictional waters, including:
    a. Vehicles and equipment will not be operated in ponded or flowing water except as described in the permits.
    b. Water containing mud, silt, or other pollutants from grading or other activities will not be allowed to enter jurisdictional waters or be placed in locations that may be subjected to high storm flows.

c. Spoil sites will not be located within 30 feet from the boundaries of jurisdictional waters or in locations that may be subject to high storm flows, where spoils might be washed back into drainages.

d. Raw cement/concrete or washings thereof, asphalt, paint, or other coating material, oil, or other petroleum products, or any other substances that could be hazardous to vegetation or wildlife resources, resulting from project-related activities, will be prevented from contaminating the soil and/or entering avoided jurisdictional waters.

e. No equipment maintenance will occur within 150 feet of jurisdictional waters, and no petroleum products or other pollutants from the equipment will be allowed to enter these areas or enter any off-site state-jurisdictional waters under any flow.

8 REFERENCES

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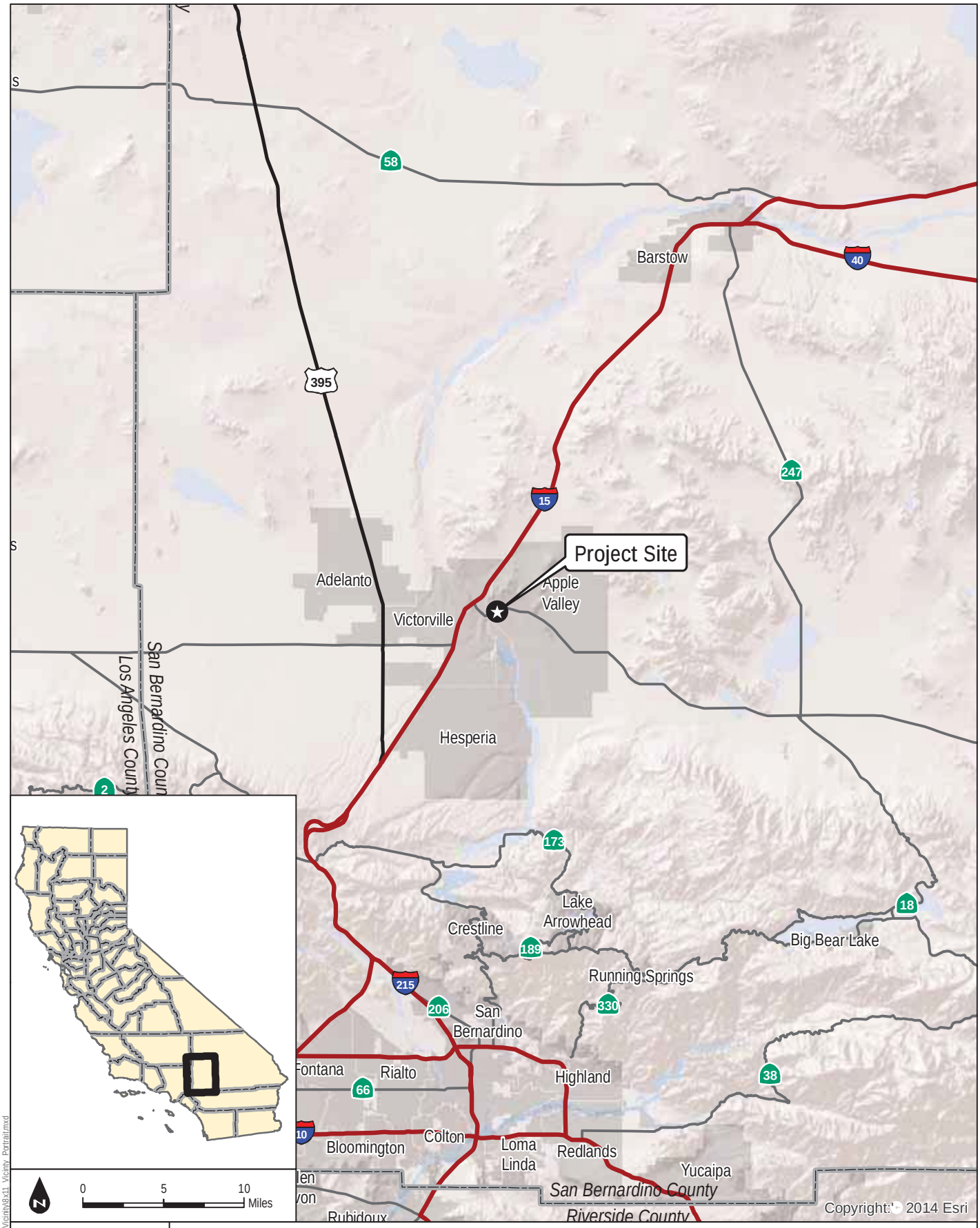
APPENDIX A

Figures 1–6



DUDEK

FIGURE 1

Regional Map

Desert Knolls Wash Phase III Flood Control Improvement Project

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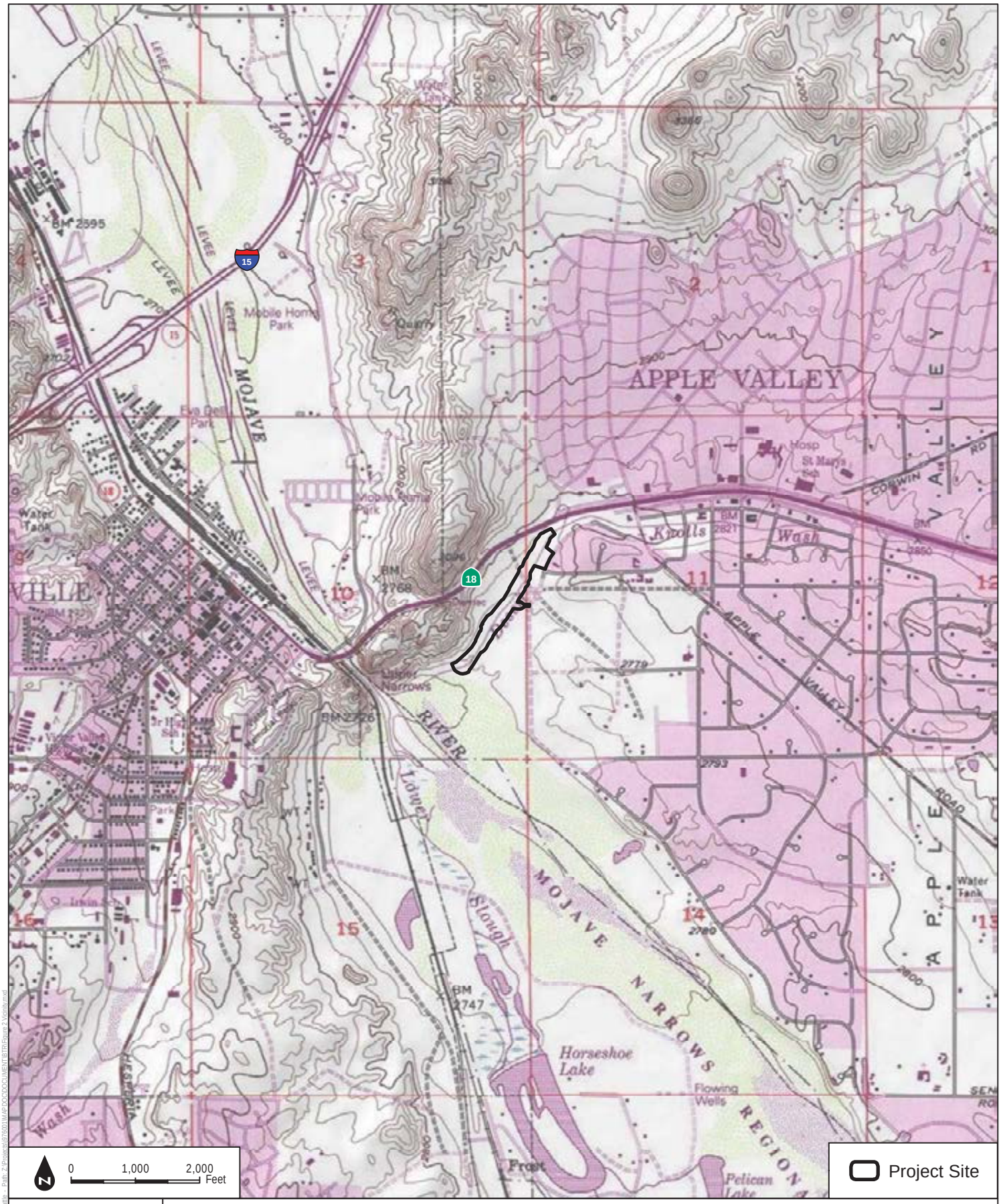

SOURCE: USGS 7.5-Minute Series Victorville Quadrangle

FIGURE 2
Vicinity Map

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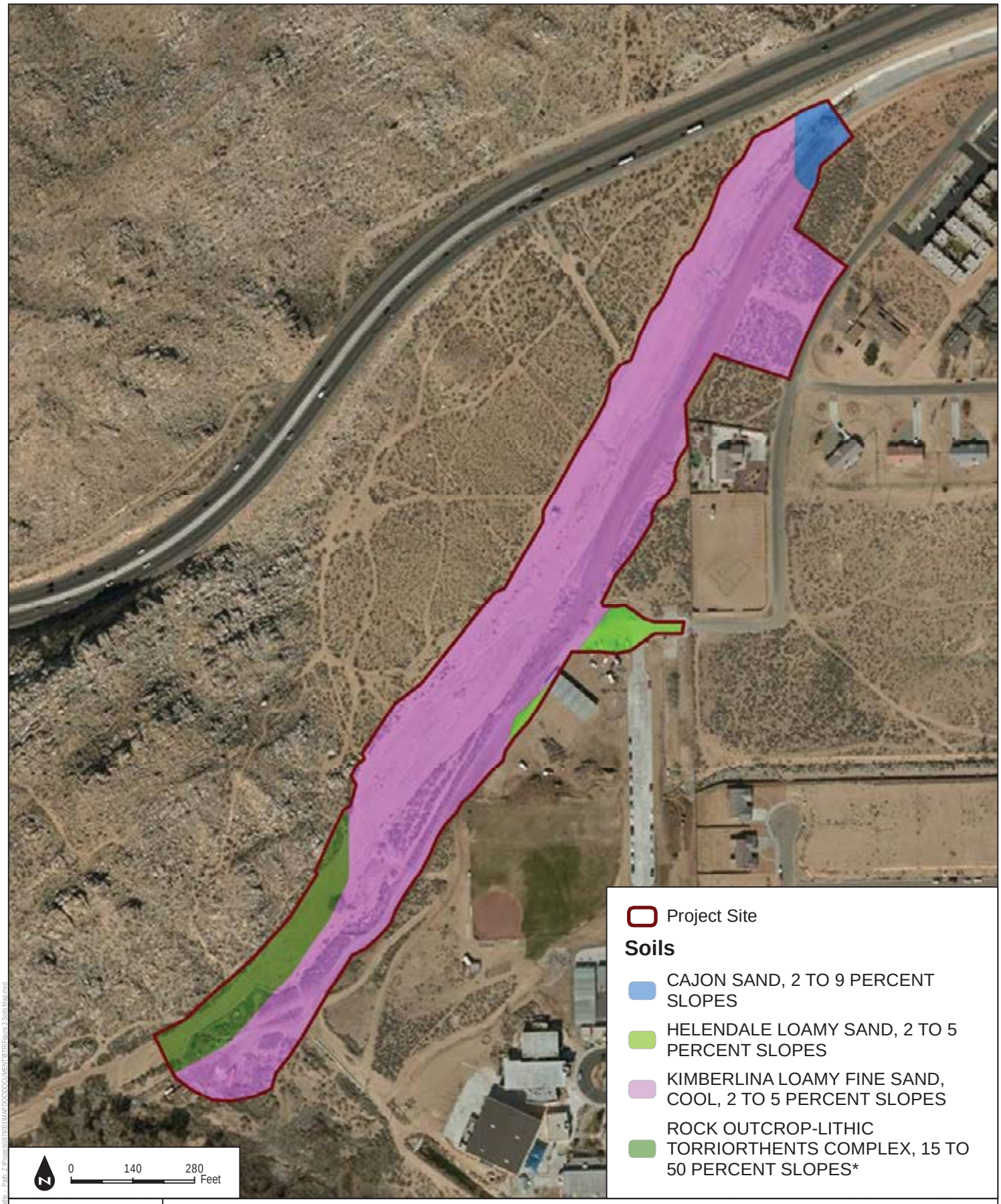
Desert Knolls Wash Phase III Flood Control Improvement Project



SOURCE: Bing Maps, 2016; County of San Bernardino, 2016

FIGURE 3

Soils Map

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Desert Knolls Wash Phase III Flood Control Improvement Project

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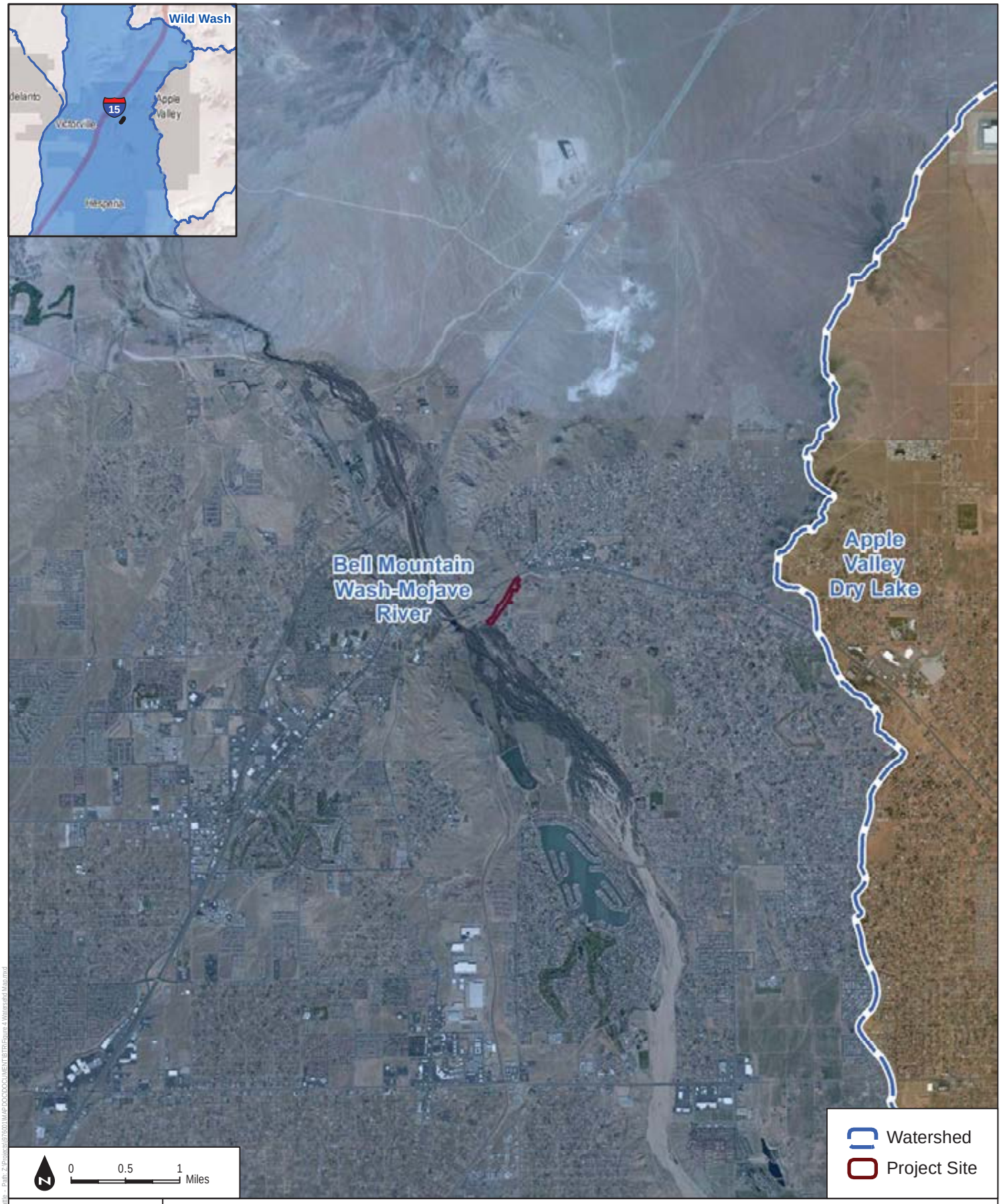

SOURCE: Bing Maps, 2016; County of San Bernardino, 2016

FIGURE 4

Watershed Map

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Desert Knolls Wash Phase III Flood Control Improvement Project

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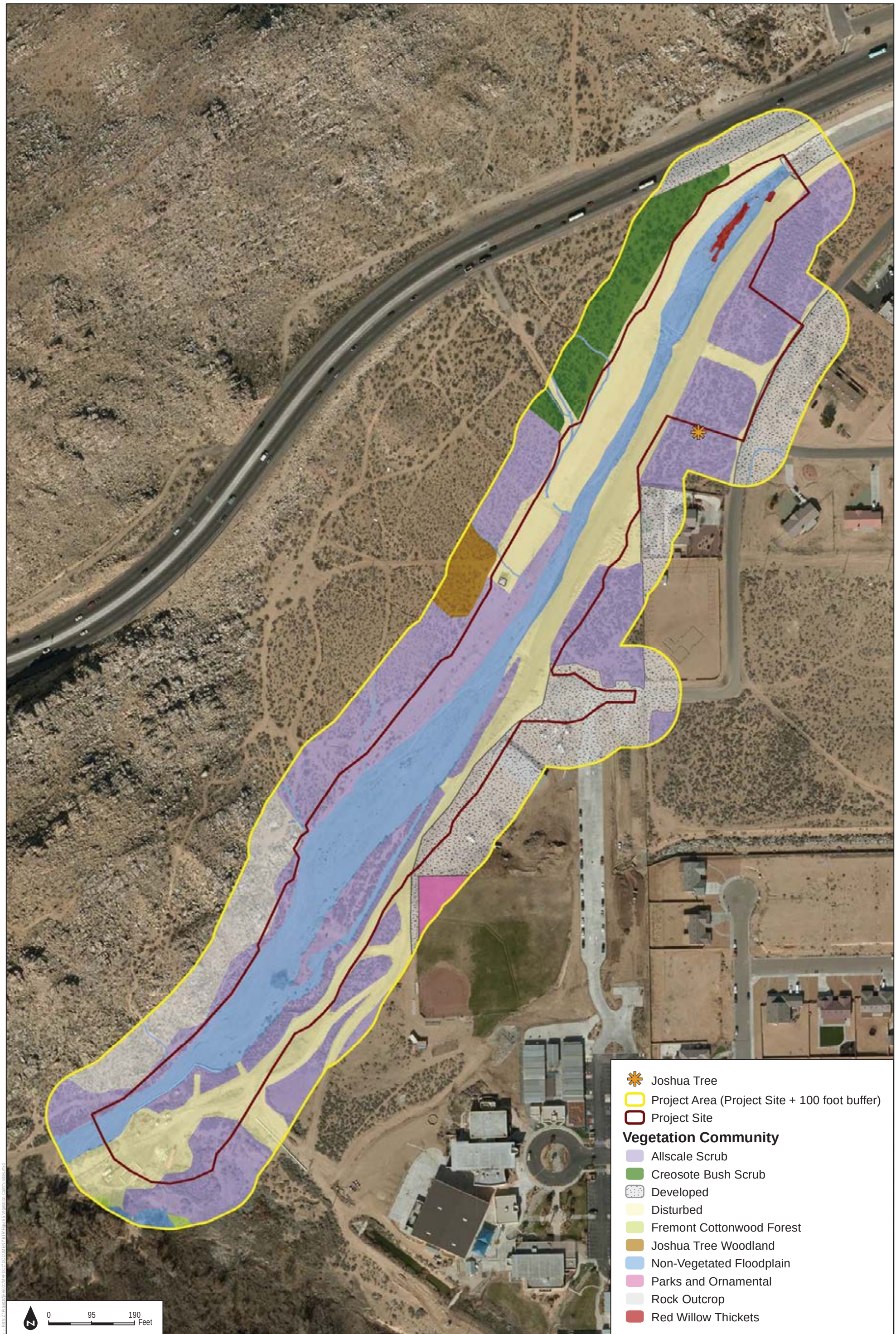

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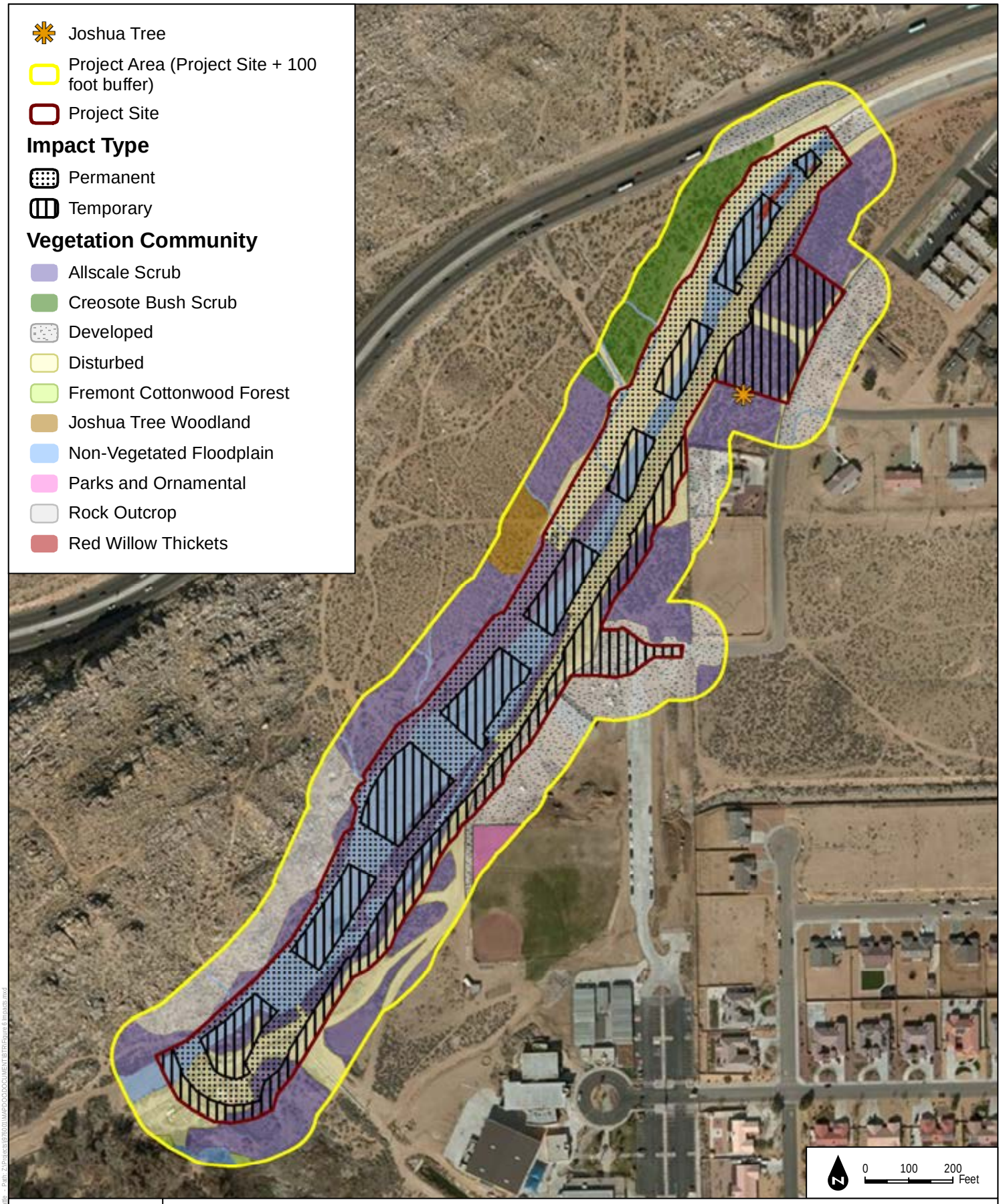
SOURCE: Bing Maps, 2016

FIGURE 5

Vegetation Communities

Desert Knolls Wash Phase III Flood Control Improvement Project



SOURCE: Bing Maps, 2016

FIGURE 6

Biological Resource Impacts

DUDEK

Desert Knolls Wash Phase III Flood Control Improvement Project

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APPENDIX B

Photo Documentation

ATTACHMENT B
Photo Documentation

Location 1: View of Fremont's cottonwoods within Mojave River at southwestern corner of project area – facing west.	**Location 2:** Junction of Mojave River and Desert Knolls Wash – facing southwest.
Location 3: Saltbush scrub and rock outcrops that line northwestern side of wash – facing north.	**Location 4:** Desert willow located at junction of Desert Knolls Wash and one of its tendrils – facing northeast.

Location 5: View upstream from central portion of Desert Knolls Wash – facing northeast.	**Location 6:** Burrows located along bank of Desert Knolls Wash – facing southeast.
Location 7: Sewer access within Desert Knolls Wash – facing northwest.	**Location 8**: View downstream from northern bank – facing south.

Location 9: Riprap sides and wetland habitat within northeastern portion of project area – facing southwest.	**Location 10:** Immature cottonwood trees and mulefat scrub within northeastern portion of project area – facing northeast.
Location 11: Channel inlet at junction between the natural portion of Desert Knolls Wash and its concrete intersection – facing northwest.	**Location 12:** Joshua tree within project area – facing west.

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APPENDIX C

Cumulative List of Plant and Wildlife Species within the Project Area

APPENDIX C
Cumulative List of Plant and Wildlife Species within the Project Area

PLANTS

VASCULAR SPECIES

MONOCOTS

AGAVACEAE—AGAVE FAMILY

Yucca brevifolia—Joshua tree

POACEAE—GRASS FAMILY

* *Schismus barbatus*—common Mediterranean grass

TYPHACEAE—CATTAIL FAMILY

Typha latifolia—broadleaf cattail

EUDICOTS

ASTERACEAE—SUNFLOWER FAMILY

Ambrosia acanthicarpa—flatspine bur ragweed
Ericameria nauseosa—rubber rabbitbrush
Baccharis salicifolia—mulefat

BIGNONIACEAE—BIGNONIA FAMILY

Chilopsis linearis—desert willow

BORAGINACEAE—BORAGE FAMILY

Cryptantha intermedia—Clearwater cryptantha

CACTACEAE—CACTUS FAMILY

Echinocereus engelmannii—Engelmann's hedgehog cactus

CHENOPODIACEAE—GOOSEFOOT FAMILY

Atriplex polycarpa—cattle saltbush
* *Salsola tragus*—prickly Russian thistle

CUCURBITACEAE—GOURD FAMILY

Cucurbita palmata—coyote gourd

POLYGONACEAE—BUCKWHEAT FAMILY

Eriogonum davidsonii—Davidson's buckwheat
Eriogonum fasciculatum var. *foliolosum*—Eastern Mojave buckwheat

SALICACEAE—WILLOW FAMILY

Salix exigua—narrowleaf willow
Salix gooddingii—Goodding's willow
Populus fremontii—Fremont cottonwood

TAMARICACEAE—TAMARISK FAMILY

* *Tamarix ramosissima*—saltcedar

ZYGOPHYLLACEAE—CALTROP FAMILY

Larrea tridentata—creosote bush

WILDLIFE

BIRDS

CARDINALS, GROSBEAKS, AND ALLIES

CARDINALIDAE—CARDINALS AND ALLIES

Passerina caerulea—blue grosbeak

EMBERIZINES

EMBERIZIDAE—EMBERIZIDS

Melospiza melodia—song sparrow

FINCHES

FRINGILLIDAE—FRINGILLINE AND CARDUELINE FINCHES AND ALLIES

Haemorhous mexicanus—house finch

FLYCATCHERS

TYRANNIDAE—TYRANT FLYCATCHERS

Sayornis saya—Say's phoebe

JAYS, MAGPIES, AND CROWS

CORVIDAE—CROWS AND JAYS

Corvus corax—common raven

MOCKINGBIRDS AND THRASHERS

MIMIDAE—MOCKINGBIRDS AND THRASHERS

Toxostoma lecontei—Le Conte's thrasher

NEW WORLD QUAIL

ODONTOPHORIDAE—NEW WORLD QUAIL

Callipepla californica—California quail

ROADRUNNERS AND CUCKOOS

CUCULIDAE—CUCKOOS, ROADRUNNERS, AND ANIS

Geococcyx californianus—greater roadrunner

THRUSHES

TURDIDAE—THRUSHES

Sialia mexicana—western bluebird

WOOD WARBLERS AND ALLIES

PARULIDAE—WOOD-WARBLERS

Setophaga petechia—yellow warbler

WOODPECKERS

PICIDAE—WOODPECKERS AND ALLIES

Picoides scalaris—ladder-backed woodpecker

Colaptes auratus—northern flicker

WRENS

TROGLODYTIDAE—WRENS

Salpinctes obsoletus—rock wren

MAMMALS

HARES AND RABBITS

LEPORIDAE—HARES AND RABBITS

Lepus californicus—black-tailed jackrabbit

SQUIRRELS

SCIURIDAE—SQUIRRELS

Spermophilus (Otospermophilus) beecheyi—California ground squirrel

REPTILES

LIZARDS

PHRYNOSOMATIDAE—IGUANID LIZARDS

Uta stansburiana—common side-blotched lizard

* signifies introduced (non-native) species

APPENDIX D

Special-Status Plant and Wildlife Species Documented in the Vicinity of the Project Site

APPENDIX D
Special-Status Plant and Wildlife Species Documented in the Vicinity of the Project Site

Table 1
Plant Species

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Boechera dispar	pinyon rockcress	None/None/ 2B.3	Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland/granitic, gravelly/perennial herb/Mar–Jun/3,937–8,333	Not expected to occur. The site is outside of the species' known elevation range.
Cymopterus deserticola	desert cymopterus	None/None/ 1B.2	Joshua tree woodland, Mojavean desert scrub/sandy/ perennial herb/ Mar–May/ 2,067–4,921	Moderate potential to occur. The site contains suitable sandy soils, both Joshua tree woodland and Mojavean desert scrub vegetation communities, and is within the appropriate elevation range to support this species. There is one documented occurrence within 5 miles of the project area (CDFW 2016).
Dudleya abramsii ssp. *affinis*	San Bernardino Mountains dudleya	None/None/ 1B.2	Pebble plain, pinyon and juniper woodland, upper montane coniferous forest/granitic, quartzite, or carbonate/perennial herb/Apr–Jul/4,101–8,530	Not expected to occur. The site is outside of the species' known elevation range; there is no suitable vegetation present; and there are no documented occurrences within 5 miles of the project area (CDFW 2016).
Eremothera boothii ssp. *boothii*	Booth's evening-primrose	None/None/ 2B.3	Joshua tree woodland, pinyon and juniper woodland/annual herb/Apr–Sep/2,674–7,874	Low potential to occur. The site is within the appropriate elevation range and contains suitable Joshua tree woodland habitat; however, this vegetation community is limited compared to the overall extent of the project area. There is a documented occurrence approximately 300 feet from the project area (CDFW 2016).
Loeflingia squarrosa var. *artemisiarum*	sagebrush loeflingia	None/None/ 2B.2	Desert dunes, Great Basin scrub, Sonoran desert scrub/sandy/annual herb/Apr–May/2,297–5,299	Low potential to occur. The site is within the appropriate elevation range for this species and has suitable sandy soils; however, while the project area contains desert scrub vegetation communities, it lacks desert dune, Great Basin scrub, or Sonoran Desert vegetation.

Table 1
Plant Species

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Mimulus mohavensis	Mojave monkeyflower	None/None/ 1B.2	Joshua tree woodland, Mojavean desert scrub/sandy or gravelly, often in washes/annual herb/Apr–Jun/1,969–3,937	Moderate potential to occur. The site is within appropriate elevation range, has suitable sandy soil, and is located within a desert wash with appropriate Mojavean desert scrub. Several extant populations of this species occur between the Mojave River and interstate 15 between Victorville and Barstow (CDFG 1997). The project area is at the southern edge of that range; however, there are no documented occurrences within 5 miles of the project area. The nearest occurrence is approximately 5.5 miles northwest of the project area (CDFW 2016).
Opuntia basilaris var. *brachyclada*	short-joint beavertail	None/None/ 1B.2	Chaparral, Joshua tree woodland, Mojavean desert scrub, pinyon and juniper woodland/perennial stem succulent/Apr–Jun(Aug)/1,394–5,906	Low potential to occur. The site is within the species' known elevation range, and suitable Mojavean desert scrub vegetation is present; however, there are no documented occurrences within 5 miles of the project area, and the nearest occurrence is approximately 11 miles southwest of the project area (CDFW 2016). Additionally, no Opuntia species were documented on site, and this conspicuous stem succulent would likely have been observed if present.
Pediomelum castoreum	Beaver Dam breadroot	None/None/ 1B.2	Joshua tree woodland, Mojavean desert scrub/sandy, washes and roadcuts/perennial herb/Apr–May/2,001–5,003	Moderate potential to occur. The site is within appropriate elevation range, has suitable sandy soil, and is located within a desert wash with suitable Mojavean desert scrub. There are two documented occurrences within 5 miles of the project area (CDFW 2016).
Scutellaria bolanderi ssp. *austromontana*	southern mountains skullcap	None/None/ 1B.2	Chaparral, cismontane woodland, lower montane coniferous forest/mesic/ perennial rhizomatous herb/ Jun–Aug/1,394–6,562	Not expected to occur. No suitable vegetation present.

Table 1
Plant Species

Scientific Name	Common Name	Status (Federal/ State/CRPR)	Primary Habitat Associations/ Life Form/ Blooming Period/ Elevation Range (feet)	Potential to Occur
Symphyotrichum defoliatum	San Bernardino aster	None/ None/ 1B.2	Cismontane woodland, coastal scrub, lower montane coniferous forest, meadows and seeps, marshes and swamps, valley and foothill grassland (vernally mesic)/near ditches, streams, springs/ perennial rhizomatous herb/Jul-Nov/7–6,693	Moderate potential to occur in project buffer area. Not expected to occur within project site. The Mojave River, which contains suitable marsh habitat and is within the appropriate elevation range, abuts the southeastern portion of the wash. Additionally, there is a documented occurrence within 5 miles of the project area, within the Mojave River (CDFW 2016).

Note:
Status Legend
CRPR: California Rare Plant Rank (previously known as the CNPS List)
1B: Plants rare, threatened, or endangered in California and elsewhere
2B: Plants rare, threatened, or endangered in California, but more common elsewhere
Threat Rank
.2 – Fairly threatened in California (20%–80% occurrences threatened/moderate degree and immediacy of threat)
.3 – Not very threatened in California (<20% of occurrences threatened/low degree and immediacy of threat or no current threats known)

Table 2
Wildlife Species

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
Amphibians				
Rana draytonii	California red-legged frog	FT/SSC	Lowland streams, wetlands, riparian woodlands, livestock ponds; dense, shrubby or emergent vegetation associated with deep, still or slow-moving water; uses adjacent uplands.	Not expected to occur. The project buffer includes a portion of the Mojave River that has suitable riparian woodland and dense shrubby vegetation that could support this species; . There is a historic occurrence of this species within 5 miles of the project area (CDFW 2016).
Anaxyrus californicus	arroyo toad	FE/ SSC	Semi-arid areas near washes, sandy riverbanks, riparian areas, palm oasis, Joshua tree, mixed chaparral and sagebrush; stream channels for breeding (typically 3rd order); adjacent stream terraces and uplands for foraging and wintering.	Not expected to occur. The site is outside the species' known current geographic range. There are documented occurrences of this species within 5 miles of the project area (project site and buffer); however, these records are historic in nature (CDFW 2016).

Table 2
Wildlife Species

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
Reptiles				
Phrynosoma blainvillii	Blainville's horned lizard	None/SSC	Open areas of sandy soil in valleys, foothills and semi-arid mountains including coastal scrub, chaparral, valley-foothill hardwood, conifer, riparian, pine-cypress, juniper, and annual grassland.	Not expected to occur. The site is outside the species' known geographic range.
Gopherus agassizii	Mojave desert tortoise	FT/ST	Arid and semi-arid habitats in Mojave and Sonoran Deserts, including sandy or gravelly locations along riverbanks, washes sandy dunes, canyon bottoms, desert oases, rocky hillsides, creosote flats, and hillsides.	Low potential to occur. The project site is located within a desert wash surrounded by desert scrub vegetation, including creosote bush. Additionally, there are suitable burrows within the project area that could support this species. There are several documented occurrences of this species within 5 miles of the project area (CDFW 2016); however, these occurrences are within a large swath of suitable habitat north of Highway 18, which lies north of the project area. Due to the small extent of suitable, contiguous habitat within the project area and with Highway 18 acting as a barrier for potentially existing populations to cross, it is unlikely to find this species present.
Birds				
Athene cunicularia (burrow sites and some wintering sites)	burrowing owl	None/SSC	Nests and forages in grassland, open scrub, and agriculture, particularly with ground squirrel burrows.	Moderate potential to occur. The project area contains open scrub and disturbed habitat suitable for this species. Additionally, there are suitable burrows both within the banks and in the terrace regions of the project area; however, no active signs of this species were observed during the site visit. There are many documented occurrences of this species within 5 miles of the project area (CDFW 2016).

Table 2
Wildlife Species

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
Lanius ludovicianus (nesting)	loggerhead shrike	None/SSC	Nests and forages in open habitats with scattered shrubs, trees, or other perches.	Moderate potential to occur. The project area contains open desert scrub comprised of saltbush and creosote. There are several documented occurrences of this species within 5 miles of the project area (CDFW 2016).
Buteo swainsoni (nesting)	Swainson's hawk	None/ST	Nests in open woodland and savanna, riparian and in isolated large trees; forages in nearby grasslands and agricultural areas such as wheat and alfalfa fields and pasture.	Not expected to occur for foraging and nesting. Outside of current range for nesting, as this species is only a migratory visitor to the region. The project area lacks suitable foraging habitat for this species (grassland, agricultural fields). There are only historic occurrences of this species within 5 miles of the project area (CDFW 2016).
Agelaius tricolor (nesting colony)	tricolored blackbird	None/SSC*	Nests near fresh water, emergent wetland with cattails or tules, but also in Himalayan blackberry; forages in grasslands, woodland, and agriculture.	Not expected to occur. Suitable nesting habitat (i.e., emergent wetlands with cattails) do not exist in the project area, nor does suitable foraging habitat (grassland, agriculture). There are no documented occurrences of this species within 5 miles of the project area (CDFW 2016).
Setophaga petechia (nesting)	yellow warbler	None/SSC	Nests and forages in riparian and oak woodlands, montane chaparral, open ponderosa pine, and mixed conifer habitats.	High potential to occur in buffer. Not expected to occur within project site. The project buffer includes a very small portion of the Mojave River, which contains riparian hardwood vegetation suitable for nesting and foraging for this species. There are occurrences of this species within 5 miles of the project area (CNDDB 2016 and eBird 2016).

Table 2
Wildlife Species

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
Vireo bellii pusillus (nesting)	least Bell's vireo	FE/SE	Nests and forages in low, dense riparian thickets along water or along dry parts of intermittent streams; forages in riparian and adjacent shrubland late in nesting season.	Moderate potential to occur within buffer. There is no potential for this species within the project site. The project buffer includes a very small portion of the Mojave River, which contains dense riparian thickets suitable for nesting and foraging for this species. There are documented occurrences of this species within 5 miles of the project area (CDFW 2016, USFWS 2016). This species was confirmed present during July 2016 survey; however, the individual was approximately 150 feet outside of the buffer.
Asio otus (nesting)	long-eared owl	None/SSC	Nests in riparian habitat, live oak thickets, other dense stands of trees, edges of coniferous forest; forages in nearby open habitats.	Low potential to occur. The project buffer includes a very small portion of the Mojave River, which contains riparian hardwood vegetation suitable for nesting for this species. Additionally, the project buffer surrounding the wash offers open saltbush scrub habitat suitable for foraging; however, there are no documented occurrences of this species within 5 miles of the project area (CDFW 2016).
Empidonax traillii extimus (nesting)	southwestern willow flycatcher	FE/SE	Nests in dense riparian habitats along streams, reservoirs, or wetlands; uses variety of riparian and shrubland habitats during migration.	Low potential to occur within buffer. Not expected to occur within project site. The project buffer includes a very small portion of the Mojave River, which contains dense riparian habitat suitable for the nesting and foraging of this species. There is one recent occurrence of this species within 5 miles of the project area (USFWS 2016).

Table 2
Wildlife Species

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
Icteria virens (nesting)	yellow-breasted chat	None/SSC	Nests and forages in dense, relatively wide riparian woodlands and thickets of willows, vine tangles and dense brush.	Moderate potential to occur within project buffer. Not expected to occur within project site. The project buffer includes a very small portion of the Mojave River, which contains dense riparian thickets suitable for the nesting and foraging of this species. There are occurrences of this species within 5 miles of the project area (CNDDB 2016 and eBird 2016).
Aquila chrysaetos (nesting and wintering)	golden eagle	None/FP	Nests and winters in hilly, open/semi-open areas, including shrublands, grasslands, pastures, riparian areas, mountainous canyon land, open desert rimrock terrain; nests in large trees and on cliffs in open areas and forages in open habitats.	Low foraging potential, no nesting potential to occur. The project area contains open foraging habitat in the form of saltbush and creosote bush scrub; however, there is high development around the small swath of suitable habitat and this species is sensitive to disturbance. There are no cliffs or very tall trees for nesting within the project area. There is only a historic occurrence of this species within 5 miles of the project area (CDFW 2016).
Vireo vicinior (nesting)	gray vireo	None/SSC	Nests and forages in pinyon–juniper woodland, oak, and chamise and redshank chaparral.	Not expected to occur. The project area is outside this species' known geographic range, and there are no documented occurrences within 5 miles of the project area (CDFW 2016).
Piranga rubra (nesting)	summer tanager	None/SSC	Nests and forages in mature desert riparian habitats dominated by cottonwoods and willows.	Moderate potential to occur in buffer. Not expected to occur within project site. The project buffer abuts the Mojave River and contains cottonwood and willow species suitable for the nesting and foraging of this species. There are occurrences of this species within 5 miles of the project area (CDFW 2016 and eBird 2016).

Table 2
Wildlife Species

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
Coccyzus americanus occidentalis (nesting)	western yellow-billed cuckoo	FT/SE	Nests dense, wide riparian woodlands and forest with well-developed understories.	Not expected to occur. The project buffer abuts the Mojave River which contains dense, riparian woodland with a substantial understory that could provide nesting and foraging habitat for this species.; however, this species has not been recently documented as breeding on the Mojave River and the project site is considered outside of its current known range. A habitat assessment for this species was conducted in 2002 in a reach upstream of the proposed project. The determination of this survey was that no habitat for this species was observed on site or in the immediate vicinity (MBA 2002).
Fishes				
Siphateles bicolor mohavensis	Mohave tui chub	FE/SE, FP	Lacustrine ponds or pools with minimum water depth of 4 feet and some freshwater flow for a mineralized and alkaline environment; aquatic plants (e.g., *Ruppia maritima*, *Typha* spp., and *Juncus* spp.), that provide habitat for aquatic invertebrate prey and substrate for egg attachment; aquatic ditchgrass (*Ruppia maritima*) appears to be preferred vegetation for egg attachment and thermal refuge in summer months.	Not expected to occur. The project buffer abuts the Mojave River; however, the area within the buffer area does not provide a consistent water source for this species. There are documented occurrences of this species within 5 miles of the project area; however, these occurrences are within the Mojave River where water traditionally flows (CDFW 2016).

Table 2
Wildlife Species

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
Mammals				
Spermophilus (Xerospermophilus) mohavensis	Mohave ground squirrel	None/ST	Desert scrub habitats including those dominated by creosote bush and burrobush, desert sink scrub, and desert saltbush scrub.	Not expected to occur. The site is at the boundary of the species' known geographic range, as eastern boundary for this species has historically been the Mojave River; however, there is one region within the Town of Apple Valley that the range appears to cross the Mojave River (Leitner 2008). That being said, there have been no documented observations of this species east of the Mojave River since 1977 (Eremico Biological Services 2008). A habitat assessment prepared by a permitted biologist concluded that Mohave ground squirrel were unlikely to inhabit the project site (Eremico Biological Services 2008). While there is suitable desert scrub habitat with both creosote and saltbush scrub and many ground squirrel burrows around the site, the project area supports only a small patch of contiguous habitat, making it highly unlikely to find this species. There are only historic occurrences of this species within the project area (CDFW 2016).
Microtus californicus mohavensis	Mojave river vole	None/SSC	Wet, weedy, herbaceous areas along the Mojave River.	Moderate potential to occur within buffer. Not expected within project site. The project buffer abuts the Mojave River, which contains herbaceous scrub suitable for this species. Additionally, there are documented occurrences of this species within the project area (CDFW 2016).
Chaetodipus fallax pallidus	pallid San Diego pocket mouse	None/SSC	Desert wash, desert scrub, desert succulent scrub and pinyon-juniper woodland	Low potential to occur. The project area is at the edge of this species' range; however, there is suitable desert wash and desert scrub within the project site suitable for this species. There is a historic occurrence of this species within 5 miles of the project area (CDFW 2016).

Table 2
Wildlife Species

Scientific Name	Common Name	Status (Federal/ State)	Habitat	Potential to Occur
Corynorhinus townsendii	Townsend's big-eared bat	None/SC, SSC*	Mesic habitats characterized by coniferous and deciduous forests and riparian habitat, but also xeric areas; roosts in limestone caves and lava tubes, also man-made structures and tunnels.	Moderate foraging potential within the project site and buffer and not expected to roost within project site. They are not expected to roost in the project site due to the lack of preferred roosts and close proximity to existing residential and a school. The project area abuts the Mojave River, which contains riparian habitat suitable for foraging of this species. There are no documented occurrences of this species within the project area (CDFW 2016).

Note:
* This species is under review by CDFW as a candidate for listing under the Endangered Species Act and in the interim is to be treated as SE.
Status Legend
Federal Designations
FE: Federally listed as endangered
FT: Federally listed as threatened
State Designations
FP: CDFW Fully Protected Species
SE: State listed as endangered
ST: State listed as threatened
SC: State candidate for listing as endangered
SSC: California Species of Special Concern

APPENDIX D

Jurisdictional Delineation

DUDEK

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January 5, 2017 9760

Ms. Nancy Sansonetti
Flood Control District
County of San Bernardino
825 E. 3rd Street, Room 123
San Bernardino, California 92415

Subject: Jurisdictional Waters Delineation Update Report for the Desert Knolls Wash Phase III Flood Control Improvement Project, Town of Apple Valley, California

Dear Ms. Sansonetti:

This report documents the results of an update to a delineation of jurisdictional waters for San Bernardino Flood Control District in support of Desert Knolls Wash Phase III Flood Control Improvement Project (proposed project). The proposed project includes flood control improvements to Desert Knolls Wash. The project footprint totals 13.9 acres within the Town of Apple Valley, San Bernardino County, California. The study area consists of the proposed project footprint and a 100-foot buffer, totaling approximately 29.1 acres.

This letter report is intended to (1) describe the existing conditions of jurisdictional waters within the project site; (2) quantify impacts to jurisdictional waters that would result from implementation of the proposed project and describe those impacts in terms of significance in view of federal, state, and local laws and policies; and (3) recommend mitigation measures for impacts to jurisdictional waters, if necessary.

1 PROJECT LOCATION

The 29.1-acre project site is generally south of Highway 18 and west of Apple Valley Parkway. The project is on the Lewis Center's property within the San Bernardino County town of Apple Valley (Figure 1; all figures are provided in Attachment A). The project site is found on the U.S. Geological Survey (USGS) 7.5-minute Victorville quadrangle, Township 5 North, Range 5 West, Sections 11 and 12 (Figure 2). The project site encompasses the wash located between Apple Valley Road on the west and Tao Road on the east.

2 PROJECT BACKGROUND AND DESCRIPTION

The proposed project involves the construction of flood control improvements along a 0.6-mile segment of the Desert Knolls Wash alignment. The work limits extend from an existing concrete trapezoidal channel in Desert Knolls Wash and terminate at the confluence of the wash with the Mojave River. The intent of the proposed project is to provide flood control protection to adjacent existing residential development.

The proposed flood control improvements include the grading of 2:1 channel side slopes and the placement of grouted rock along both sides of the channel to provide slope protection. The channel bottom would be earthen with a base width that varies in width from 30 to 150 feet. In order to avoid erosion of the earthen channel bottom, a series of grade stabilization structures will be constructed. The stabilization structures will consist of un-grouted large rock, with a rock invert added at sections that may be subject to higher velocity flows and increased erosion.

3 REGULATORY BACKGROUND

3.1 Federal Statutes and Regulations – U.S. Army Corps of Engineers

Pursuant to Section 404 of the Clean Water Act, any person or public agency proposing to discharge dredged or fill material into waters of the United States, including jurisdictional wetlands, must obtain a permit from the U.S. Army Corps of Engineers (ACOE). Title 33 of the Code of Federal Regulations (CFR), Part 328.3, defines waters of the United States, with an amendment published in the Federal Register on June 29, 2015, effective August 28, 2015. The newly modified Section 328.3(a) defines waters of the United States as follows:

1. All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
2. All interstate waters, including interstate wetlands;
3. The territorial seas;
4. All impoundments of waters otherwise identified as waters of the United States under this section;
5. All tributaries, as defined in this section;
6. All waters adjacent to a water identified in 1 through 5 above;

7. Additional waters (as defined in the section) where they are determined, on a case-specific basis, to have a significant nexus to a water in 1 through 3 above.

For non-tidal waters of the United States, the lateral limits of ACOE jurisdiction extend to the ordinary high water mark (OHWM) when no adjacent wetlands are present. As defined in 33 CFR 328.3(c)(6), the OHWM is "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as [a] clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas." If adjacent wetlands are present, the jurisdiction extends to the limit of the wetlands.

Wetlands are "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (33 CFR 328.3). Wetlands are jurisdictional if they meet this definition as well as the definition of waters of the United States. The ACOE predominantly uses the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (ACOE Regional Supplement; ACOE 2008a) methodology to determine the presence of wetlands. According to the ACOE Regional Supplement, three criteria must be satisfied to classify an area as a wetland: (1) a predominance of plant life that is adapted to life in wet conditions (hydrophytic vegetation); (2) soils that saturate, flood, or pond long enough during the growing season to develop anaerobic conditions in the upper part (hydric soils); and (3) permanent or periodic inundation or soils saturation, at least seasonally (wetland hydrology).

ACOE-Regulated Activities

Under Section 404 of the Clean Water Act, the ACOE regulates activities that involve a discharge of dredged or fill material, including but not limited to grading, placing riprap for erosion control, pouring concrete, laying sod, and stockpiling excavated material into waters of the United States. Activities that generally do not involve a regulated discharge (if performed specifically in a manner to avoid discharges) include driving pilings, providing some drainage channel maintenance activities, and excavating without stockpiling.

3.2 State Statutes and Regulations – Regional Water Quality Control Board

The State of California has concurrent jurisdiction with the federal government over Section 401 Water Quality Certification for jurisdictional waters and wetlands of the United States. Where isolated waters and wetlands (not subject to federal jurisdiction) are involved, the state will exert independent jurisdiction via the Porter–Cologne Water Quality Control Act (Porter–Cologne Act).

Section 401 of the Clean Water Act

Section 401 of the Clean Water Act requires that any applicant for a federal permit for activities that involve a discharge to waters of the United States shall provide the federal permitting agency a certification from the state in which the discharge is proposed that states that the discharge will comply with the applicable provisions under the federal Clean Water Act.

Therefore, in California, before the ACOE will issue a Section 404 permit, applicants must apply for and receive a Section 401 Water Quality Certification or waiver from the Regional Water Quality Control Board (RWQCB).

Under Section 401 of the Clean Water Act, the RWQCB regulates at the state level all activities that are regulated at the federal level by ACOE.

Porter–Cologne Water Quality Control Act

The RWQCB regulates actions that would involve "discharging waste, or proposing to discharge waste, within any region that could affect the quality of the waters of the state" (California Water Code, Section 13260(a)), pursuant to provisions of the state Porter–Cologne Act. "Waters of the state" are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (California Water Code, Section 13050(e)).

Under the Porter–Cologne Act, the RWQCB regulates all such activities, as well as dredging, filling, or discharging materials into waters of the state, that are not regulated by the ACOE due to a lack of connectivity with a navigable water body.

3.3 State Statutes and Regulations – California Department of Fish and Wildlife

California Fish and Game Code, Sections 1600–1616, mandates that "it is unlawful for any person to substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds, without first notifying the department of such activity."

California Department of Fish and Wildlife (CDFW) jurisdiction includes ephemeral, intermittent, and perennial watercourses (including dry washes) and lakes characterized by the presence of (1) definable bed and banks and (2) existing fish or wildlife resources. Furthermore, CDFW jurisdiction extends to riparian habitat and may include oak woodlands in canyon bottoms. Historical court cases have further extended CDFW jurisdiction to include watercourses that seemingly disappear, but reemerge elsewhere. Under the CDFW definition, a watercourse

need not exhibit evidence of an OHWM to be claimed as jurisdictional. CDFW does not have jurisdiction over ocean or shoreline resources.

Water features such as vernal pools and other seasonal swales, where the defined bed and bank are absent and the feature is not contiguous or closely adjacent to other jurisdictional features, are generally not asserted to fall within state jurisdiction. The state generally does not assert jurisdiction over human-made water bodies, unless they are located where such natural features were previously located or (importantly) where they are contiguous with existing or prior natural jurisdictional areas.

Under California Fish and Game Code, Sections 1600–1616, CDFW has the authority to regulate work that will substantially divert or obstruct the natural flow of, or substantially change or use any material from, the bed, channel, or bank of any river, stream, or lake. CDFW also has the authority to regulate work that will deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake. This regulation takes the form of a requirement for a Lake or Streambed Alteration Agreement and is applicable to all federal and nonfederal projects.

4 METHODS

4.1 Literature Review

The following available resources were reviewed to assess the potential for jurisdictional waters: a 1:200-scale aerial photograph (Google Earth 2016), a USGS 7.5-minute topographic quadrangle (USGS 2016), a Natural Resources Conservation Service soil map (USDA 2016), U.S. Environmental Protection Agency *Watershed Assessment, Tracking & Environmental Results (WATERS)* (EPA 2016) which includes the National Hydrography Dataset, and the National Wetland Inventory (USFWS 2016).

Additionally, a previous jurisdictional delineation report prepared by ICF International in 2013 was reviewed and updated for this report (ICF International 2013).

4.2 Jurisdictional Delineation

On July 22, 2016, Dudek biologists Anna Cassady and Mikael Romich updated a delineation of jurisdictional waters within the project area for the following types of features:

- Waters of the United States, including wetlands, under the jurisdiction of ACOE, pursuant to Section 404 of the federal Clean Water Act

- Waters of the state under the jurisdiction of the California RWQCB, pursuant to Section 401 of the federal Clean Water Act and the Porter–Cologne Act
- Streambeds under the jurisdiction of CDFW, pursuant to Section 1602 of the California Fish and Game Code

Non-wetland waters of the United States are delineated based on the presence of an OHWM as determined utilizing the methodology in *A Field Guide to the Identification of the Ordinary High Water Mark* (OHWM) *in the Arid West Region of the Western United States* (ACOE 2008b). Wetland waters of the United States are delineated based on methodology described in the 1987 *Wetlands Delineation Manual* (ACOE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (ACOE 2008a).

All surface flows are waters of the state and are delineated at the OHWM, at outer limits of hydrophytic vegetation or at the outer rim of depressional features if relevant.

In accordance with the California Fish and Game Code, streambeds are determined based on the presence of a definable bed and bank and are delineated from top of bank to top of bank or the extent of associated riparian vegetation.

A map of the jurisdictional waters from the *Jurisdictional Delineation Report for Desert Knolls Wash Improvement Project (Phase III)* prepared by ICF in 2013 was reviewed in the field (ICF International 2013). All features mapped were walked on foot to confirm jurisdictional waters mapped matched existing conditions. The entire study area was also walked on foot and potentially jurisdictional features were delineated using a Global Positioning System (GPS) handheld unit with sub-meter accuracy. The delineation was completed in support of a Preliminary Approved Determination from the ACOE. GPS data collected in the field was transferred to geographic information system (GIS) software and compared with shapefiles from the ICF jurisdictional delineation. Updates to the boundaries of jurisdictional waters were made where results from the field survey differed from the previous delineation. Due to the limited scope of this update, soil pit analysis to determine whether the project site contained hydric soils was not performed; however, it was assumed that while the physical makeup of the channel may have changed between 2013 and present, the composition of the soil matrix has stayed the same. Therefore, any area that had been previously mapped as wetlands that currently supported signs of hydrology and hydrophytic vegetation were considered to be the same.

5 ENVIRONMENTAL SETTING

The Desert Knolls Wash site (project site) is located on the Lewis Center's property, west of Apple Valley Road, east of the Mojave River, and 500 feet directly south of State Route 18 (SR-18). The Lewis Center, rural residential developments, and vacant lots are located to the south, and developed and undeveloped land is located to the east. The project site itself is undeveloped. Open space occurs to the west and north; however, SR-18 bisects this area. A hiking trail runs parallel to the wash on the northern side. There is also a maintenance shed located on the north side of the wash within the northeastern section of the project area.

5.1 Climate

Apple Valley, within which the project area is located, has a semi-arid climate characterized by low annual rainfall with hot summers and mild to warm winters. Average temperatures within Victorville, which is nearby to Apple Valley, range from approximately 32° Fahrenheit (°F) to 62°F in the winter (November through February) and 56°F to 92°F in the summer (May through August). The area generally receives an average rainfall of 5.6 inches per year (WRCC 2016).

5.2 Soils

Four soil series are located within the project site: Kimberlina, Helendale, Cajon, and Lithic torriorthents rock outcrops (geographic extent of soil series is depicted on Figures 3a and 3b) and are described in more detail below (USDA 2016).

- **Kimberlina series** are very deep, well-drained soils found within flood plains and alluvial fans and formed predominantly from igneous and/or sedimentary rocks. They occur in elevations from 1,800 to 4,100 feet above mean sea level (amsl) within the Mojave Desert, though this soil type also occurs within the San Joaquin Valley. Uncultivated areas yield annual grasses and saltbush species. This soil series makes up much of Desert Knolls Wash, as well as a portion of the upland area south of the wash.
- **Helendale series** are very deep, well-drained soils derived predominantly from granitoid rocks. They occur in terraces and alluvial fans at elevations from 2,000 to 3,935 feet amsl. These soils have negligible to low runoff and high and high saturated hydraulic conductivity. Uncultivated areas yield creosote bush, Joshua trees, and annual forbs and grasses. This soil series makes up a portion of the upland area south of the wash.
- **Cajon series** are very deep, somewhat excessively drained soils derived predominantly from granitic rocks. They occur in river terraces and alluvial fans at elevations from 200 to 4,300 feet amsl. These soils have moderate to rapid permeability and negligible to low runoff.

Uncultivated areas yield annual grasses, creosote bush, saltbush, and Joshua trees. This soil series makes up portions of the upland area within the northeastern portion of the project site.

- **Lithic torriorthents rock outcrops** are rock piles with basalt origin comprised of well-drained material with medium runoff. This rock type makes up the southwestern portion of the wash, as well as a part of the upland area north of the wash.

5.3 Vegetation

Native vegetation communities on site include allscale scrub alliance, creosote bush scrub alliance, Fremont cottonwood forest alliance, Joshua tree woodland alliance, and red willow thickets alliance. The non-native vegetation communities and unvegetated land cover types occurring within the project area are developed, disturbed, non-vegetated floodplain, parks and ornamental, and rock outcrop. These vegetation communities and land cover types are described below; their acreages are presented in Table 1, and are demonstrated in Figures 3a and 3b. There are no special-status vegetation communities within the project site.

Table 1
Vegetation Communities and Land Covers

Vegetation Communities/Land Covers	Code[1]	Study Area Acreage[2]
Native Vegetation Communities		
Allscale Scrub	AS	9.84
Creosote Bush Scrub	CRBS	1.30
Fremont Cottonwood Forest[3]	FCF	0.04
Joshua Tree Woodland[3, 4]	JTW	0.37
Red Willow Thickets[3]	RWT	0.08
	Subtotal	*11.63*
Land Covers		
Developed	DEV	4.42
Disturbed	DS	6.88
Non-vegetated Floodplain	NVC	4.42
Parks and Ornamental	ORN	0.18
Rock Outcrop	RO	1.56
	Subtotal	*17.46*
	Total	**29.1**

Notes:
1 Source: CDFG (2010).
2 Totals may not add due to rounding.
3 Sensitive vegetation community per CDFG 2010.
4 Sensitive vegetation community per San Bernardino County General Plan.

5.3.1 Allscale Scrub Alliance

Allscale scrub is dominated by allscale (*Atriplex polycarpa*) and is widespread throughout the Mojave, Sonoran, and Colorado Deserts. Common species found within this community include white bursage (*Ambrosia dumosa*), creosote bush (*Larrea tridentata*), and other saltbush species such as four-winged saltbush (*Atriplex canescens*).

This alliance typically occurs within washes and terraces, but is also found associated with alluvial fans, rolling hills, and playa lakebeds. This alliance may have carbonate rich and sandy, alkaline, or sandy clay loam soils (Sawyer et al. 2009).

The dominant species in this alliance, allscale scrub, is a FACU (facultative upland) species, which is considered non-hydrophytic and usually would not occur in wetlands, but may occasionally occur.

Within the project area, allscale scrub is the most prevalent vegetation community, covering the majority of the area south of the wash. It is also interspersed amongst rocky outcrops north of the wash. Species found associated include white bursage and other saltbush species.

The allscale scrub alliance is ranked by the CDFW (CDFG 2010) as a G5S4 alliance. This ranking indicates that globally the alliance is widespread, abundant, and is considered secure (CDFG 2010; NatureServe 2009), and within California the alliance is apparently secure.

5.3.2 Creosote Bush Scrub Alliance

Creosote bush scrub is dominated by creosote (*Larrea tridentata*) and is widespread throughout the Mojave, Sonoran, and Colorado Deserts. Common species found within this community include white bursage (*Ambrosia dumosa*), honey mesquite (*Prosopis glandulosa*), and Joshua tree (*Yucca brevifolia*). This community is open with little structural diversity and reaches heights of 5 to 10 feet.

This alliance typically occurs along minor washes and upland slopes, but is also found associated with alluvial fans and bajadas. This alliance may have well-drained soils or be associated with a pavement surface (Sawyer et al. 2009).

The dominant species within this alliance, creosote bush, does not have a wetland indicator status.

Within the project area, this community is found in the northwestern corner of the project buffer. The dominant species is creosote bush, but there are several saltbush species (*Atriplex* sp.) found within the area as well.

The creosote bush scrub alliance is ranked by the CDFW (CDFG 2010) as a G5S5 alliance. This ranking indicates that globally the alliance is common, widespread, abundant, and secure (CDFG 2010; NatureServe 2009), and within California the alliance is secure.

5.3.3 Fremont Cottonwood Forest Alliance

Fremont cottonwood forest is dominated by Fremont cottonwood (*Populus fremontii*) and is a widespread riparian community. Common species found within this community include black walnut (*Juglans hindsii*), California sycamore (*Platanus racemosa*), and many willow species, including black willow (*Salix gooddingii*), red willow (*Salix laevigata*), and sandbar willow (*Salix exigua*).

This alliance typically occurs along rivers and intermittent streams, but is also associated with alluvial fans and lower canyons within desert mountains (Sawyer et al. 2009).

The dominant species within this alliance, Fremont cottonwood, does not have a wetland indicator status.

Within the project area, this community is found in the very southern portion of the buffer that overlaps with the Mojave River. It is dominated by Fremont cottonwood, but is also comprised of various willow species (*Salix* sp.).

Fremont cottonwood forest alliance is ranked by the CDFW (CDFG 2010) as a G4S3 alliance. This ranking indicates that globally the alliance is uncommon, but not rare, with some cause for long-term concern due to declines or other factors (CDFG 2010; NatureServe 2009); within California, the alliance is vulnerable due to restricted range.

5.3.4 Joshua Tree Woodland Alliance

Joshua tree woodland is dominated by Joshua tree (*Yucca brevifolia*) and is widespread throughout the Mojave, Sonoran, and Colorado Deserts. Common species found within this community include creosote bush (*Larrea tridentata*), buckwheat (*Eriogonum fasciculatum*), and white bursage (*Ambrosia dumosa*).

This alliance typically occurs along gentle alluvial fans with soils that include coarse sands, very fine silts, gravel, or sandy loams (Sawyer et al. 2009).

The dominant species within this alliance, the Joshua tree, does not have a wetland indicator status.

Within the project area there is one area mapped as Joshua tree woodland to the north of the wash.

Joshua tree woodland alliance is ranked by the CDFW (CDFG 2010) as a G4S3 alliance. This ranking indicates that globally the alliance is uncommon, but not rare, with some cause for long-term concern due to declines or other factors (CDFG 2010; NatureServe 2009); within California, the alliance is vulnerable due to restricted range. This alliance is also a sensitive vegetation community by San Bernardino County due to its limited regional distribution.

5.3.5 Red Willow Thickets

Red willow thickets alliance is dominated or co-dominated by red willow (*Salix laevigata*). This alliance is found along ditches, floodplains, lake edges, and low-gradient depositions along streams, and has an open to continuous canopy less than 66 feet (20 meters) with a variable herbaceous layer. Associated species include box elder (*Acer negundo*), white alder (*Alnus rhombifolia*), California sycamore (*Platanus racemosa*), Fremont cottonwood (*Populus fremontii*), California live oak (*Quercus agrifolia*), and various willows (*Salix exigua*, *S. gooddingii*, *S. laevigata*, and *S. lasiolepis*) (Sawyer et al. 2009).

The dominant species within this alliance, red willow, is a FACW (facultative wetland) species, which is considered hydrophytic and usually occurs in wetlands, though it may occur within non-wetlands.

Within the project area, red willow thickets occur in a patch at the most upstream portion of the wash and is dominated by red willow, but also comprised of immature Fremont cottonwood and mulefat (*Baccharis salicifolia*).

Fremont cottonwood forest alliance is ranked by the CDFW (CDFG 2010) as a G5S3 alliance. This ranking indicates that globally the alliance is common, widespread, abundant, and secure (CDFG 2010; NatureServe 2009), and within California, the alliance is vulnerable due to restricted range.

5.3.6 Developed

Developed land refers to areas supporting man-made structures, including homes, yards, roadways, sidewalks, and other highly modified lands supporting structures associated with dwellings or other permanent structures.

Within the project area, developed land refers to existing roads, parking areas, and buildings within the buffer area south of the wash.

5.3.7 Disturbed Habitat

Disturbed land includes areas that experience or have experienced high levels of human disturbance and as a result are generally lacking vegetation. Areas mapped as disturbed land may include unpaved roads, trails, and graded areas. Vegetation in these areas, if present at all, is usually sparse and dominated by non-native weedy herbaceous species.

Within the project area, disturbed habitat is comprised of unpaved access roads south of the wash. Additionally, the banks and slopes of the northern portion of the wash are graded for maintenance vehicle access.

5.3.8 Non-vegetated Floodplain

Areas mapped as non-vegetated floodplain are commonly found within major desert washes. These areas are nearly permanently unvegetated due to variable water flow, though some weedy species may be found along wash edges. Cover by these species will make up less than 10% of total cover within the area.

Within the project area, the bottom of Desert Knolls Wash is mostly non-vegetated and runs through the extent of the project area.

5.3.9 Parks and Ornamental Plantings

Areas mapped as parks and ornamental plantings include planted areas where ornamental landscaping has been installed as part of a recreational park, development, or roadway landscaping.

Within the project area, parks and ornamental plantings includes landscaping associated with the baseball field south of the wash.

5.3.10 Rock Outcrops

This land cover type includes areas primarily made up of boulders with interspersed vegetation, including California croton (*Croton californicus*) and various lichens.

Within the project area, rock outcrops dominate the southwestern portion of the project area and are interspersed with saltbush species, a single Joshua tree, and hedgehog cactus (*Echinocereus engelmannii*).

5.4 Topography

The project site is located north of the San Bernardino Mountains within the Mojave Desert. The area generally slopes from the northeast to the southwest, with surface and subsurface flows trending towards the Mojave River, which flows north. The project site is at approximately 2,800 feet (853 meters) amsl in elevation at the southwest end and 2,860 feet (871 meters) amsl at the northeast end. Rolling hills are located to the west and north.

5.5 Hydrology

The project site is within the Upper Mojave Hydrologic Area (HA) of the Mojave Hydrologic Unit (Figures 4 and 5). The Hydrologic Basin Number is 628.20. The Mojave River is the main feature found within the Upper Mojave HA and is located just 0.66 mile west of the project site. The Mojave River flows north towards Barstow, ultimately terminating at Soda Dry Lake approximately 100 miles to the northeast. The majority of the Mojave River is ephemeral, although portions of the Mojave River, primarily in the southern end, are intermittent. Rolling hills are located to the west and north, which likely provides runoff into the wash. The Desert Knolls Wash flows to the west, terminating at the Mojave River.

6 RESULTS OF SURVEY

6.1 Jurisdictional Delineation Results

Desert Knolls Wash flows west and confluences with the Mojave River, which flows east and terminates in Soda Dry Lake. The limits of jurisdictional waters are provided in Figures 3A and 3B. Representative photos are provided in Attachment B. The following represents a summary of jurisdictional features mapped in 2013 along with an analysis of the current state of each feature. Table 2 provides an acreages list of jurisdictional waters.

Drainage 1

Drainage 1, known as Desert Knolls Wash, enters the project area from the east and runs parallel to SR-18. It runs southwest through the extent of the project area until it confluences with the Mojave River at the southern end of the project area.

This drainage takes the form of an ephemeral desert wash. It demonstrates the following OHWM indicators: presence of bed and bank, break in bank slope, change in vegetation species, debris racking, and change in average sediment texture. The top of bank was determined as jurisdictional CDFW streambed.

A portion of the wash was previously mapped as jurisdictional wetland waters. This portion supports a dominance of hydrophytic vegetation (red willow thickets) and wetland hydrology. Due to the limited scope of this update, soil pit analysis to determine whether the site contained hydric soils was not performed; however, it was assumed that while the physical makeup of the channel may have changed between 2013 and present, the composition of the soil matrix has stayed the same.

Based on the presence of an OHWM and connectivity to the Mojave River, the wash is a non-wetland waters of the United States under the jurisdiction of ACOE and the RWQCB, and CDFW-jurisdictional streambed. The northern portion of the wash contains wetland waters of the United States under the jurisdiction of ACOE and the RWQCB.

The 2013 report lists Drainage 1 as having 4.30 acres (2,985 linear feet) of non-wetland waters and 0.08 acre (236 linear feet) of wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 6.79 acres (2,985 linear feet) of unvegetated streambed and 0.11 acre (276 linear feet) of riparian vegetation are under jurisdiction of CDFW.

This update determined Drainage 1 has 4.16 acres (2,870 linear feet) of non-wetland waters and 0.08 acre (236 linear feet) of wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 5.86 acres (2,870 linear feet) of unvegetated streambed and 0.11 acre (276 linear feet) of riparian vegetation are under jurisdiction of CDFW. Changes between 2013 and present are likely due to the presence of a graded access road on the north side of the upstream portion of Desert Knolls Wash. This road was previously considered jurisdictional under CDFW, but it was concluded that the top of bed and bank would lie at the edge of the road.

Drainage 2

Drainage 2 is a portion of the Mojave River that runs through the southern extent of the Project area.

This drainage takes the form of an active riverbed. It demonstrates the following OHWM indicators: presence of bed and bank, break in bank slope, and change in vegetation species and cover. The top of bank was determined as jurisdictional CDFW streambed.

Based on the presence of an OHWM, the channel is a non-wetland waters of the United States under the jurisdiction of ACOE and the RWQCB, and CDFW-jurisdictional streambed.

The 2013 report lists Drainage 2 as having 0.06 acre (36 linear feet) of non-wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 0.20 acre (38 linear

feet) of unvegetated streambed and 0.02 acre (20 linear feet) of riparian vegetation are under jurisdiction of CDFW.

This update determined Drainage 2 has no change between 2013 and present.

Drainage 3

Drainage 3 is a tendril of Drainage 1 that runs along the southeastern bank. It appears to be the remnant of a braided feature within the Desert Knolls Wash that has, over time, developed into an independent feature, demonstrated by an absence of OHWM characteristics in the space between the two streams.

This drainage takes the form of an ephemeral wash. It demonstrates the following OHWM indicators: presence of bed and bank, break in bank slope, and change in vegetation species and cover. The top of bank was determined as jurisdictional CDFW streambed.

Based on the presence of an OHWM and connectivity to the Mojave River, the channel is a non-wetland waters of the United States under the jurisdiction of ACOE and the RWQCB, and CDFW-jurisdictional streambed.

The 2013 report lists Drainage 3 as having 0.17 acre (544 linear feet) of non-wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 0.35 acre (544 linear feet) of unvegetated streambed are under jurisdiction of CDFW.

This update determined Drainage 3 as having 0.16 acre (536 linear feet) of non-wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 0.33 acre (536 linear feet) of unvegetated streambed are under jurisdiction of CDFW. Changes between 2013 and present are minimal and likely due to minor changes in the streambed.

Drainage 4

Drainage 4 is a northern tributary to Drainage 1 by means of Drainage 5. It appears to capture flows primarily from SR-18 and the surrounding watershed.

This drainage takes the form of an ephemeral, unvegetated desert wash. It demonstrates the following OHWM indicators: presence of bed and bank, break in bank slope, and change in average sediment texture.

Based on the presence of an OHWM and connectivity to the Mojave River, the channel is a non-wetland waters of the United States under the jurisdiction of ACOE and the RWQCB, and CDFW-jurisdictional streambed.

The 2013 report lists Drainage 4 as having 0.01 acre (306 linear feet) of non-wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 0.03 acre (306 linear feet) of unvegetated streambed is under jurisdiction of CDFW.

This update determined Drainage 4 as having no change between 2013 and present.

Drainage 5

Drainage 5 is a northern tributary to Drainage 1. It appears to capture flows primarily from Highway 18 and the surrounding watershed.

This drainage takes the form of an ephemeral, unvegetated desert wash. It demonstrates the following OHWM indicators: presence of bed and bank, break in bank slope, and change in average sediment texture.

Based on the presence of an OHWM and connectivity to the Mojave River, the channel is a non-wetland waters of the United States under the jurisdiction of ACOE and the RWQCB, and CDFW-jurisdictional streambed.

The 2013 report lists Drainage 5 as having 0.02 acre (357 linear feet) of non-wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 0.03 acre (357 linear feet) of unvegetated streambed is under jurisdiction of CDFW.

This update determined Drainage 5 as having no change between 2013 and present.

Drainage 6

Drainage 6 is a northern tributary to Drainage 1 by means of Drainage 5. It appears to capture flows primarily from Highway 18 and the surrounding watershed.

This drainage takes the form of an ephemeral, unvegetated desert wash. It demonstrates the following OHWM indicators: presence of bed and bank, break in bank slope, and change in average sediment texture.

Based on the presence of an OHWM and connectivity to the Mojave River, the channel is a non-wetland waters of the United States under the jurisdiction of ACOE and the RWQCB, and CDFW-jurisdictional streambed.

The 2013 report lists Drainage 6 as having less than 0.01 acre (97 linear feet) of non-wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 0.01 acre (97 linear feet) of unvegetated streambed is under jurisdiction of CDFW.

This update determined Drainage 6 as having no change between 2013 and present.

Drainage 7

Drainage 7 is a northern tributary to Drainage 1. It appears to capture flows primarily from Highway 18 and the surrounding watershed.

This drainage takes the form of an ephemeral, unvegetated desert wash. It demonstrates the following OHWM indicators: presence of bed and bank, break in bank slope, and change in average sediment texture.

Based on the presence of an OHWM and connectivity to the Mojave River, the channel is a non-wetland waters of the United States under the jurisdiction of ACOE and the RWQCB, and CDFW-jurisdictional streambed.

The 2013 report lists Drainage 7 as having less than 0.01 acre (178 linear feet) of non-wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 0.01 acre (178 linear feet) of unvegetated streambed is under jurisdiction of CDFW.

This update determined Drainage 7 as having no change between 2013 and present.

Drainage 8

Drainage 8 is a northern tributary to Drainage 1. It appears to capture flows primarily from SR-18 and the surrounding watershed.

This drainage takes the form of an ephemeral, unvegetated desert wash. It demonstrates the following OHWM indicators: presence of bed and bank, break in bank slope, and change in average sediment texture.

Based on the presence of an OHWM and connectivity to the Mojave River, the channel is a non-wetland waters of the United States under the jurisdiction of ACOE and the RWQCB, and CDFW-jurisdictional streambed.

The 2013 report lists Drainage 8 as having less than 0.01 acre (119 linear feet) of non-wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 0.01 acre (119 linear feet) of unvegetated streambed is under jurisdiction of CDFW.

This update determined Drainage 8 as having no change between 2013 and present.

Drainage 9

Drainage 9 is a northern tributary to Drainage 1. It appears to capture flows primarily from SR-18 and the surrounding watershed.

This drainage takes the form of an ephemeral, unvegetated desert wash. It demonstrates the following OHWM indicators: presence of bed and bank, break in bank slope, and change in average sediment texture.

Based on the presence of an OHWM and connectivity to the Mojave River, the channel is a non-wetland waters of the United States under the jurisdiction of ACOE and the RWQCB, and CDFW-jurisdictional streambed.

The 2013 report lists Drainage 9 as having less than 0.01 acre (211 linear feet) of non-wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 0.01 acre (211 linear feet) of unvegetated streambed is under jurisdiction of CDFW.

This update determined Drainage 9 as having no change between 2013 and present.

Drainage 10

Drainage 10 is a paleo-channel that appears to be a historic tributary that channeled flow from the surrounding watershed.

This drainage does not demonstrate OHWM indicators and therefore is not considered jurisdictional by the ACOE or RWQCB. Similarly, due to the absence of characteristics of a streambed, is not under the jurisdiction of CDFW.

The 2013 report lists Drainage 10 as having 0.01 acre (85 linear feet) of unvegetated streambed under the jurisdiction of CDFW.

This update concluded Drainage 10 is not a jurisdictional streambed.

Drainage 11

Drainage 11 is a northern tributary to Drainage 1. It appears to capture flows primarily from SR-18 and the surrounding watershed.

This drainage takes the form of an ephemeral, unvegetated desert wash. It demonstrates the following OHWM indicators: presence of bed and bank, break in bank slope, and change in average sediment texture.

Based on the presence of an OHWM and connectivity to the Mojave River, the channel is a non-wetland waters of the United States under the jurisdiction of ACOE and the RWQCB, and CDFW-jurisdictional streambed.

The 2013 report lists Drainage 11 as having 0.01 acre (130 linear feet) of non-wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 0.02 acre (130 linear feet) of unvegetated streambed is under jurisdiction of CDFW.

This update determined Drainage 11 as having no change between 2013 and present.

Drainage 12

Drainage 12 is a northern tributary to Drainage 1. It appears to capture flows primarily from SR-18 and the surrounding watershed.

This drainage takes the form of an ephemeral, unvegetated desert wash. It demonstrates the following OHWM indicators: presence of bed and bank, break in bank slope, and change in average sediment texture.

Based on the presence of an OHWM and connectivity to the Mojave River, the channel is a non-wetland waters of the United States under the jurisdiction of ACOE and the RWQCB, and CDFW-jurisdictional streambed.

The 2013 report lists Drainage 12 as having less than 0.01 acre (87 linear feet) of non-wetland waters under jurisdiction of ACOE and the RWQCB. In addition, less than 0.01 acre (87 linear feet) of unvegetated streambed is under jurisdiction of CDFW.

This update determined Drainage 12 as having no change between 2013 and present.

Drainage 13

Drainage 13 is an erosional feature that lies south and runs adjacent to Drainage 1. It appears to be caused by runoff from Potomac Road and the surrounding watershed.

The 2013 report lists Drainage 13 as having 0.04 acre (1,001 linear feet) of non-wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 0.07 acre (1,001 linear feet) of unvegetated streambed is under jurisdiction of CDFW.

While the 2013 delineation identifies this feature as a non-wetland waters under jurisdiction of ACOE and RWQCB, and a jurisdictional streambed under CDFW, the current state of the feature does not support OHWM indicators. While an erosional feature exists in the northernmost corner of the project area, it is more likely that water from this feature runs off northwest as sheet flow towards Drainage 1 as opposed to following along adjacent to the drainage. Traces of OHWM in the form of sediment sorting were only intermittently identifiable, as were traces of bed and bank. Additionally, this feature does not appear to connect to a drainage leading to the Mojave River. Based on the absence of a consistent OHWM and bed and bank, this update does not consider this feature jurisdictional under ACOE, RWQCB, or CDFW.

Drainage 14

Drainage 14 is a southern tributary to an unnamed ephemeral wash in the southeastern portion of the project area. This wash runs southeast and joins with the Mojave River.

The 2013 report lists Drainage 14 as having 0.02 acre (762 linear feet) of non-wetland waters under jurisdiction of ACOE and the RWQCB. In addition, approximately 0.06 acre (762 linear feet) of unvegetated streambed is under jurisdiction of CDFW.

This update determined Drainage 14 as having no change between 2013 and present.

Drainage 15

Drainage 15 is an erosional feature that appears to be a historic tributary to Drainage 13; it is a paleo-channel. It appears to have historically channeled flows from the surrounding watershed.

The 2013 report lists Drainage 15 as having 0.01 acre (202 linear feet) of unvegetated streambed under the jurisdiction of CDFW.

Paleo-channels are described in *A Field Guide to the Identification of the Ordinary High Water Mark* (OHWM) *in the Arid West Region of the Western United States* (ACOE 2008b) as occurring on low

terraces; they are not under ACOE jurisdiction. By definition, paleo-channels do not exhibit consistent OHWM indicators; therefore, they are not waters of the United States. Similarly, due to the absence of characteristics of a streambed, they are not under the jurisdiction of CDFW.

This update concluded Drainage 15 is not a jurisdictional streambed.

6.2 Jurisdictional Delineation Conclusion

The results of the jurisdictional delineation concluded there are approximately 10.67 acres of jurisdictional wetlands and waters within the project area as summarized in Table 2 and depicted on Figures 5A and 5B. Desert Knolls Wash and its tributaries support an OHWM and flow to the Mojave River, and therefore, meet the definition of waters of the United States under the jurisdiction of the ACOE and RWQCB. Desert Knolls Wash supports wetland waters of the United States. It also has a clear bed and bank; therefore, it is a streambed under the jurisdiction of CDFW. Within the project area, there is a total of 0.08 acre of wetland waters of the United States, 4.26 acres of non-wetland waters, 6.20 acres of unvegetated streambed, and 0.13 acre of riparian vegetation.

Table 2
Jurisdictional Waters Delineation Summary

Feature	ACOE/RWQCB Non-Wetland Waters (acres)	ACOE/RWQCB Wetland Waters (acres)	ACOE/RWQCB Linear Feet	CDFW Unvegetated Streambed	CDFW Riparian	CDFW Linear Feet
Drainage 1 (Desert Knolls Wash)	4.16	0.08	2,870	5.86	0.11	2,870
Drainage 2 (Mojave River)	0.06	0.00	36	0.20	0.02	38
Drainage 3	0.16	0.00	536	0.33	0.00	536
Drainage 4	0.01	0.00	306	0.03	0.00	306
Drainage 5	0.02	0.00	357	0.03	0.00	357
Drainage 6	<0.01	0.00	97	0.01	0.00	97
Drainage 7	<0.01	0.00	178	0.01	0.00	178
Drainage 8	<0.01	0.00	119	0.01	0.00	119
Drainage 9	<0.01	0.00	211	0.01	0.00	211
Drainage 11	0.01	0.00	130	0.02	0.00	130
Drainage 12	<0.01	0.00	87	<0.01	0.00	87
Drainage 14	0.02	0.00	762	0.06	0.00	762
Total	**4.26**	**0.08**	**5,689**	**6.20**	**0.13**	**5,691**

7 IMPACTS

The proposed project involves improvements to Desert Knolls Wash, including the creation of 2:1 side-slopes and the installation of grade stabilization structures intermittently throughout the stream. The newly created channel sides and grade stabilization structures are considered permanent impacts, while equipment access areas and portions of the wash that are expected to be left natural bottomed will be temporarily impacted. Implementation of the proposed project would result in the following impacts to federal and state waters summarized in Table 3 and are depicted on Figures 6A and 6B.

Table 3
Jurisdictional Waters Delineation Impacts Summary

Jurisdiction	Vegetation Community	Temporary Impact Acreage	Permanent Impact Acreage	Total Impact Acreage
ACOE/RWQCB Wetland Waters	Red Willow Thickets	0.05	0.03	0.08
	Non-vegetated Floodplain	<0.01	0.00	<0.01
ACOE/RWQCB Wetland Waters Subtotal		*0.05*	*0.03*	*0.08*
ACOE/RWQCB Non-Wetland Waters	Non-vegetated Floodplain	2.33	1.84	4.14
	Developed	0.00	0.01	0.01
ACOE/RWQCB Non-wetland Waters Subtotal		*2.33*	*1.85*	*4.18*
CDFW Unvegetated Streambed	Allscale Scrub	0.32	0.52	0.84
	Non-vegetated Floodplain	2.30	1.84	4.14
	Disturbed	0.19	0.74	0.93
	Developed	0.00	0.02	0.02
CDFW Unvegetated Streambed Subtotal		*2.81*	*3.12*	*5.93*
CDFW Riparian	Red Willow Thickets	0.05	0.03	0.08
	Non-vegetated Floodplain	0.03	<0.01	0.03
CDFW Riparian Subtotal		*0.08*	*0.03*	*0.11*

Note: * Acreage may not total due to rounding.

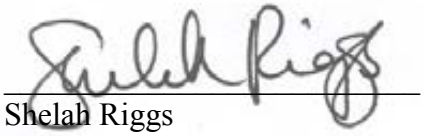
8 CONCLUSIONS

The proposed project will result in temporary and permanent impacts to waters of the United States, including wetlands, and temporary and permanent impacts to waters of the state. The ACOE requires a permit pursuant to Section 404 of the Clean Water Act (Section 404 permit) prior to discharging fill into a waters of the United States. The temporary and permanent impacts to federal waters associated with the proposed project exceed the thresholds of the 404 Nationwide Permit Program (NWP), which is typically 0.5-acres of permanent impacts.

Therefore, issuance of an Individual Permit under Section 404 of the Clean Water Act is expected to be required. A Water Quality Certification is required from the RWQCB pursuant to section 401 of the Clean Water Act ("401 Certification") for any federal action, including a 404 permit. A notification of a Streambed Alteration Agreement to CDFW would be required prior to modification of jurisdictional streambeds.

If you have any questions or comments regarding the content of this letter, please do not hesitate to contact me via telephone at 951.300.2100 or via e-mail at sriggs@dudek.com.

Sincerely,



Shelah Riggs
Senior Regulatory Specialist

Att: Attachment A: Figures 1–6
Attachment B: Photo Documentation

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ATTACHMENT A

Figures 1–6

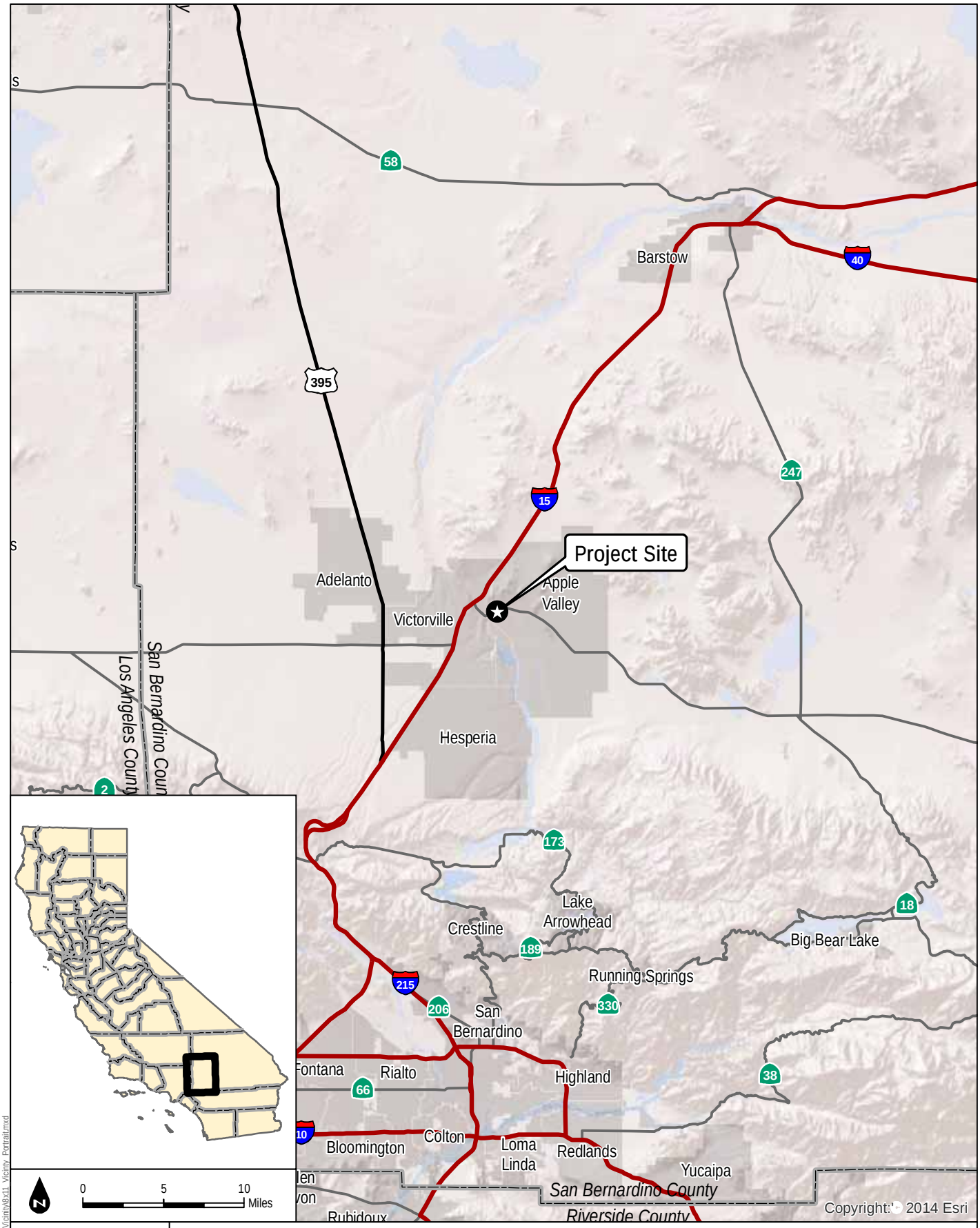

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FIGURE 1

Regional Map

Desert Knolls Wash Phase III Flood Control Improvement Project

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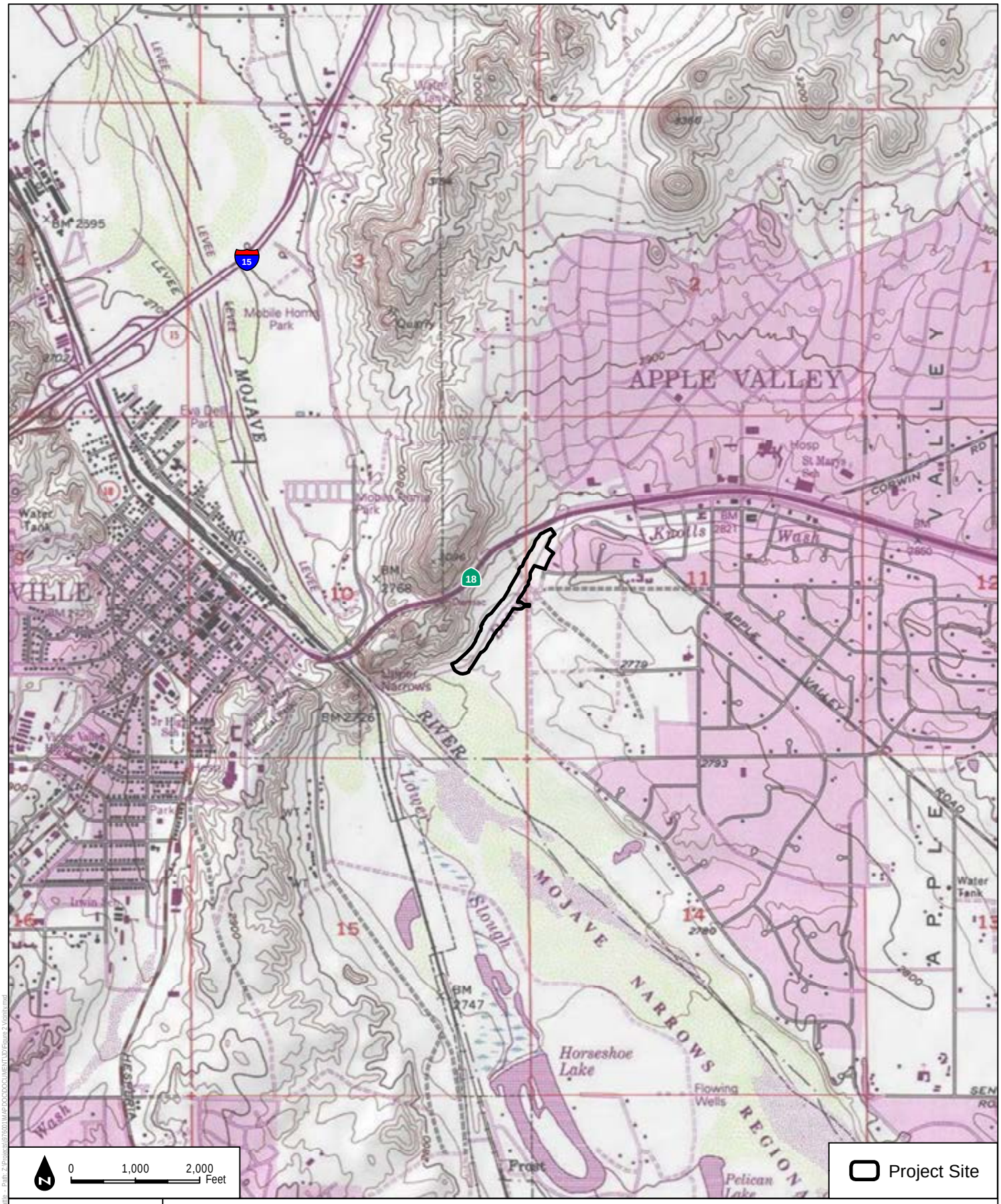

SOURCE: USGS 7.5-Minute Series Victorville Quadrangle

FIGURE 2

Vicinity Map

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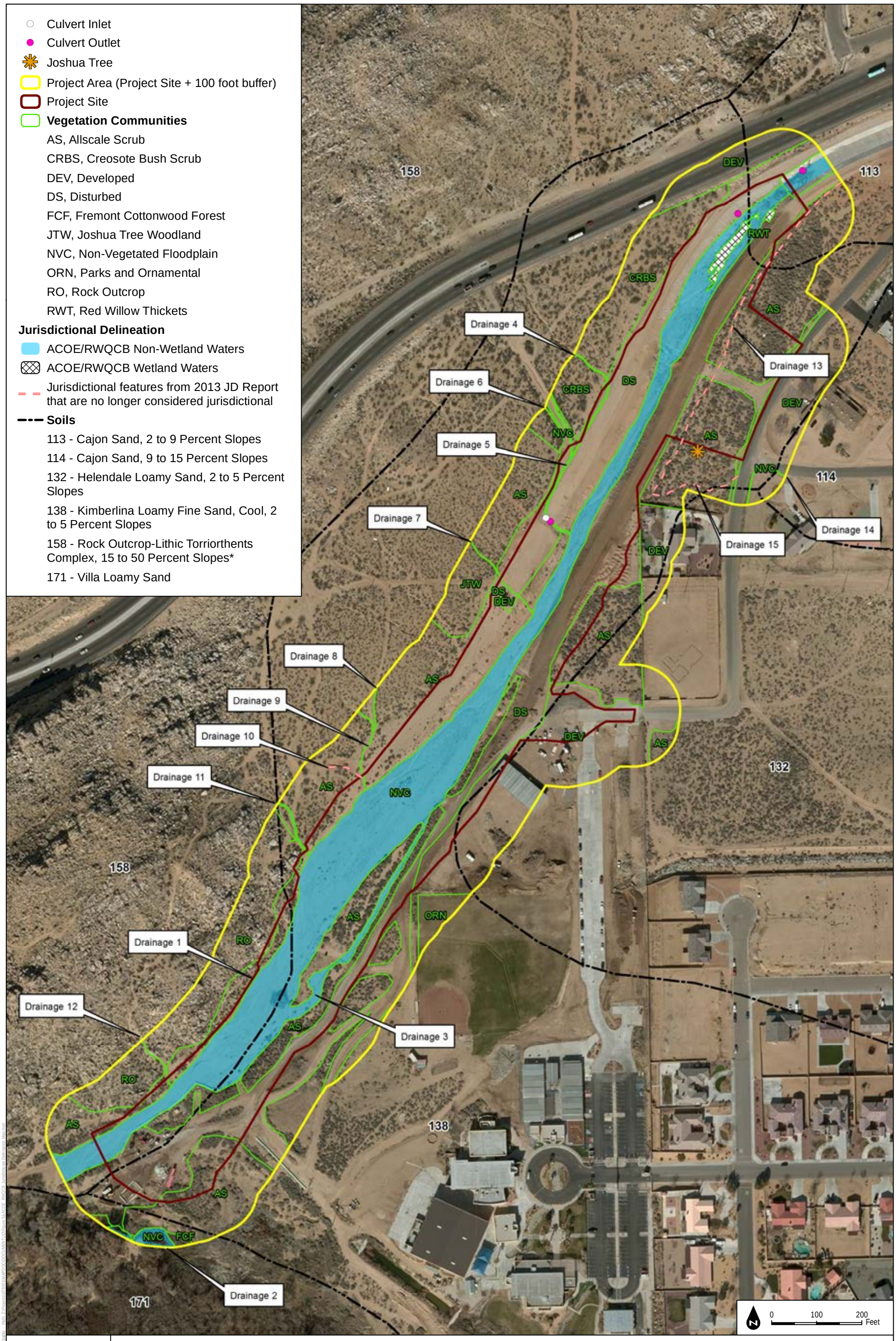
Desert Knolls Wash Phase III Flood Control Improvement Project



SOURCE: Bing Maps, 2016

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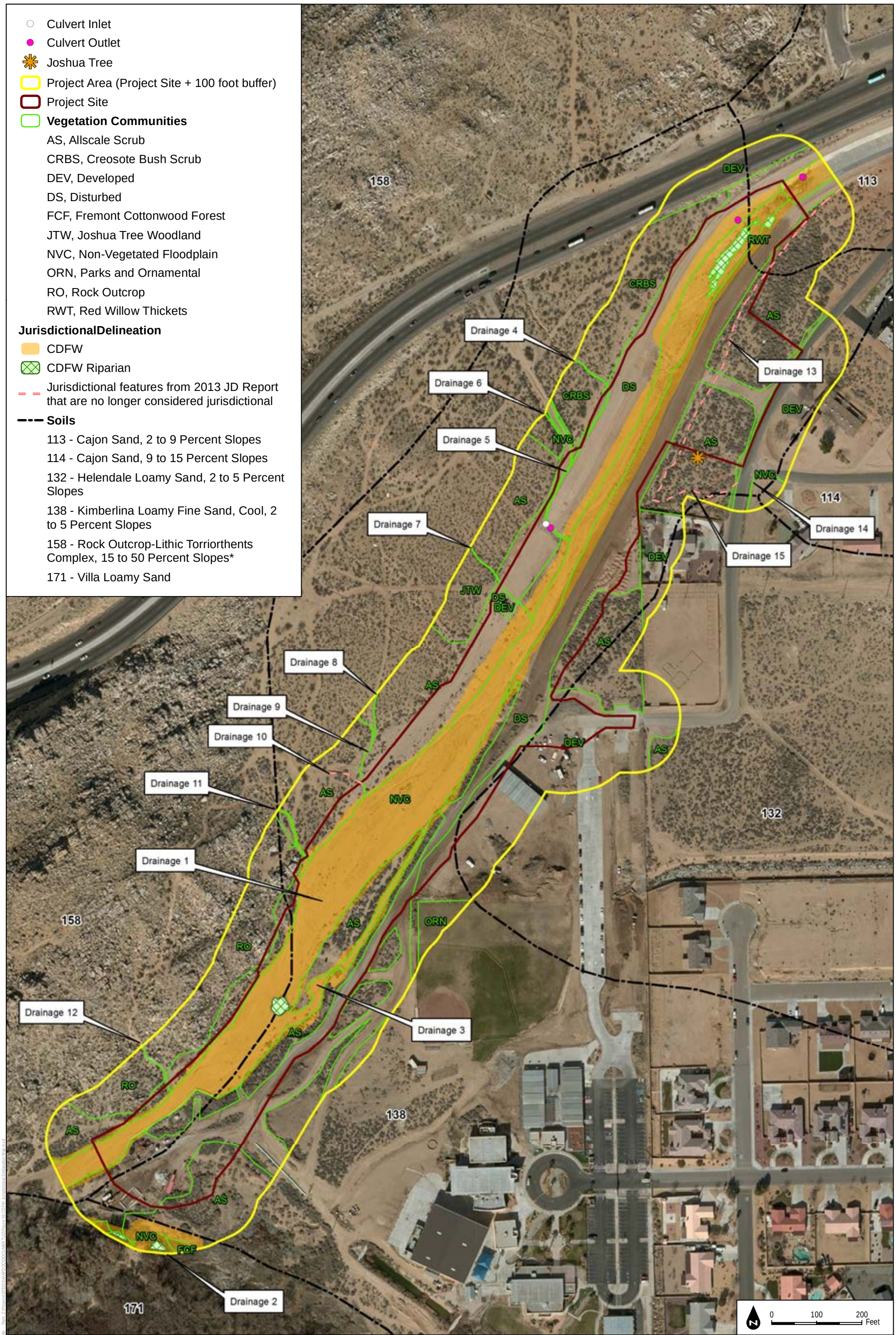
FIGURE 3A

Jurisdictional Delineation - ACOE/RWQCB

Desert Knolls Wash Phase III Flood Control Improvement Project



SOURCE: Bing Maps, 2016

FIGURE 3B

Jurisdictional Delineation - CDFW

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Desert Knolls Wash Phase III Flood Control Improvement Project

SOURCE: Bing Maps, 2016; County of San Bernardino, 2016

FIGURE 4

Watershed Map

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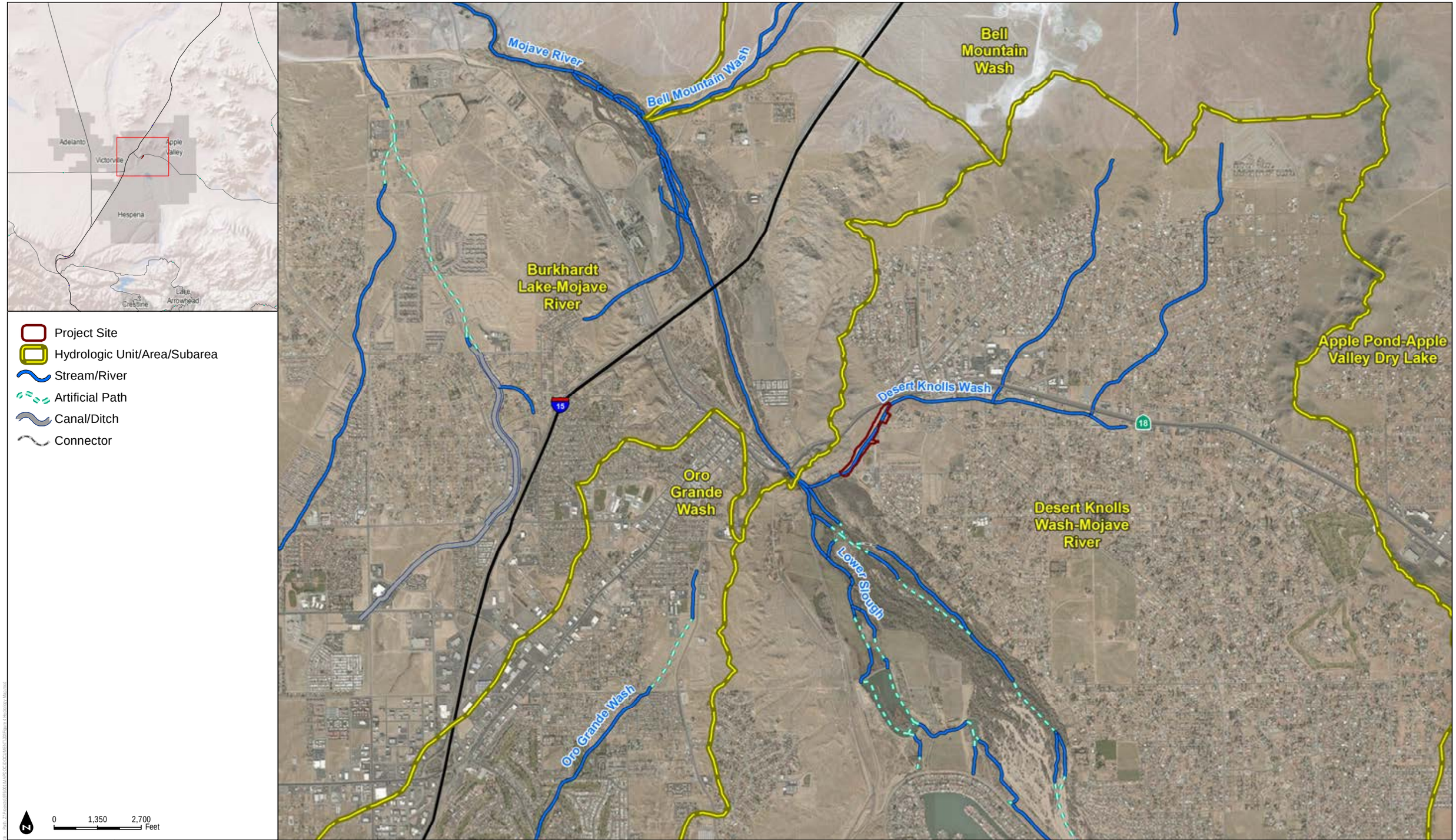
Desert Knolls Wash Phase III Flood Control Improvement Project



SOURCE: Bing Map, USGS NHD 2016

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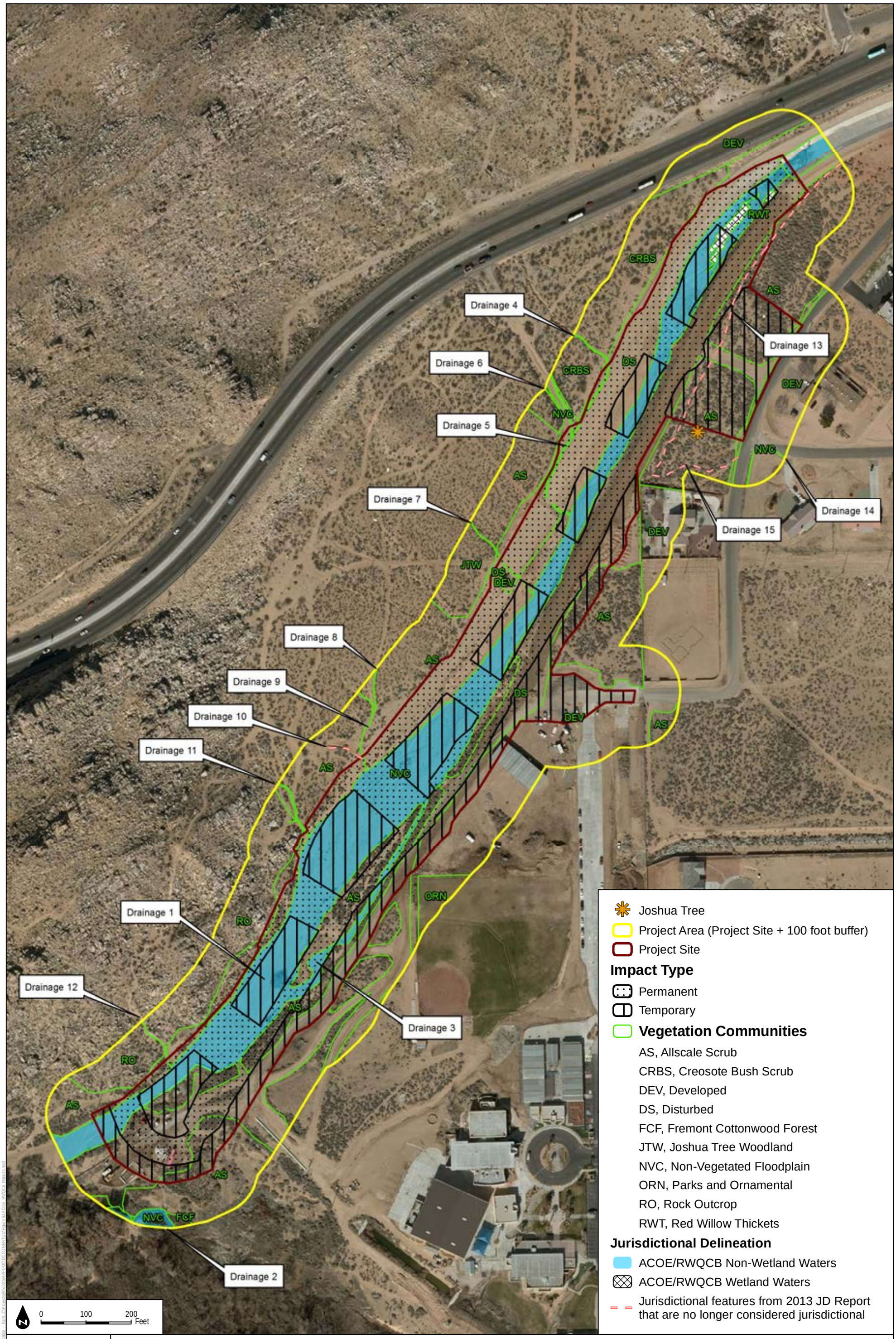
FIGURE 5

Hydrology Map

Desert Knolls Wash Phase III Flood Control Improvement Project



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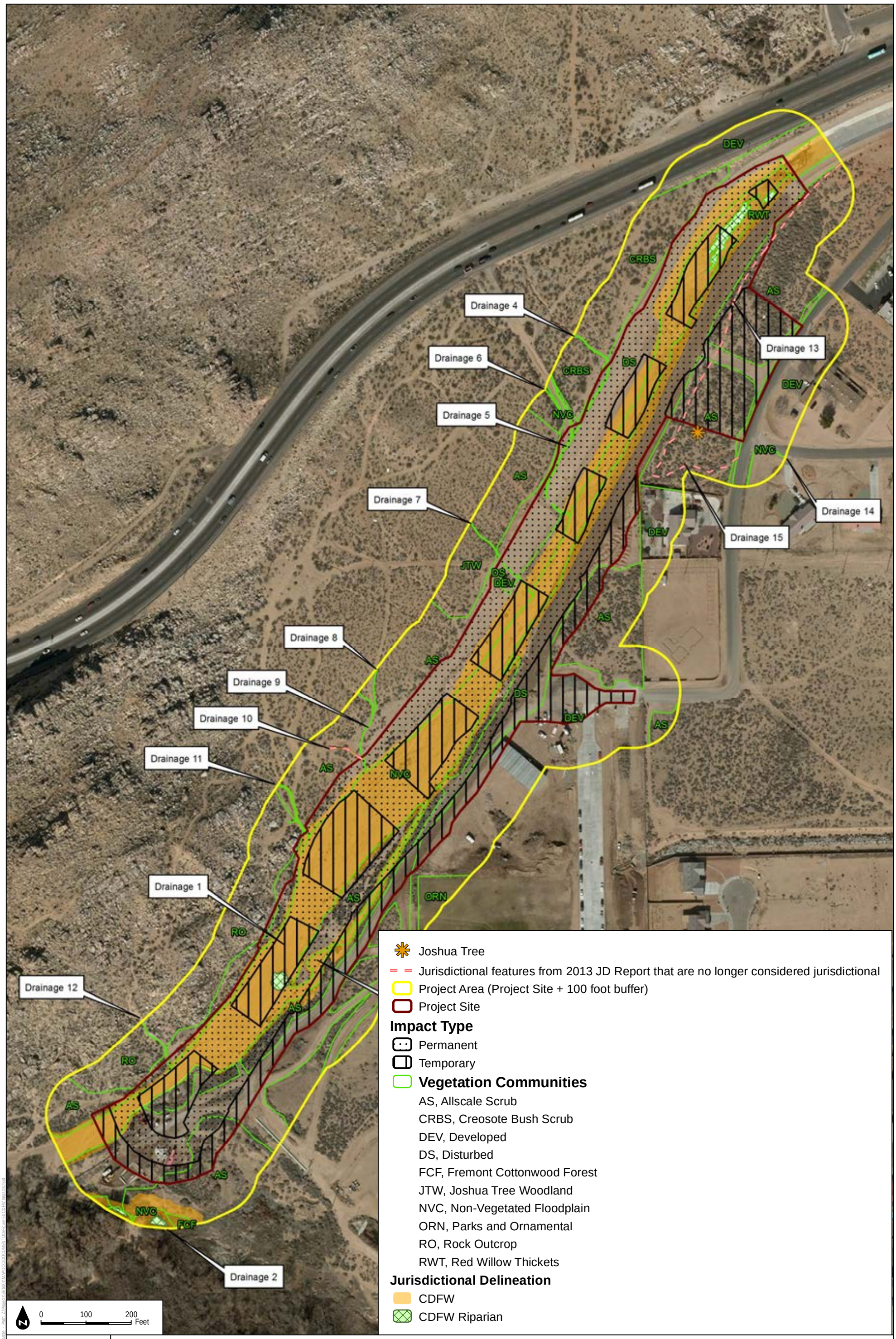
SOURCE: Bing Maps, 2016

FIGURE 6A

Impacts - ACOE/RWQCB

Desert Knolls Wash Phase III Flood Control Improvement Project



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SOURCE: Bing Maps, 2016

FIGURE 6B

Impacts - CDFW

Desert Knolls Wash Phase III Flood Control Improvement Project

ATTACHMENT B

Photo Documentation

ATTACHMENT B
Photo Documentation

Location 1: Confluence of Desert Knolls Wash and Mojave River – facing southwest.	**Location 2:** Example of top of bank, indicating CDFW jurisdiction – facing southwest.
Location 3: Tributary leading into Desert Knolls Wash – facing northwest.	**Location 4:** Tributary leading into Desert Knolls Wash – facing northwest.

Location 5: View downstream from central portion of Desert Knolls Wash – facing southwest.	**Location 6:** Example of lower terrace within Desert Knolls wash – facing northwest.
Location 7: Tributary to Desert Knolls Wash – facing west.	**Location 8**: View downstream into wetland area from southern bank – facing southwest.

Location 9: Riprap sides and wetland habitat within northeastern portion of project area – facing northeast.	**Location 10:** Immature cottonwood trees and mulefat scrub within northeastern portion of project area – facing northeast.
Location 11: Channel inlet at junction between the natural portion of Desert Knolls Wash and its concrete intersection – facing northwest.	**Location 12:** Roadside ditch tributary to the Mojave River within the Project Area – facing

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APPENDIX E

Cultural Resources Report

IDENTIFICATION AND EVALUATION OF HISTORIC PROPERTIES

DESERT KNOLLS WASH PHASE III PROJECT

Town of Apple Valley
San Bernardino County, California

Prepared for:

Environmental Management Division
San Bernardino County Department of Public Works
825 East Third Street
San Bernardino, CA 92415

Prepared by:

CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Bai "Tom" Tang, Principal Investigator
Michael Hogan, Principal Investigator

June 25, 2015
Revised July 30, 2015
County Contract No. 14-947
CRM TECH Contract No. 2888A

Title: Identification and Evaluation of Historic Properties: Desert Knolls Wash Phase III Project, Town of Apple Valley, San Bernardino County, California

Author(s): Bai "Tom" Tang, Principal Investigator/Historian/Architectural Historian
Deirdre Encarnación, Archaeologist/Report Writer
Daniel Ballester, Archaeologist/Field Director
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Consulting Firm: CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324
(909) 824-6400

Date: June 25, 2015; revised July 30, 2015

Prepared for: Environmental Management Division
San Bernardino County Department of Public Works
825 East Third Street
San Bernardino, CA 92415
(909) 387-1811

USGS Quadrangle: Victorville, Calif., 7.5' quadrangle (Sections 10 and 11, T5N R4W, San Bernardino Baseline and Meridian)

Project Size: Approximately 78 acres

Keywords: Victor Valley, southern Mojave Desert, San Bernardino County; Phase I/ Extended Phase I historical/archaeological resources survey; Sites 36-00967 (prehistoric camp site), 36-007147 (historic-period refuse scatter), 36-013879 (prehistoric habitation site), and PSBR-16 (pending prehistoric habitation site); archaeological monitoring recommended due to sensitivity for subsurface deposits of prehistoric cultural remains

EXECUTIVE SUMMARY

Between January and June 2015, at the request of the San Bernardino County Department of Public Works (SBCDPW), CRM TECH performed a cultural resources study on the Area of Potential Effects (APE) for the proposed Desert Knolls Wash Phase III Project in the Town of Apple Valley, San Bernardino County, California. The undertaking entails a series of flood control improvements to the Desert Knolls Wash, including the installation of trapezoidal channel stabilizers, side slope grading and protection, the construction of culverts and a stilling basin, along with associated relocation of sewer lines. The objective of the undertaking is to stabilize the existing wash and provide flood protection to the neighboring properties.

The APE for the undertaking is delineated to encompass the maximum extent of ground disturbance required by project design, including staging areas, as well as adjacent parcels occupied by buildings that may receive visual, atmospheric, or other indirect effects. The archaeological survey for this study covered the portion of the APE to be impacted directly by ground-disturbing activities during the undertaking, while the remainder of the APE was surveyed for buildings, structures, and other built-environment features of potential historic value. The entire APE measures approximately 78 acres, located within Sections 10 and 11 of T5N R4W, San Bernardino Baseline and Meridian, and the APE for direct effects measures approximately 14 acres, lying along the course of the Desert Knolls Wash near its confluence with the Mojave River.

The SBCDPW, as the project proponent and the lead agency, initiated the study in compliance with the California Environmental Quality Act (CEQA). In anticipation of future federal review of the undertaking, this study seeks to satisfy the mandates of both CEQA and Section 106 of the National Historic Preservation Act. In addition, the study is prepared pursuant to a Memorandum of Understanding (MOU) among the San Manuel Band of Mission Indians, the San Bernardino County Flood Control District, and the Lewis Center for Educational Research, which establishes specific protocols for the treatment of Native American cultural resources, if encountered, and procedures for tribal participation during ground-disturbing activities.

The purpose of the study is to provide the SBCDPW and other responsible public agencies with the necessary information and analysis to determine whether the proposed undertaking would have an effect on any "historic properties," as defined by 36 CFR 800.16(l), or "historical resources," as defined by Title 14 CCR §15064.5(a)(1)-(3), that may exist in or near the APE. In order to identify such properties, CRM TECH conducted a cultural resources records search, pursued historical background research, contacted Native American representatives, carried out a systematic field survey, and excavated exploratory trenches to detect possible subsurface archaeological deposits.

The results of the records search revealed that most of the APE had been included in at least eight previous cultural resources studies, particularly the western portion. The surveys invariably found Mojave Narrows vicinity to be archaeologically sensitive for Native American cultural deposits. As a result of these and other similar studies in the vicinity, four archaeological sites, including three prehistoric sites (36-000967, 36-013879, and PSBR-16) and one historic-period site (36-007147), were previously identified within or partially within the APE for direct effects. During the field survey, a late historic-period building was recorded within the APE for indirect effects, but three of

the four archaeological sites could not be found at their previously reported locations, leaving only one site, 36-013879, that may receive direct impact from the proposed undertaking.

Described as a large prehistoric habitation site, 36-013879 encompasses several previously recorded sites, including one that was determined eligible for listing in the National Register of Historic Places, but the significance of 36-013879 as a whole has not been formally evaluated. As a complete evaluation of 36-013879 is well beyond the scope of statutory compliance for this undertaking, the site is hereby presumed to be a "historic property" and a "historical resource" under Section 106 and CEQA provisions in the environmental review process.

During this study, a complete mano was discovered on the ground surface within the boundaries of 36-013879, but the excavation of three exploratory trenches to the depths of two to three meters encountered no cultural remains. In light of its location in an active wash, the portion of the site within the APE for direct effects is unlikely to contain intact, potentially significant archaeological deposits. As such, this portion of the site does not appear to demonstrate sufficient archaeological data potential to contribute to the significance and integrity of the site as a whole. Therefore, the physical impact of the proposed undertaking on this portion of 36-013879 would not constitute an "effect" or a "substantial adverse change" to this presumptive "historic property"/"historical resource."

The late historic-period building recorded in the APE for indirect effects is a fourplex constructed around 1966. Historical research has yielded no evidence that the building is closely associated with any persons or events of recognized significance in national, state, or local history. The building is a common example of the then-popular Ranch-style residential architecture, but does not stand out as an important example of that style or of its type, period, region, or method of construction. Based on these considerations, the building does not appear eligible for listing the National Register of Historic Places or the California Register of Historical resources, and thus does not qualify as a "historic property" or a "historical resource."

In summary, among the five cultural resources encountered during the course of this study, only Site 36-013879 is presumed to constitute a "historic property"/"historical resource" for Section 106- and CEQA-compliance purposes, but the undertaking will not cause an "effect" or a "substantial adverse change" to the potential significance or integrity of the site. However, the presence of the known prehistoric sites in a relatively concentrated cluster in and near the APE suggests a heightened possibility for similar cultural remains to be encountered in subsurface deposits beyond the active channel of the Desert Knolls Wash.

Based on these findings, CRM TECH presents the following recommendations to the SBCDPW and other responsible public agencies involved in the proposed undertaking:

- The proposed undertaking will not cause an "effect" or a "substantial adverse change" to any known "historic properties" or "historical resources," as defined by Section 106 and CEQA.
- In order to properly identify, evaluate and, if necessary, protect previously undetected subsurface cultural deposits, an archaeological monitoring program should be implemented, in coordination with the San Manuel Band of Mission Indians and in keeping with the MOU, during all earth-moving activities associated with the undertaking.

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INTRODUCTION

Between January and June 2015, at the request of the San Bernardino County Department of Public Works (SBCDPW), CRM TECH performed a cultural resources study on the Area of Potential Effects (APE) for the proposed Desert Knolls Wash Phase III Project in the Town of Apple Valley, San Bernardino County, California (Fig. 1). The undertaking entails a series of flood control improvements to the Desert Knolls Wash, including the installation of trapezoidal channel stabilizers, side slope grading and protection, the construction of culverts and a stilling basin, along with associated relocation of sewer lines. The objective of the undertaking is to stabilize the existing wash and provide flood protection to the neighboring properties.

The APE for the undertaking is delineated to encompass the maximum extent of ground disturbance required by project design, including staging areas, as well as adjacent parcels occupied by buildings that may receive visual, atmospheric, or other indirect effects (Fig. 2). The archaeological survey for this study covered the portion of the APE to be impacted directly by ground-disturbing activities during the undertaking, while the remainder of the APE was surveyed for buildings, structures, and other built-environment features of potential historic value (Fig. 3). The entire APE measures approximately 78 acres, located within Sections 10 and 11 of T5N R4W, San Bernardino Baseline and Meridian, and the APE for direct effects measures approximately 14 acres, lying along the course of the Desert Knolls Wash near its confluence with the Mojave River (Fig. 2).

The SBCDPW, as the project proponent and the lead agency, initiated the study in compliance with the California Environmental Quality Act (CEQA). In anticipation of future federal review of the undertaking, this study seeks to satisfy the mandates of both CEQA and Section 106 of the National Historic Preservation Act. In addition, the study is prepared pursuant to a Memorandum of Understanding among the San Manuel Band of Mission Indians, the San Bernardino County Flood Control District, and the Lewis Center for Educational Research, which establishes specific protocols for the treatment of Native American cultural resources, if encountered, and procedures for tribal participation during ground-disturbing activities.

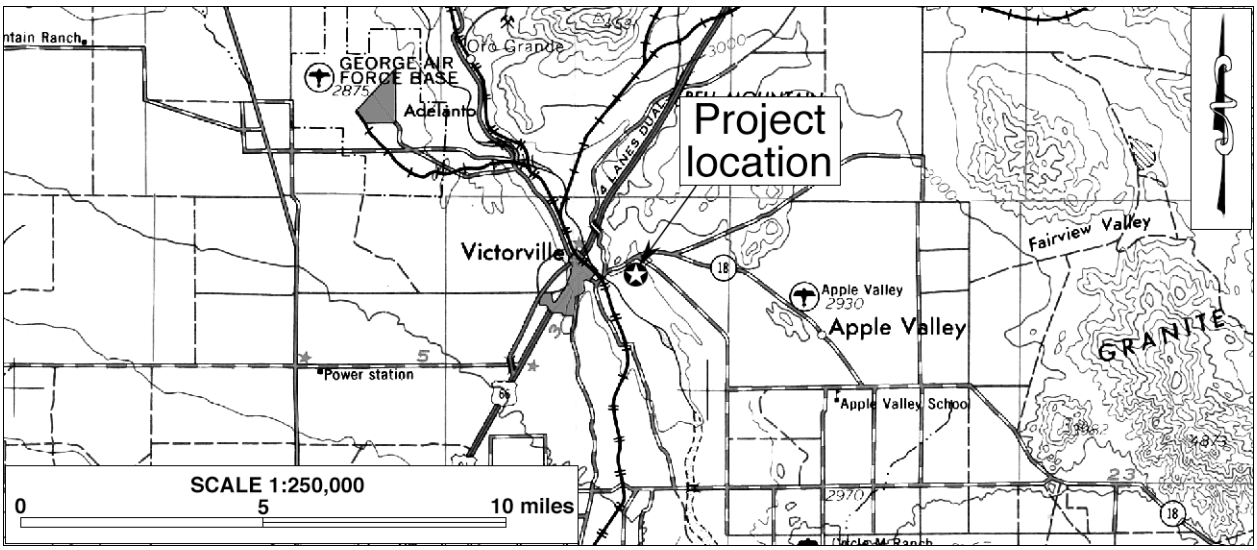

Figure 1. Project vicinity. (Based on USGS San Bernardino, Calif., 1:250,000 quadrangle [USGS 1969])

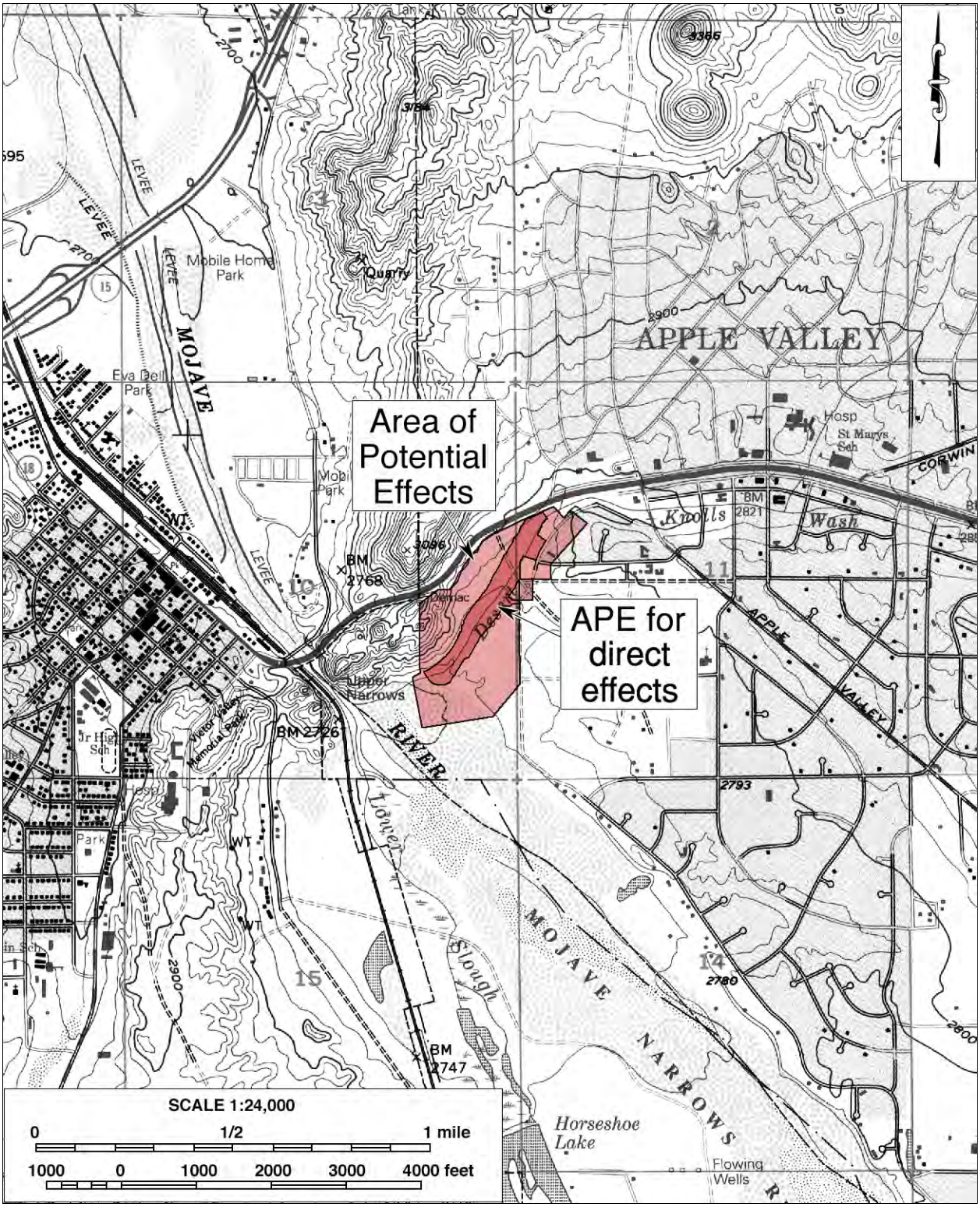

Figure 2. Area of Potential Effects. (Based on USGS Victorville, Calif., 1:24,000 quadrangle [USGS 1993])

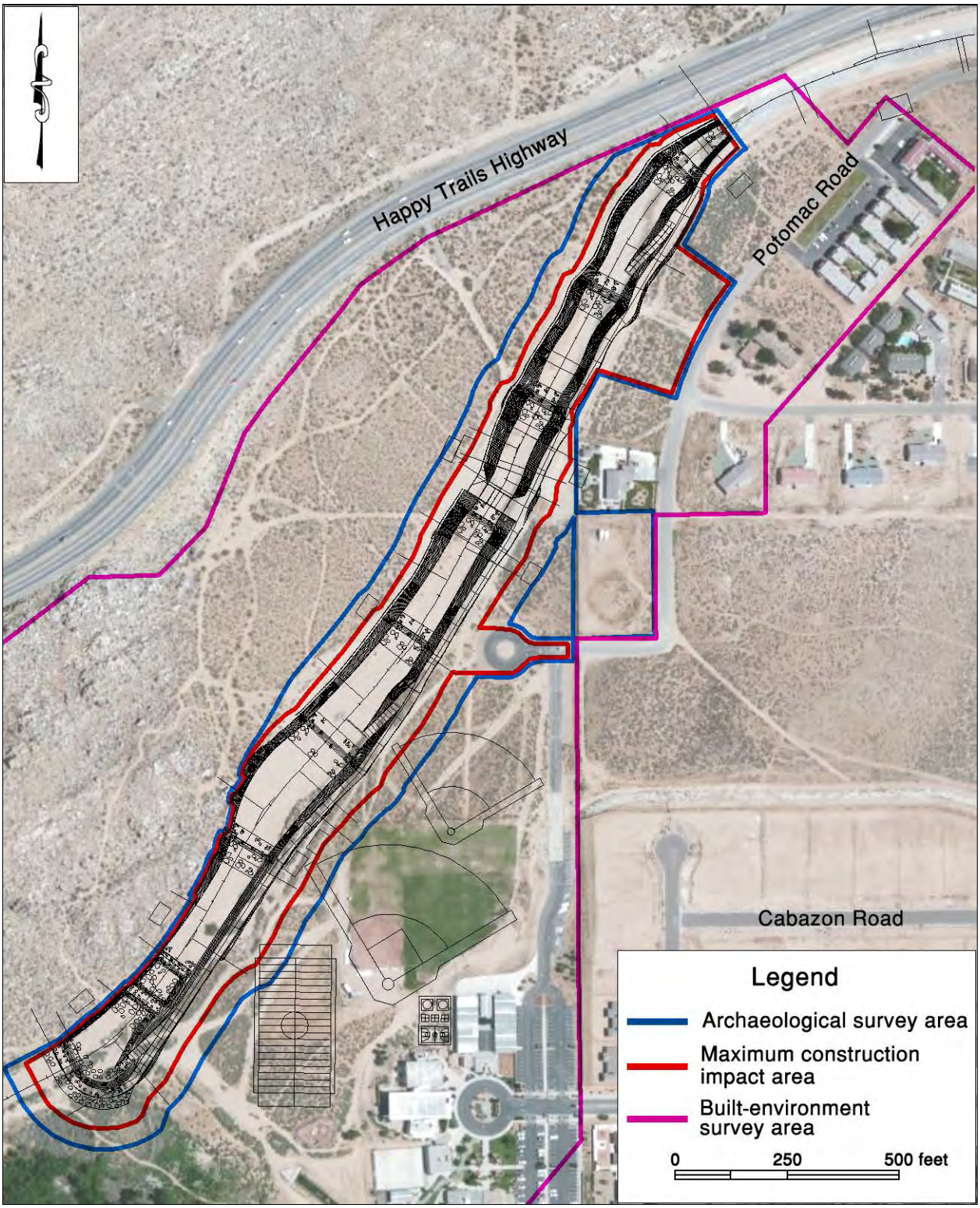

Figure 3. Survey efforts in different portions of the APE.

The purpose of the study is to provide the SBCDPW and other responsible public agencies with the necessary information and analysis to determine whether the proposed undertaking would have an effect on any "historic properties," as defined by 36 CFR 800.16(l), or "historical resources," as defined by Title 14 CCR §15064.5(a)(1)-(3), that may exist in or near the APE. In order to identify such properties, CRM TECH conducted a cultural resources records search, pursued historical background research, contacted Native American representatives, carried out a systematic field survey, and excavated exploratory trenches to detect possible subsurface archaeological deposits. The following report is a complete account of the methods and results of the various avenues of research, and the final conclusion of the study.

SETTING

CURRENT NATURAL SETTING

The Town of Apple Valley is located in the Victor Valley, on the southern rim of the Mojave Desert and to the north of the San Bernardino-San Gabriel mountain ranges. Dictated by this geographic setting, the climate and environment of the area is typical of southern California high desert region, so named because of its higher elevation than the Colorado Desert to the southeast. The climate is marked by extremes in temperature and aridity, with summer highs reaching well over 110ºF and winter lows dropping below freezing. Average annual precipitation is less than five inches.

The APE lies on the southwestern edge of the Town of Apple Valley, near the confluence of the Mojave River and the Desert Knolls Wash, as mentioned above. It encompasses much of the campus of the Lewis Center for Educational Research and a portion of a residential neighborhood along Potomac Road, as well as large stretches of undeveloped land (Fig. 4). The surrounding land uses similarly feature both residential and, to a lesser extent, commercial development and vacant

Figure 4. Overview of the current natural setting of the APE, view to the southwest along the Desert Knoll Wash. (Photograph taken on March 23, 2015)

land. The ground surface in most of the APE has been disturbed by construction activities, including those associated with ongoing development on the Lewis Center campus and with past channel improvement along the Desert Knolls Wash.

Elevations in the APE range approximately from 2,745 feet to 2,785 feet above mean sea level, with an incline towards the north. Soils in the APE consist of light grayish brown, medium-grained sands with decomposing granite in most areas, with coarse fluvial sand within the wash. Vegetation observed includes both introduced landscaping plants and native flora such as creosote bushes, cottonwood trees, foxtails, datura, and other small desert shrubs and grasses (Fig. 4).

CULTURAL SETTING

Archaeological Context

In order to understand the progress of Native American cultures prior to European contact, archaeologists have devised chronological frameworks on the basis of artifacts and site types that date back some 12,000 years. Currently, the chronology most frequently applied in the Mojave Desert divides the region's prehistory into five periods marked by changes in archaeological remains, reflecting different ways in which Native peoples adapted to their surroundings. According to Warren (1984) and Warren and Crabtree (1986), the five periods are as follows: the Lake Mojave Period, 12,000 years to 7,000 years ago; the Pinto Period, 7,000 years to 4,000 years ago; the Gypsum Period, 4,000 years to 1,500 years ago; the Saratoga Springs Period, 1,500 years to 800 years ago; and the Protohistoric Period, 800 years ago to European contact.

More recently, Hall (2000) presented a slightly different chronology for the region, also with five periods: Lake Mojave (ca. 8000-5500 B.C.), Pinto (ca. 5500-2500 B.C.), Newberry (ca. 1500 B.C.-500 A.D.), Saratoga (ca. 500-1200 A.D.), and Tecopa (ca. 1200-1770s A.D.). According to Hall (*ibid*.:14), small mobile groups of hunters and gatherers inhabited the Mojave Desert during the Lake Mojave sequence. Their material culture is represented by the Great Basin Stemmed points and flaked stone crescents. These small, highly mobile groups continued to inhabit the region during the Pinto Period, which saw an increased reliance on ground foods, small and large game animals, and the collection of vegetal resources, suggesting that "subsistence patterns were those of broad-based foragers" (*ibid*.:15). Artifact types found in association with this period include the Pinto points and *Olivella* sp. spire-lopped beads.

Distinct cultural changes occurred during the Newberry Period, in comparison to the earlier periods, including "geographically expansive land-use pattern…involving small residential groups moving between select localities," long-distance trade, and diffusion of trait characteristics (Hall 2000:16). Typical artifacts from this period are the Elko and Gypsum Contracting Stem points and Split Oval beads. The two ensuing periods, Saratoga and Tecopa, are characterized by seasonal group settlements near accessible food resources and the intensification of the exploitation of plant foods, as evidenced by groundstone artifacts (*ibid*.:16).

Hall (2000:16) states that "late prehistoric foraging patterns were more restricted in geographic routine and range, a consequence of increasing population density" and other variables. Saratoga Period artifact types include Rose Spring and Eastgate points as well as Anasazi grayware pottery. Artifacts from the Tecopa Period include Desert Side-notched and Cottonwood Triangular points,

buffware and brownware pottery, and beads of the Thin Lipped, Tiny Saucer, Cupped, Cylinder, steatite, and glass types (*ibid*.).

Ethnohistorical Context

The Victor Valley area is generally considered to be a part of the traditional territories of the Serrano and the Vanyume Indians. The basic written sources on Serrano and Vanyume cultures are Kroeber (1925), Strong (1929), and Bean and Smith (1978). The following ethnographic discussion of the Serrano and Vanyume peoples is based on these sources.

Very little is known about the Vanyume people. Linguistically they were probably related to the Serrano, their southern neighbors, but politically they seem to have diverged. Never large in number, the Vanyume population dwindled rapidly between 1820 and 1834, when southern California Indians were removed to the various missions and their *asistencias.* As a group, the Vanyume virtually disappeared well before 1900.

The Serrano territory is centered at the San Bernardino Mountains, but also includes the southern rim of the Mojave Desert, stretching from Victorville eastward to Twentynine Palms. However, it is nearly impossible to assign definitive boundaries for the Serrano territory due to the nature of the tribe's clan-based organization as well as the lack of reliable data. The name Serrano is derived from a Spanish term meaning "mountaineer" or "highlander."

Prior to European contact, the Serrano were primarily gatherers and hunters, and occasional fishers, who settled mostly where flowing water emerged from the mountains. Shell, wood, bone, stone, and plant fibers were used in a variety of implements, such as lavishly decorated baskets, pottery, rabbit-skin blankets, and musical instruments. The tribe was loosely organized into exogamous clans, led by hereditary heads, and the clans in turn were affiliated with one of two exogamous moieties. The exact nature of the clans, their structure, function, and number are not known, except that each clan was the largest autonomous political and landholding unit, the core of which was the patrilineage. There was no pan-tribal political union among the clans.

Families lived in circular, domed structures made from willow and tule thatching and containing a central fire pit. These homes were used mainly for sleep and storage, while most of the daily household activities occurred in the open or under the shade of a ramada. Other important structures in Serrano life were large ceremonial house, granaries and sweat lodges, the last being a circular semi-subterranean hut framed with willow, covered with earth, and having only one entrance. In terms of Serrano technology, shells, wood bone stone, and plant fibers were employed to create household items, tools, and other everyday items, as well as fashion functional decorative items like baskets and blankets.

Although contact with Europeans may have occurred as early as 1771 or 1772, Spanish influence on Serrano lifeways was negligible until the 1810s, when a mission *asistencia* was established on the southern edge of Serrano territory. Between then and the end of the mission era in 1834, most of the Serranos in the San Bernardino Mountains, like the Vanyume, were removed to the nearby missions. At present, most Serrano descendants are found on the San Manuel and the Morongo Indian Reservations, where they participate in ceremonial and political affairs with other Native American groups on an inter-reservation basis.

Historical Context

The present-day Victor Valley area received its first European visitor, the famed Spanish explorer Francisco Garcés, in 1776, and the first Euroamerican settlements appeared in the valley as early as 1860 (Peirson 1970:128). Despite these "early starts," due to its harsh environment, development in the arid high desert country of southern California was slow and limited for much of the historic period, and the Victor Valley remained only sparsely populated until the second half of the 20th century.

Garcés traveled through the Victor Valley along an ancient Indian trading route known today as the Mojave Trail (Beck and Haase 1974:15). In the early 1830s, part of this trail was incorporated into the Old Spanish Trail, an important pack-train road that extended between southern California and Santa Fe, New Mexico (Warren 2004). Some 20 years later, when the historic wagon road known as the Mormon Trail or Salt Lake Trail was established between Utah and southern California, it followed essentially the same route across the Mojave Desert (NPS 2001:5). Since then, the Victor Valley has always served as a crucial link on a succession of major transportation arteries, where the heritage of the ancient Mojave Trail was carried on by the Santa Fe Railroad since the 1880s, by the legendary U.S. Route 66 during the early and mid-20th century and finally by today's I-15.

With the completion of the Santa Fe Railroad, settlement activities began in earnest in the Victor Valley in the 1880s, and reached a peak in the 1910s. Thanks to the availability of fertile lands and the abundance of ground water, agriculture played a dominant role in the early development of the Victor Valley area. During the late 19th and early 20th centuries, settlers in the valley attempted a number of moneymaking staples, such as alfalfa, deciduous fruits, and poultry, with only limited success. The name of Apple Valley, adopted around the turn of the century, reflects one such endeavor in the vicinity (Gudde 1998:15).

As a community, Apple Valley did not come into being until 1945, when developers Newton T. Bass and Bernard "Bud" Westlund acquired approximately 25,000 acres of land and developed a new town under the name of Apple Valley Ranchos (Ryon 1964; O'Rourke 2004:37). Through a series of high-profile promotion campaigns, within 20 years Bass and Westlund had succeeded in turning this sparsely settled stretch of desert land into a western-themed town of 11,000 residents (O'Rourke 2004:41-43). Since then, the Town of Apply Valley, incorporated in 1988, has grown into a city of well over 70,000 residents, largely as a commuter bedroom community in support of the industrial and commercial centers in the Greater Los Angeles area.

RESEARCH METHODS

RECORDS SEARCH

Records search services for this study were provided by the Archaeological Information Center (AIC) at the San Bernardino County Museum, Redlands. During the records search, Robin Laska, Assistant Center Coordinator of the AIC, examined maps and records on file at the AIC for previously identified cultural resources in or near the APE, and existing cultural resources reports pertaining to the vicinity. Previously identified cultural resources include properties designated as

California Historical Landmarks, Points of Historical Interest, or San Bernardino County Historical Landmarks, as well as those listed in the National Register of Historic Places, the California Register of Historical Resources, or the California Historical Resources Inventory.

HISTORICAL BACKGROUND RESEARCH

Historical background research for this study was completed in two phases. The preliminary background research was conducted by CRM TECH principal investigator Bai "Tom" Tang (see App. 1 for qualifications). In addition to published literature in local and regional history, sources consulted during the research included the U.S. General Land Office (GLO) land survey plat maps dated 1856, the U.S. Geological Survey's (USGS) topographic maps dated 1934-1956, and aerial photographs taken in 1952-2012. The historic maps are collected at the Science Library of the University of California, Riverside, and the California Desert District of the U.S. Bureau of Land Management, located in Moreno Valley. The aerial photographs are available at the NETR Online website.

After the identification of a historic-era building in the APE, CRM TECH historian/architectural historian Terri Jacquemain (see App. 1 for qualifications) pursued more focused and in-depth historical research on that property. Sources examined during this phase of the research included primarily the archival records of the County of San Bernardino and the Town of Apple Valley, in particular real property tax assessment database and building permit records. Findings from these sources are summarized in the sections below.

NATIVE AMERICAN PARTICIPATION

On January 19, 2015, CRM TECH submitted a written request to the State of California's Native American Heritage Commission (NAHC) for a records search in the commission's sacred lands file. Following the NAHC's recommendations, CRM TECH further contacted a total of eight tribal representatives in the region in writing and by telephone between February 9 and March 3 to solicit local Native American input regarding any potential cultural resources concerns over the proposed undertaking. The correspondence between CRM TECH and the Native American representatives is attached to this report as Appendix 2.

As noted above, the MOU among the San Manuel Band of Mission Indians, the San Bernardino County Flood Control District, and the Lewis Center for Educational Research establishes specific protocols for the treatment of Native American cultural resources and procedures for tribal participation during ground-disturbing activities. Specifically, the MOU requires that an approved Native American monitor be present during "all archaeological testing, cultural resources studies and surveys, geological, geotechnical testing, grading and all other ground-disturbing activities associated with the Project that could potentially affect cultural resources" (MOU 2014:14; see App. 3).

FIELD SURVEY

On March 23, 2015, CRM TECH archaeologists Daniel Ballester and Nina Gallardo (see App. 1 for qualification) carried out the intensive-level field survey of the APE for direct effects with the

assistance of Native American monitor Terri Gilvin from the San Manuel Band of Mission Indians. The survey was completed on foot by walking a series of parallel transects oriented northeast-southwest and spaced 10 meters (approx. 33 feet) apart. Ground visibility during the survey varied from poor (0%) to excellent (90%), depending on the density of vegetation growth. The balance of the APE was surveyed at a reconnaissance level for built environment features that appear to date to the historic period, mostly through a "windshield" inspection. When potential features of historical origin were encountered, they were inspected as closely as permitted by public access to the properties and field-recorded for further studies, including preliminary photo-documentation.

EXPLORATORY TRENCHING

After the identification of a potentially significant archaeological site lying partially within the APE (see below), on March 25, 2015, CRM TECH conducted exploratory trenching at the portion of the site within the APE for direct effects to assess the potential for subsurface cultural deposits that may be impacted by the proposed undertaking. Three trenches were excavated at locations determined on the basis of topographic features. One of them measured 25 meters long and one meter wide, while the other two measured 27 meters long and one meter wide. The trenches were excavated with a backhoe in 50-centimeter levels, reach total depths of two to three meters.

Excavated soils were screened through 1/8-inch and 1/4-inch hardware meshes, and sidewall profiles were drawn to record both the geological and archaeological stratigraphy. These procedures were completed by Daniel Ballester and CRM TECH archaeologist John D. Goodman, II, under the direct supervision of CRM TECH principal investigator Michael Hogan (see App. 1 for qualifications), again with the assistance of Native American monitor Terri Gilvin from the San Manuel Band.

RESULTS AND FINDINGS

PREVIOUS CULTURAL RESOURCES STUDIES IN THE VICINITY

According to AIC records, most of the APE was covered by at least eight previous cultural resources studies, particularly the western portion, but the APE as a whole had not been surveyed systematically prior to this study (Fig. 5). AIC records further indicate that six archaeological sites, including a "pending" site, and an isolate were previously identified within or partially within the overall APE boundaries, as listed in Table 1.

Among these, Sites 36-000967, 36-007147, 36-013879, and PSBR-16 were found to be located within or partially within the APE for direct effects. These four sites will be discussed further in the sections below. The other two sites and the isolate were found within the APE for virtual, atmospheric, or other indirect effects. Since the proposed undertaking has no potential for direct, physical impact on these localities, and since the lithic artifacts and refuse items found at these localities are not subject to indirect effects, Site 36-007146, Site 36-007148, and isolate 36-061291 do not require any further consideration during this study. No historic-period buildings, structures, or other built-environment features were previously recorded within the APE, either for direct effects or for indirect effects.

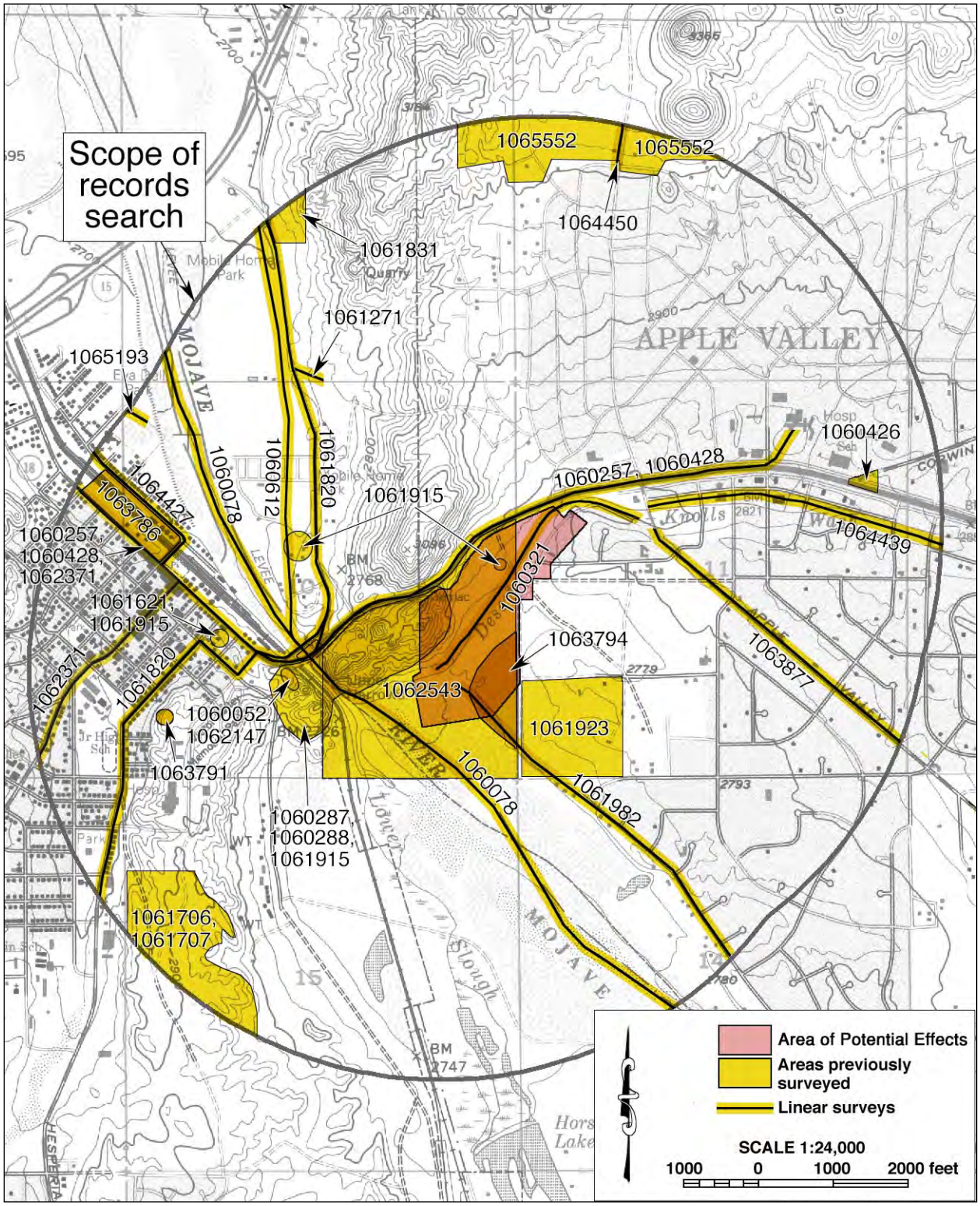

Figure 5. Previous cultural resources studies in the vicinity of the APE, listed by AIC file number. Locations of historical and archaeological sites are not shown as a protective measure.

Table 1. Previously Recorded Cultural Resources in the APE		
Site No.	**Recorder and Date**	**Description**
36-000967*	Various 1977-2007	Prehistoric campsite
36-007146	McKenna 1992	Rock alignment and historic-period refuse deposit
36-007147*	Various 1992-2007	Historic-period refuse scatter
36-007148	McKenna 1992	Refuse scatter
36-013879*	McDougall 2007	Large prehistoric habitation site (encompassing Sites 36-000058, 36-000059, and part of 36-000060)
36-061291	McKenna 1992	Isolate: mano fragment with possible lithic flakes
PSBR-16*	Smith 1941	"Pending" prehistoric habitation site

* Located in the APE for direct effects.

Outside the APE boundaries but within a one-mile radius, 27 additional studies have been reported to the AIC, the majority of them covering various linear features (Fig. 5). Several of the studies near the Mojave River channel found the area to be sensitive for Native American cultural remains due to prior discoveries nearby both on the ground surface and in subsurface deposits, and thus recommended monitoring of earth-moving activities (Farrell 1976:1; Maxon 1999:11; McKenna 2006:18).

In total, 35 additional cultural resources, including five isolates and three "pending" sites, have been identified within the one-mile radius (Table 2). Twelve of the sites and all five of the isolates were of Native American origin, and several of these sites were described as habitation areas or rock art locales. The other 18 resources, including all three "pending sites," were of non-Native origin and consisted of refuse scatters, residential and commercial buildings, linear features such as roads and power transmission lines, and other built-environment features.

The spatial distribution of the prehistoric sites in and near the APE is clearly related to the topography, with the majority found at higher elevations near, but outside, the streambeds. The relative concentration of prehistoric features and artifacts around the Upper Mojave Narrows renders the APE an area of heightened archaeological interest. Their presence supports existing prehistoric settlement-subsistence models for inland California, which postulates that longer-term residential settlement in this region tended to be concentrated on elevated ridges or terraces along natural waterways, while the arid valley floor was more often used for resource procurement, travel, and opportunistic camping.

HISTORICAL OVERVIEW

Historical sources consulted for this study suggest that despite its location near the Mojave River, several early transportation arteries, and the historical center of the town of Victorville, the APE apparently remained vacant and undeveloped throughout the historic period (Figs. 6-8). As late as the 1950s, while the post-WWII housing boom suburbanization movement swept across much of southern California, no evidence of any settlement or land development activities could be found within the APE, and the only man-made features known to be present were a number of crisscrossing direct roads (Fig. 8; NETR Online 1952).

Archival records indicate that the first building to appear in the APE, a fourplex located at present-day 15753 Potomac Road, was constructed around 1966 (County Assessor n.d.). Between 1969 and

Table 2. Previously Recorded Cultural Resources near the APE		
Site No.	**Recorder and Date**	**Description**
36-000058	Various 1949-2008	Campsite
36-000059	Various 1949-2008	Campsite
36-000060	Various 1965-2008	Habitation site
36-000061	Various 1949-1989	Lithic reduction site
36-000062	Bierman and Mohr 1949	Campsite
36-000063	Various 1963-1992	Rock art site
36-000064	Various 1949-2008	Rock art site
36-000065	Various 1949-1977	Lithic scatter
36-000572	Turner 1971	Rock art site
36-000966	Turner 1971	Rock art site
36-000968	Various 1948-1986	Burial and historic-period "Paiute" settlement
36-002910	Various 1978-2011	National Old Trails Highway
36-003033	Various 1968-2007	Mojave Trail/Old Government Road
36-004282	Various 1950-1972	Food-processing site
36-006301	McLean and Lanier 1989	Refuse scatters
36-006793	Various 1990-2009	Atchison, Topeka and Santa Fe Railroad
36-008266	Arch and Urbas 1996	Single-family residence, ca. 1940
36-009360	Various 1998-2006	Stoddard Wells Road
36-010318	Cunkelman 1993	Victorville-Barstow telegraph and telephone line
36-012231	Jones 2005	St. Mary Medical Center, ca. 1955
36-012837	Smallwood 2006	Isolate: mano
36-014120	Bholat 2007	Flood-control berm, ca. 1952
36-014171	Neuenschwander and Miller 1988	Rainbow Bridge, ca. 1962
36-018731	Bricker 1995	Trailer park, ca. 1945
36-018732	Bricker 1995	Service station and single-family residence, ca. 1939-1942
36-018733	Bricker 1995	Commercial building and single-family residence, ca. 1932-1940
36-018734	Bricker 1995	Commercial building, ca. 1927
36-018735	Bricker 1995	First National Bank, ca. 1918
36-061292	McKenna 1992	Isolate: mano fragment
36-064118	James and Briggs 1999	Isolate: flake
36-064130	Maxon and Patrick 1999	Isolate: flake and mano fragment
36-064297	James and Briggs 1999	Isolate: flake
P1584-22H	Swisher 1994	Victor Valley Airport site
P1584-3H	Unknown	Huntington-Rogers Trading Post
P1584-5H	Various 1898-1984	John Brown House and Verde Ranch

1994, the fourplex was joined by an apartment complex further to the north on Potomac Road, but all other buildings within the APE clearly postdate 1994 (NETR Online 1969; 1994).

NATIVE AMERICAN INPUT

In response to CRM TECH's inquiry, the NAHC reports in a letter dated February 4, 2015, that the sacred lands record search identified no Native American cultural resources within the APE, but recommends that local Native American groups be contacted for further information. For that purpose, the commission provided a list of potential contacts in the region (see App. 2). Upon receiving the commission's response, CRM TECH initiated correspondence with all seven individuals on the referral list and the organizations they represent. In addition, Raymond Huaute,.

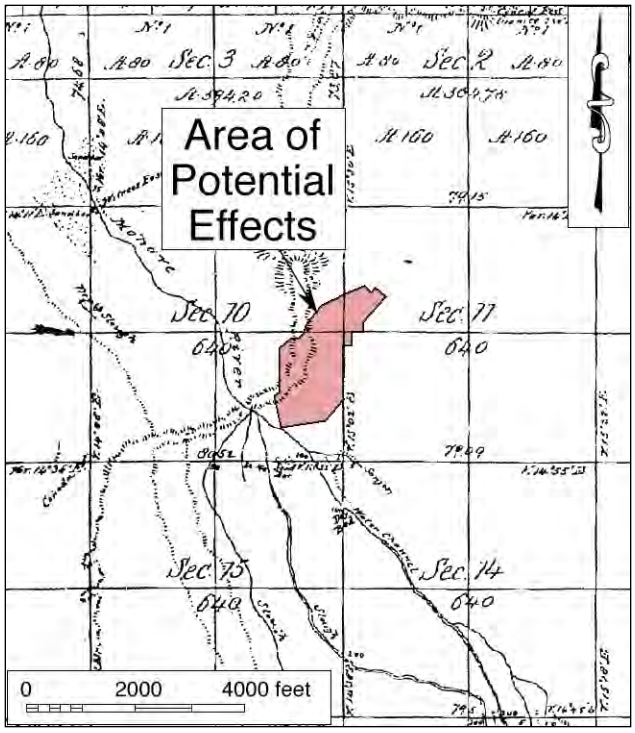

Figure 6. The APE and vicinity in 1853-1854. (Source: GLO 1856)

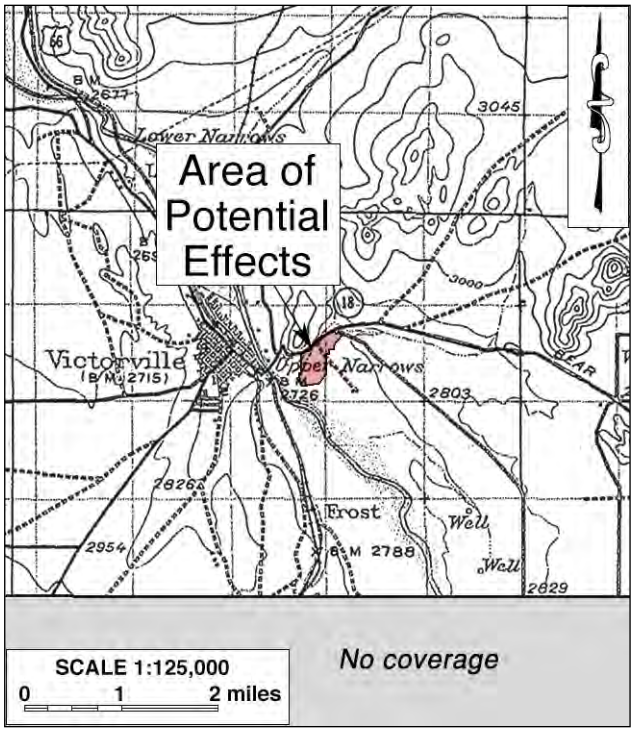

Figure 7. The APE and vicinity in 1920-1932. (Source: USGS 1934)

Cultural Heritage Program Coordinator for the Morongo Band of Mission Indians, was also contacted. The written requests for comments were sent to the tribal representatives on February 9, 2015, and follow-up telephone solicitations were carried out on February 23 and March 3 (see App. 2).

To date, two of the tribal representatives contacted have responded in writing. On February 20, 2015, Daniel McCarthy, Director of Cultural Resources Management Department for the San Manuel Band of Mission Indians, replied by e-mail to remind CRM TECH that the tribe had been engaged in this and other related projects around the Lewis Center for the last four years under an existing MOU. He indicates in the e-mail that Native American cultural resource specialists from the San Manuel Band will be participating in this undertaking during construction (see App. 2).

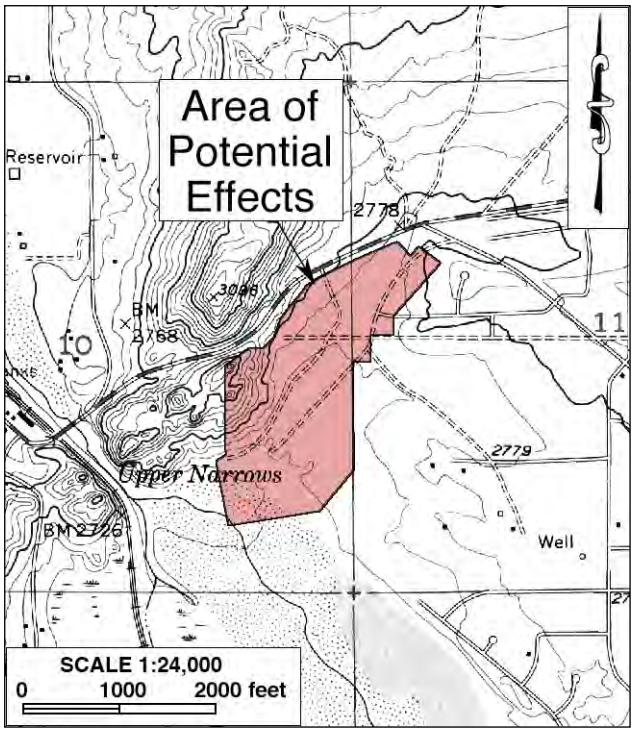

Figure 8. The APE and vicinity in 1952-1956. (Source: USGS 1956)

In a letter dated February 23, 2015, Raymond Huaute of the Morongo Band identifies the APE as a part of the tribe's traditional use area. Therefore, the tribe requests that all ground disturbances be halted if any Native American cultural remains are encountered during the undertaking until the finds can be examined by a qualified archaeologist. In addition, the tribe emphasizes that the County Coroner to contacted if human remains are found, and further requests to be consulted "if significant Native American cultural resources are discovered, for which a Treatment Plan must be prepared" (see App. 2).

POTENTIAL "HISTORIC PROPERTIES"/ "HISTORICAL RESOURCES" IN THE APE

As stated above, four archaeological sites were previously recorded as lying within or partially within the APE for direct effects and thus may be affected by the proposed undertaking. During the field survey, the fourplex at 15753 Potomac Road, which dates to the late historic period and lies within the APE for indirect effects, was recorded into the California Historical Resources Inventory. These five sites are discussed in further detail below, and the site record forms are attached to this report in Appendix 4. No other buildings, structures, objects, sites, features, or artifact deposits were encountered within the APE.

Site 36-000967 (Prehistoric Campsite)

In 1977, G.A. Smith recorded this "large midden site" in the central portion of the APE for direct effects. In 1992 and again 2007, however, repeated attempts to revisit the site failed to locate it. It was thus reported that the site may have destroyed during previous improvement to the Desert Knolls Wash, or that its location may not have been documented correctly (see App. 4). The current survey similarly found no evidence of the site at its recorded location in the APE.

Site 36-007147 (Historic-Period Refuse Scatter)

Site 36-007147 was originally recorded in 1992 by Jeanette McKenna of McKenna et al. as a historic-period refuse scatter that consisted of glass, metal, ceramics, tobacco tins, and other household items. As the result of a 2007 study, Applied Earthworks relocated the site and expanded its boundaries. During that study, the artifacts at the site were analyzed and the refuse was dated to a temporal period of the 1920-1930s. Approximately 100 artifacts were recorded at the site, but there was also evidence of a looter's pit, suggesting that the site had been disturbed previously (see App. 4). A portion of the site may have been located on the northwestern edge of the APE for direct effects, but no artifacts associated with the site were observed in or near the APE during this study.

Site 36-013879 (Prehistoric Habitation Site)

Site 36-013879, a large prehistoric habitation site, was delineated in 2007 by combining what had been recorded before as Site 36-000058, Site 36-000059, and a portion of Site 36-000060, along with seven other localities identified nearby (see App. 4). Sites 36-000058, 36-000059, and 36-000060 were all recorded in 1949 (Mohr and Bierman 1949a-c). Site 36-000058 was described as a surface scatter of lithic artifacts located roughly a quarter-mile east of the Mojave River, composed of a mano, mano fragments, two scrapers, an apparently painted pebble with ground edges, a hammerstone, quartzite and chalcedony flakes, and fire-cracked rock (Mohr and Bierman 1949a).

Site 36-000059, a habitation site located some 500 feet northwest of 36-000058, was recorded as a group of seven bedrock milling features with a mano, mano fragments, and some quartzite flakes (Mohr and Bierman 1949b).

Site 36-000060 was originally recorded approximately 300 feet northwest of 36-000058 (Mohr and Bierman 1949c). The site was later expanded significantly, but only a small portion of it along the southeastern edge was incorporated into 36-013879. As re-designated in 2007, Site 36-013879 contained a variety of features and artifacts, including fire hearths, probable cremation remains, lithic scatters, bedrock milling features, cairns and other rock features, fire-affected rock, and habitation debris (see App. 4). Site 36-000060 was previously determined eligible for listing in the National Register, but Site 36-013879, as a whole, has not been evaluated for significance.

As delineated in 2007, a small portion of Site 36-013879 is located within the southwestern portion of the APE for direct effects. During the field survey, a complete granitic unifacial mano was observed in that area, adjacent to a proposed sewage line alignment (Fig. 9). The mano appears to have been exposed recently by vehicular traffic, and was collected during this study.

As mentioned above, three exploratory trenches were excavated within and adjacent to the portion of Site 36-013879 that overlaps with the APE for direct effects in search for possible subsurface archaeological deposits. The trenches were placed on the east side of and mostly parallel to the Desert Knoll Wash, with two of them within the previously established site boundaries (Fig. 10).

The L-shaped Trench 1 measured 25 meters in total length. The depth of the trench reached three meters in the northern portion and two meters in the southern portion. The soil profile for this trench showed that the subsurface sediments had been heavily disturbed by natural forces along the Desert Knoll Wash. The T-shaped Trench 2 measured 27 meters in total length, with the maximum depth of three meters. A charcoal layer was found in the side wall, but was apparently the result of a natural burn that covered the entire area. The L-shaped Trench 3 measured 27 meters in total length, and was excavated to a maximum depth of three meters. The burn area found in Trench 2 also appeared in this trench.

No artifacts were recovered throughout the trenching and screening process. Given the location of the APE for direct effects within an active wash, the potential for any intact, potentially significant archaeological deposits to be present in this portion of the APE is considered to be rather low.

Figure 9. Mano found at Site 36-013879.

Site PSBR-016 ("Pending" Prehistoric Habitation Site)

In 1941, G.A. Smith reported a habitation site with clusters of stones (possible fire pits), metates, manos, mortars, pestles, and one projectile point on the Verde Ranch Bluff. The extent of the site was reported to cover an

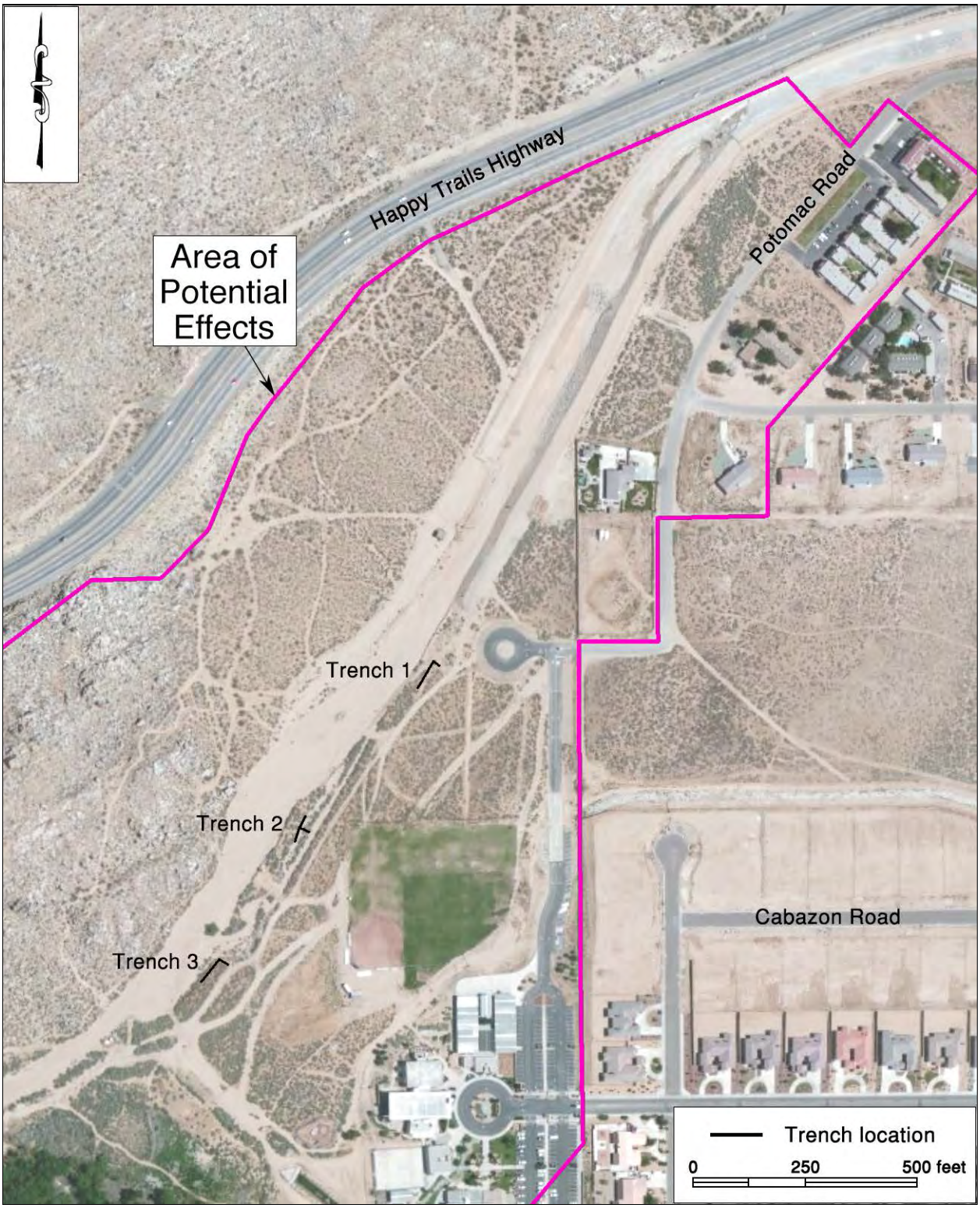

Figure 10. Locations of exploratory trenches at Site 36-013879.

approximately four-mile-long, narrow strip of land, and the located was roughly one mile east of the Mojave River (see App. 4). The AIC considers this a pending site since its location has not been verified since the original documentation and/or the location information is insufficient. The northwestern tip of the tentative site boundary overlaps with the northeastern portion of the APE for direct effects, but no features or artifacts were found in that area during this study.

15753 Potomac Road (Multi-Family Residence)

This single-story fourplex of wood-frame construction is rectangular in plan and faces the street corner to the southwest. The low-pitched, side-facing gable-on-hip roof is sheathed with composition shingles and features wide eaves with fascia boards (Fig. 11). The exterior walls are clad with stucco except at the gable peaks, which are filled with vertical wood siding. The stucco surface is painted bluish gray in contrast to the white trim. Shallow, recessed entry porches shelter the side-facing entrances to the units. Fenestration consists predominantly of large aluminum-framed sliding windows.

Situated to the southwest of the fourplex, connected by a privacy wall built of decorative concrete blocks, is a four-car garage of similar materials and appearance. Facing Potomac Road to the northwest, the garage is surmounted by a front-gable roof of such a low pitch that it is almost flat. The southwestern wall of the garage is covered with vertical wood siding, while the rest of the exterior is clad in stucco. Four sectional garage doors occupy essentially the entire northwestern façade. The two buildings are accompanied by a small shed of apparently modern origin and very little landscaping except for a few mature trees. The surrounding area contains a mixture of well-spaced residential and commercial buildings of modern origin.

Real property tax assessment records indicate that this residence was constructed around 1966, which is supported by aerial photographs showing both buildings extant by 1968 (County Assessor

Figure 11. Late historic-period fourplex at 15753 Potomac Road. (Photograph taken on March 23, 2015.)

n.d.; NETR Online 1968). No documentation for any alterations was found in the Town of Apple Valley building permit records. The property was owned by the Purser and Clemons families in the 1970s (Town of Apple Valley n.d.), but the lack of available records precludes confirmation on whether they were the original owners when the fourplex was built.

MANAGEMENT CONSIDERATIONS

REGULATORY GUIDELINES

Section 106 of the National Historic Preservation Act mandates that federal agencies or other public agencies under federal delegation take into account the effects of their undertakings on "historic properties" and seek ways to avoid, minimize, or mitigate any adverse effects on such properties (36 CFR 800.1(a)). Similarly, CEQA establishes that "a project that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment" (PRC §21084.1).

"Historic properties," as defined by the Advisory Council on Historic Preservation, include "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior" (36 CFR 800.16(l)). The eligibility for inclusion in the National Register is determined by applying the following criteria, developed by the National Park Service as per provision of the National Historic Preservation Act:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
> (b) that are associated with the lives of persons significant in our past; or
> (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
> (d) that have yielded, or may be likely to yield, information important in prehistory or history. (36 CFR 60.4)

For CEQA-compliance considerations, the State of California's Public Resources Code (PRC) establishes the definitions and criteria for "historical resources," which require similar protection to what NHPA Section 106 mandates for "historic properties." "Historical resources," according to PRC §5020.1(j), "includes, but is not limited to, any object, building, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California."

More specifically, CEQA guidelines state that the term "historical resources" applies to any such resources listed in or determined to be eligible for listing in the California Register of Historical Resources, included in a local register of historical resources, or determined to be historically

significant by the lead agency (Title 14 CCR §15064.5(a)(1)-(3)). Regarding the proper criteria of historical significance, CEQA guidelines mandate that "generally a resource shall be considered by the lead agency to be 'historically significant' if the resource meets the criteria for listing on the California Register of Historical Resources" (Title 14 CCR §15064.5(a)(3)). A resource may be listed in the California Register if it meets any of the following criteria:

(1) Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage.
(2) Is associated with the lives of persons important in our past.
(3) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values.
(4) Has yielded, or may be likely to yield, information important in prehistory or history. (PRC §5024.1(c))

If "historic properties" are found to be present in an undertaking's APE, Section 106 procedures require that the agency official further determine whether the proposed undertaking will have an effect upon these properties (36 CFR 800.4(d)(1)). According to 36 CFR 800.16(i), "*Effect* means alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." Under CEQA provisions, PRC §5020.1(q) provides a similar definition for a "substantial adverse change in the significance of a historical resource," which means "demolition, destruction, relocation, or alteration such that the significance of an historical resource would be impaired."

Local regulatory guidelines are codified for this undertaking in the MOU among the San Manuel Band of Mission Indians, the San Bernardino County Flood Control District, and the Lewis Center for Educational Research. The MOU stipulates that the APE lies within the ancestral territory of the San Manuel Band of Mission Indians and outlines, in part, the following protocols and procedures for the protection of Native American cultural resources encountered during the undertaking:

- That the San Manuel Band of Mission Indians is the designated Most Likely Descendant (MLD) within the meaning of California Public Resources Code Section 5097.98.
- That the San Bernardino County Sheriff-Coroner's Department and the tribe be contacted immediately upon the discovery of human remains, and ground-disturbing activities be halted within 50 feet of the discovery, the site be secured, and the MLD be allowed to inspect the site and make a determination the treatment for the remains and/or grave goods.
- That treatment of funerary object and middens associated or buried with human remains be treated in the same manner as human remains.
- That cultural resource finds by law belong to the landowner, the Lewis Center for Educational Research, who will consult with San Manuel Band of Mission Indians regarding the disposition of the finds.
- That mitigation of impacts to cultural resources be consistent with provisions of the National Historic Preservation Act, the Archeological Protection Act, and CEQA as appropriate.
- That Native American participation be permitted during all phases of the undertaking.

The full contents of the MOU is attached to this report as Appendix 3.

DISCUSSION

In summary of the research results presented above, four archaeological sites, including three prehistoric sites and one historic-period site, were previously recorded as lying within or partially within the APE for direct effects, and a late historic-period building was recorded within the APE for indirect effects during this study (see App. 4). Three of the four archaeological sites, however, could not be found at their previously reported locations, leaving only one site, 36-013879, that may receive direct impact from the proposed undertaking.

The late historic-period building recorded in the APE for indirect effects is a fourplex constructed around 1966. Historical research has yielded no evidence that the building is closely associated with any persons or events of recognized significance in national, state, or local history. The building is a common example of the then-popular Ranch-style residential architecture, but does not stand out as an important example of that style or of its type, period, region, or method of construction. Based on these considerations, the building does not appear eligible for listing the National Register or the California Register, and thus does not qualify as a "historic property" or a "historical resource."

Described as a large prehistoric habitation site, 36-013879 encompasses two previously recorded sites in their entirety and a portion of a third site, along with other loci that were found when the current site boundaries were delineated and subsequently revised. One of the three original sites, 36-000060, was determined to be eligible for listing in the National Register, but the significance of 36-013879 as a whole is yet to be ascertained. As a complete evaluation of 36-013879 is well beyond the scope of statutory compliance for this undertaking, the site is hereby presumed to be a "historic property" and a "historical resource" under Section 106 and CEQA provisions in the environmental review process.

During the course of this study, a complete mano was discovered on the ground surface within the boundaries of 36-013879, but the excavation of three exploratory trenches to the depths of two to three meters encountered no cultural remains. In light of its location in an active wash, the portion of the site within the APE for direct effects is unlikely to contain intact, potentially significant archaeological deposits. As such, this portion of the site does not appear to demonstrate sufficient archaeological data potential to contribute to the significance and integrity of the site as a whole. Therefore, the physical impact of the proposed undertaking on this portion of 36-013879 would not constitute an "effect" or a "substantial adverse change" to this presumptive "historic property"/ "historical resource."

The late historic-period building recorded in the APE for indirect effects is a fourplex constructed around 1966. Historical research has yielded no evidence that the building is closely associated with any persons or events of recognized significance in national, state, or local history. The building is a common example of the then-popular Ranch-style residential architecture, but does not stand out as an important example of that style or of its type, period, region, or method of construction. Based on these considerations, the building does not appear eligible for listing the National Register or the California Register, and thus does not qualify as a "historic property" or a "historical resource."

CONCLUSION AND RECOMMENDATIONS

In conclusion, among the five cultural resources encountered during the course of this study, only Site 36-013879 is presumed to constitute a "historic property"/"historical resource" for Section 106- and CEQA-compliance purposes, but the undertaking will not cause an "effect" or a "substantial adverse change" to the potential significance or integrity of the site. However, the presence of known prehistoric sites in a relatively concentrated cluster in and near the APE suggests a heightened possibility for similar cultural remains to be encountered in subsurface deposits beyond the active channel of the Desert Knolls Wash.

Based on these findings, CRM TECH presents the following recommendations to the SBCDPW and other responsible public agencies involved in the proposed undertaking:

- The proposed undertaking will not cause an "effect" or a "substantial adverse change" to any known "historic properties" or "historical resources," as defined by Section 106 and CEQA.
- In order to properly identify, evaluate and, if necessary, protect previously undetected subsurface cultural deposits, an archaeological monitoring program should be implemented, in coordination with the San Manuel Band of Mission Indians and in keeping with the MOU, during all earth-moving activities associated with the undertaking. The monitoring program should consist of, at a minimum, the following:
    - All disturbances of native soils should be monitored by a qualified archaeologist and an approved Native American cultural resources monitor. Whenever cultural materials more than 50 years old are discovered, they need to be field-recorded and evaluated. The monitors should be prepared to quickly recover any artifacts as they are unearthed to avoid construction delays. If a substantial cultural deposit is encountered, however, the monitors must have the power to temporarily halt or divert construction activities in that area to allow for controlled removal.
    - If human remains or possible human remains are encountered, construction activities within 50 feet should be halted, and the San Bernardino County Sheriff-Coroner's Department and the San Manuel Band of Mission Indians, as the designated Most Likely Descendant, should be notified immediately pursuant to state law and the MOU.
    - With the understanding that all archaeological finds remain the property of the Lewis Center for Educational Research, it is recommended that any artifacts collected during the monitoring program be cleaned, identified, catalogued, analyzed, and prepared for curation at an appropriate repository with permanent retrievable storage that would allow for additional research in the future.
    - Site records or site record updates (as appropriate) that incorporate the artifacts encountered during monitoring should be prepared and submitted to the South Central Coastal Information Center, which has recently taken over the responsibility as the official repository for the County of San Bernardino, as a permanent record of the discovery.
    - A report that documents the methods and results of the monitoring program, including an itemized inventory of recovered artifacts and a detailed artifact analysis, should be prepared upon completion of the fieldwork. The report should include an interpretation of the cultural activities represented by the archaeological remains and a discussion of the significance of all recovered cultural material.

- The submittal of the report to the SBCDPW and the curation of the artifacts will signify completion of the monitoring program and the mitigation of impacts to cultural resources.

Under these conditions, the proposed undertaking may be cleared to proceed in compliance with Section 106 and CEQA provisions.

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Beck, Warren A., and Ynez D. Haase

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GLO (General Land Office, U.S. Department of the Interior)

1856 Plat Map: Township No. 5 South Range No. 4 West, San Bernardino Meridian; surveyed in 1853-1854.

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2000 Archaeological Survey of 2472 Acres in Adjacent Portions of Lava, Lead Mountain, and Cleghorn Pass Training Areas, Marine Corps Air Ground Combat Center, Twentynine Palms, California (Volume I). Report prepared by the Archaeological Research Unit, University of California, Riverside, for the United States Marine Corps Natural Resources and Environmental Affairs Division.

Kroeber, Alfred L.

1925 *Handbook of the Indians of California*. Bureau of American Ethnology Bulletin 78. Government Printing Office, Washington, D.C.

Maxon, Patrick O.

1999 Cultural Resources Reconnaissance of a Six Acre Parcel for the High Desert Partnership in Academic Excellence Foundation, Apple Valley, California. NADB No. 1063794. On file, Archaeological Information Center, San Bernardino County Museum, Redlands.

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2006 Results of a Phase I Cultural Resources Investigation for the Proposed Lewis Center Athletic Fields and Parking Area on Land Adjacent to the Existing Facilities in Apple Valley, San Bernardino Co., California. On file, Archaeological Information Center, San Bernardino County Museum, Redlands.

Mohr and Bierman (first names unknown)

1949a California Historical Resource Information System site record, 36-000058. On file, Archaeological Information Center, San Bernardino County Museum, Redlands.

1949b California Historical Resource Information System site record, 36-000059. On file, Archaeological Information Center, San Bernardino County Museum, Redlands.

1949c California Historical Resource Information System site record, 36-000060. On file, Archaeological Information Center, San Bernardino County Museum, Redlands.

MOU (Memorandum of Understanding)
2014 Memorandum of Understanding: San Manuel Band of Mission Indians, San Bernardino County Flood Control District, and Lewis Center for Educational Research. See Appendix 3.
NETR Online
1952-1994 Aerial photographs of the project vicinity, taken in 1952, 1968, 1969, and 1994. http://www.historicaerials.com.
NPS (National Park Service, U.S. Department of the Interior)
2001 *National Historic Trail Feasibility Study and Environmental Assessment: Old Spanish Trail, New Mexico, Colorado, Utah, Arizona, Nevada, California*. National Park Service, U.S. Department of the Interior, Washington, D.C.
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2004 *The Story of Apple Valley.* The Lewis Center for Educational Research/Apple Valley Chamber of Commerce, Apple Valley.
Peirson, Erma
1970 *The Mojave River and Its Valley*. The Arthur H. Clarke Company, Glendale, California.
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1964 *The Apple Valley Story*. Supplement to the *Los Angeles Times*.
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1929 *Aboriginal Society in Southern California*. University of California Publications in American Archaeology and Ethnology, Vol. 26. Reprinted by Malki Museum Press, Banning, California, 1972.
Town of Apple Valley
n.d. Building permit records for 15753 Potomac Road. On file, Town of Apple Valley Building and Safety Department.
USGS (United States Geological Survey, U.S. Department of the Interior)
1934 Map: Barstow, Calif. (30', 1:125,000); surveyed in 1920 and 1932.
1956 Map: Victorville, Calif. (7.5', 1:24,000); aerial photographs taken in 1952, field-checked in 1956.
1969 Map: San Bernardino, Calif. (1:250,000); 1958 edition revised.
1993 Map: Victorville, Calif. (7.5', 1:24,000); 1956 edition photorevised in 1989.
Warren, Claude N.
1984 The Desert Region. In Michael J. Moratto (ed.): *California Archaeology*; pp. 339-430. Academic Press, Orlando, Florida.
Warren, Claude N., and Robert H. Crabtree
1986 Prehistory of the Southwestern Area. In Warren L. D'Azevedo(ed.): *Handbook of North American Indians*, Vol. 11: *Great Basin*; pp. 183-193. Smithsonian Institution, Washington, D.C.
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2004 The Old Spanish National Historic Trail. Http://www.oldspanishtrail.org/learn/trail_history.php.

APPENDIX 1:
PERSONNEL QUALIFICATIONS

PRINCIPAL INVESTIGATOR/HISTORIAN/ARCHITECTURAL HISTORIAN
Bai "Tom" Tang, M.A.

Education

1988-1993	Graduate Program in Public History/Historic Preservation, UC Riverside.
1987	M.A., American History, Yale University, New Haven, Connecticut.
1982	B.A., History, Northwestern University, Xi'an, China.
2000	"Introduction to Section 106 Review," presented by the Advisory Council on Historic Preservation and the University of Nevada, Reno.
1994	"Assessing the Significance of Historic Archaeological Sites," presented by the Historic Preservation Program, University of Nevada, Reno.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside/Colton, California.
1993-2002	Project Historian/Architectural Historian, CRM TECH, Riverside, California.
1993-1997	Project Historian, Greenwood and Associates, Pacific Palisades, California.
1991-1993	Project Historian, Archaeological Research Unit, UC Riverside.
1990	Intern Researcher, California State Office of Historic Preservation, Sacramento.
1990-1992	Teaching Assistant, History of Modern World, UC Riverside.
1988-1993	Research Assistant, American Social History, UC Riverside.
1985-1988	Research Assistant, Modern Chinese History, Yale University.
1985-1986	Teaching Assistant, Modern Chinese History, Yale University.
1982-1985	Lecturer, History, Xi'an Foreign Languages Institute, Xi'an, China.

Honors and Awards

1988-1990	University of California Graduate Fellowship, UC Riverside.
1985-1987	Yale University Fellowship, Yale University Graduate School.
1980, 1981	President's Honor List, Northwestern University, Xi'an, China.

Cultural Resources Management Reports

Preliminary Analyses and Recommendations Regarding California's Cultural Resources Inventory System (with Special Reference to Condition 14 of NPS 1990 Program Review Report). California State Office of Historic Preservation working paper, Sacramento, September 1990.

Numerous cultural resources management reports with the Archaeological Research Unit, Greenwood and Associates, and CRM TECH, since October 1991.

PRINCIPAL INVESTIGATOR/ARCHAEOLOGIST
Michael Hogan, Ph.D., RPA*

Education

1991	Ph.D., Anthropology, University of California, Riverside.
1981	B.S., Anthropology, University of California, Riverside; with honors.
1980-1981	Education Abroad Program, Lima, Peru.

2002	Section 106—National Historic Preservation Act: Federal Law at the Local Level. UCLA Extension Course #888.
2002	"Recognizing Historic Artifacts," workshop presented by Richard Norwood, Historical Archaeologist.
2002	"Wending Your Way through the Regulatory Maze," symposium presented by the Association of Environmental Professionals.
1992	"Southern California Ceramics Workshop," presented by Jerry Schaefer.
1992	"Historic Artifact Workshop," presented by Anne Duffield-Stoll.

Professional Experience

2002-	Principal Investigator, CRM TECH, Riverside/Colton, California.
1999-2002	Project Archaeologist/Field Director, CRM TECH, Riverside.
1996-1998	Project Director and Ethnographer, Statistical Research, Inc., Redlands.
1992-1998	Assistant Research Anthropologist, University of California, Riverside
1992-1995	Project Director, Archaeological Research Unit, U. C. Riverside.
1993-1994	Adjunct Professor, Riverside Community College, Mt. San Jacinto College, U.C. Riverside, Chapman University, and San Bernardino Valley College.
1991-1992	Crew Chief, Archaeological Research Unit, U. C. Riverside.
1984-1998	Archaeological Technician, Field Director, and Project Director for various southern California cultural resources management firms.

Research Interests

Cultural Resource Management, Southern Californian Archaeology, Settlement and Exchange Patterns, Specialization and Stratification, Culture Change, Native American Culture, Cultural Diversity.

Cultural Resources Management Reports

Author and co-author of, contributor to, and principal investigator for numerous cultural resources management study reports since 1986.

Memberships

* Register of Professional Archaeologists; Society for American Archaeology; Society for California Archaeology; Pacific Coast Archaeological Society; Coachella Valley Archaeological Society.

PROJECT ARCHAEOLOGIST/REPORT WRITER
Deirdre Encarnación, M.A.

Education

2003	M.A., Anthropology, San Diego State University, California.
2000	B.A., Anthropology, minor in Biology, with honors; San Diego State University, California.
1993	A.A., Communications, Nassau Community College, Garden City, N.Y.

2001	Archaeological Field School, San Diego State University.
2000	Archaeological Field School, San Diego State University.

Professional Experience

2004-	Project Archaeologist/Report Writer, CRM TECH, Riverside/Colton, California.
2001-2003	Part-time Lecturer, San Diego State University, California.
2001	Research Assistant for Dr. Lynn Gamble, San Diego State University.
2001	Archaeological Collection Catalog, SDSU Foundation.

PROJECT ARCHAEOLOGIST
Nina Gallardo, B.A.

Education

2004 B.A., Anthropology/Law and Society, University of California, Riverside.

Professional Experience

2004- Project Archaeologist, CRM TECH, Riverside/Colton, California.

- Surveys, excavations, mapping, and records searches.

Honors and Awards

2000-2002 Dean's Honors List, University of California, Riverside.

PROJECT HISTORIAN/ARCHITECTURAL HISTORIAN
Terri Jacquemain, M.A.

Education

2004 M.A., Public History and Historic Resource Management, University of California, Riverside.
2002 B.S., Anthropology, University of California, Riverside.

Professional Experience

2003- Historian/Report Writer, CRM TECH, Riverside/Colton, California.
- Writer/co-author of cultural resources reports for CEQA and NHPA Section 106 compliance;
- Historic context development, historical/archival research, oral historical interviews, consultation with local historical societies;
- Historic building surveys and recordation, research in architectural history.

2002-2003 Teaching Assistant, Religious Studies Department, University of California, Riverside.
1997-2000 Reporter, *Inland Valley Daily Bulletin*, Ontario, California.
1991-1997 Reporter, *The Press-Enterprise*, Riverside, California.

Memberships

California Council for the Promotion of History.
Friends of Public History, University of California, Riverside.

PROJECT ARCHAEOLOGIST/FIELD DIRECTOR
Daniel Ballester, M.S.

Education

2013	M.S., Geographic Information System (GIS), University of Redlands, California.
1998	B.A., Anthropology, California State University, San Bernardino.
1997	Archaeological Field School, University of Las Vegas and University of California, Riverside.
1994	University of Puerto Rico, Rio Piedras, Puerto Rico.
2007	Certificate in Geographic Information Systems (GIS), California State University, San Bernardino.
2002	"Historic Archaeology Workshop," presented by Richard Norwood, Base Archaeologist, Edwards Air Force Base; presented at CRM TECH, Riverside, California.

Professional Experience

2002- Field Director/GIS Specialist, CRM TECH, Riverside/Colton, California.
- Report writing, site record preparation, and supervisory responsibilities over all aspects of fieldwork and field crew.

1999-2002 Project Archaeologist, CRM TECH, Riverside, California.
- Survey, testing, data recovery, monitoring, and mapping.

1998-1999 Field Crew, K.E.A. Environmental, San Diego, California.
- Two and a half months of excavations on Topomai village site, Marine Corp Air Station, Camp Pendleton.

1998 Field Crew, A.S.M. Affiliates, Encinitas, California.
- Two weeks of excavations on a site on Red Beach, Camp Pendleton, and two weeks of survey in Camp Pendleton, Otay Mesa, and Encinitas.

1998 Field Crew, Archaeological Research Unit, University of California, Riverside.
- Two weeks of survey in Anza Borrego Desert State Park and Eureka Valley, Death Valley National Park.

PROJECT ARCHAEOLOGIST
John D. Goodman II, M.S.

Education

1993	M.S., Anthropology, University of California, Riverside.
1985	B.S., Anthropology, University of California, Riverside.
2005	Training Session on Senate Bill 18; sponsored by the Government Office of Planning and Research, Riverside, California.
2002	Protecting Heritage Resources under Section 106 of the National Historic Preservation Act; sponsored by the Advisory Council on Historic Preservation, Arcadia, California.
2000	Federal Historic Preservation Law for the Forest Service; sponsored by the Advisory Council on Historic Preservation, San Bernardino, California.
1994	National Environmental Policy Act workshop; Flagstaff, Arizona.

Professional Experience

2011-	Project Archaeologist/Artifact Analyst, CRM TECH, Colton, California.
2008-	Independent sub-contractor (faunal analyses and historical archaeology).
2006-2008	Project Director, Statistical Research, Inc., Redlands, California.
2003-2006	Project Manager/Principal Investigator, Stantec Consulting, Inc. (formerly The Keith Companies [TKC]), Palm Desert, California.
2000-2003	Supervisory Archaeologist, Heritage Resources Program, San Bernardino National Forest, United States Forest Service, Department of Agriculture.
1993-2000	Project Manager, Historical Archaeologist, Faunal Specialist, Human Osteologist, and Shell Specialist, SWCA Inc., Environmental Consultants, Flagstaff, Arizona.
1982-1993	Project Director, Staff Archaeologist, Physical Anthropologist, Faunal Specialist, and Lithic Specialist, Archaeological Research Unit, University of California, Riverside (part-time).

Research Interests

Subsistence practices and related technologies of both prehistoric and historical-period groups; special interest in Archaic sites of western states; ethnic/group markers; zooarchaeology/faunal analyses, lithic analyses, and historical archaeology.

Cultural Resources Management Reports

Co-author of many cultural resources management study reports since 1986.

Memberships

Society for American Archaeology.

APPENDIX 2

CORRESPONDENCE WITH NATIVE AMERICAN REPRESENTATIVES*

* A total of eight local Native American representatives were contacted; a sample letter is included in this report.

SACRED LANDS FILE & NATIVE AMERICAN CONTACTS LIST REQUEST

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Project: Desert Knolls Wash Phase III Flood Control Improvement Project (CRM TECH Contract No. 2888A)

County: San Bernardino

USGS Quadrangle Name: Victorville, Calif.

Township 5 North **Range** 4 West SB **BM; Section(s)** 10 & 11

Company/Firm/Agency: CRM TECH

Contact Person: Nina Gallardo

Street Address: 1016 E. Cooley Drive, Suite A/B

City: Colton, CA **Zip:** 92324

Phone: (909) 824-6400 **Fax:** (909) 824-6405

Email: ngallardo@crmtech.us

Project Description: The project consists of flood-control improvements to the Desert Knolls Wash in the Town of Apple Valley, San Bernardino County, California.

January 19, 2015

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., ROOM 100
West SACRAMENTO, CA 95691
(916) 373-3710
Fax (916) 373-5471

February 4, 2015

Nina Gallardo
CRM Tech
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Sent by Fax: (909) 824-6405
Number of Pages: 2

Re: Desert Knolls Wash Phase III Flood Control Improvement Project (CRM TECH Contract No. 2888A), San Bernardino County.

Dear Ms. Gallardo,

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 373-3712.

Sincerely,

Katy Sanchez

Katy Sanchez
Associate Government Program Analyst

Native American Contacts
San Bernardino County
February 4, 2015

San Manuel Band of Mission Indians
Lynn Valbuena, Chairwoman
26569 Community Center Serrano
Highland , CA 92346
(909) 864-8933
(909) 864-3724 Fax
(909) 864-3370 Fax

Morongo Band of Mission Indians
Robert Martin, Chairperson
12700 Pumarra Rroad Cahuilla
Banning , CA 92220 Serrano
(951) 849-8807
(951) 755-5200
(951) 922-8146 Fax

San Fernando Band of Mission Indians
John Valenzuela, Chairperson
P.O. Box 221838 Fernandeño
Newhall , CA 91322 Tataviam
tsen2u@hotmail.com Serrano
Vanyume
(661) 753-9833 Office Kitanemuk
(760) 885-0955 Cell
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Serrano Nation of Mission Indians
Goldie Walker, Chairwoman
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Patton , CA 92369
(909) 528-9027
(909) 528-9032

Morongo Band of Mission Indians
Denisa Torres, Cultural Resources Manager
12700 Pumarra Road Cahuilla
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(951) 572-6004 Fax

Ernest H. Siva
Morongo Band of Mission Indians Tribal Elder
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Banning , CA 92220 Cahuilla
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San Manuel Band of Mission Indians
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26569 Community Center Drive Serrano
Highland , CA 92346
dmccarthy@sanmanuel-nsn.gov
(909) 864-8933 Ext 3248
(909) 862-5152 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list s only applicable for contacting locative Americans with regard to cultural resources for the proposed Desert Knolls Wash Phase III Flood Control Improvement Project (CRM TECH Contract No. 2888A), San Bernardino County.

February 9, 2015

Denisa Torres, Interim Cultural Heritage Program Coordinator
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220

RE: Desert Knolls Wash Phase III Flood Control Improvement Project
Approximately 19.3 Acres in the Town of Apple Valley
San Bernardino County, California
CRM TECH Contract #2888A

Dear Ms. Torres:

The San Bernardino County Department of Public Works proposes Desert Knolls Wash Phase III Project, a flood-control improvement project on the existing Desert Knolls Wash alignment near the Lewis Center for Educational Research, in order to stabilize the wash and provide flood protection to the neighboring properties. The Area of Potential Effects (APE) encompasses approximately 19.3 acres of undeveloped land located within and adjacent to the Desert Knolls Wash, just to the east of the Mojave River and within the Town of Apple Valley. The accompanying map, based on the USGS Victorville, Calif., 7.5' quadrangle, depicts the location of the APE in Sections 10 and 11, T5N R4W, SBBM.

According to records on file at the Archaeological Information Center (AIC), four archaeological sites were previously recorded within in the boundaries of the APE. Site 33-000967 consisted of a large area of midden soil recorded in 1977, located in the central portion of the APE. Site 36-013879 was a large prehistoric habitation site that encompassed Sites 36-000058, 36-000059, and part of 36-000060. Site 36-007147 consisted of a historic-period refuse scatter. Site PSBR-016, a pending site, was a possible habitation area that was reported in 1941.

Outside the APE but within a one-mile radius, 13 prehistoric sites and 6 prehistoric isolates have been recorded. The closest among these was 36-000572, a pictograph site located 0.13 mile northwest of the APE, just north of Highway 18. Twenty-one historic-period resources were also identified in the one-mile radius, including three refuse scatter sites, nine buildings, three roads, and three pending sites.

In a letter dated February 4, 2015, the Native American Heritage Commission reports that the sacred lands record search identified no Native American cultural resources within the APE, but recommends that local Native American groups be contacted for further information. Therefore, as part of the cultural resources study for this project, I am writing to request your input on potential Native American cultural resources in or near the APE.

Please respond at your earliest convenience if you have any specific knowledge of sacred/religious sites or other sites of Native American traditional cultural value within or near the APE. Any information or concerns regarding Native American cultural resources or sacred sites may be forwarded to CRM TECH by telephone, e-mail, facsimile, or standard mail. Requests for

documentation or information we cannot provide will be forwarded to the client and/or the lead agency, which is the San Bernardino County Department of Public Works for Section 106-compliance purposes. We would also like to clarify that CRM TECH, as the cultural resources consultant for the project, is not the appropriate entity to initiate government-to-government consultations. Thank you for the time and effort in addressing this important matter.

Respectfully,

Nina Gallardo
CRM TECH
Email: ngallardo@crmtech.us

Encl.: APE map

From: Daniel McCarthy <DMcCarthy@sanmanuel-nsn.gov>
Sent: Friday, February 20, 2015 11:28 AM
To: Nina Gallardo; 'Ernest Siva'; rmartin@morongo-nsn.gov; dtorres@morongo-nsn.gov; Lynn Valbuena; tsen2u@hotmail.com; tsen2u@msn.com; Ray Huaute
Subject: RE: NA Scoping Letter for the Desert Knolls Wash Phase III Flood Control Improvement Project, Town of Apple Valley (CRM #2888A)

Nina,

I am sending this note to you as a reminder that San Manuel has been engaged in the project and others surrounding the Lewis Center property for the last four years. We, the Tribe, and the County Flood Control have engaged in an MOU and we have had recent meetings with CRMT participating in those meetings. Native American cultural resource specialists will be participating during the project construction. Thank you for your due diligence.

//daniel
Daniel McCarthy, MS, RPA
Director
Cultural Resources Management Department
San Manuel Band of Mission Indians
26569 Community Center Drive
Highland, CA 92346
Office: 909 864-8933 x 3248
Cell: 909 838-4175
dmccarthy@sanmanuel-nsn.gov

February 23, 2015

RE:
Desert Knolls Wash Phase III Flood Control Improvement Project, Town of Apple Valley (CRM #2888A)

Dear,
Nina Gallardo
Project Archaeologist/Native American liaison
CRM TECH

Thank you for contacting the Morongo Band of Mission Indians regarding the above referenced project. The Tribe greatly appreciates the opportunity to review the project and, respectfully, offer the following comments.

The project is outside of the Tribe's current reservation boundaries but within an area that may be considered a traditional use area or one in which the Tribe has cultural ties (e.g. Cahuilla/Serrano territory). However, the Morongo Band of Mission Indians asks that you impose specific conditions regarding cultural and/or archaeological resources and buried cultural materials on any development plans or entitlement applications as follows:

1. If human remains are encountered during grading and other construction excavation, work in the immediate vicinity shall cease and the County Coroner shall be contacted pursuant to State Health and Safety Code §7050.5.

2. In the event that Native American cultural resources are discovered during project development/construction, all work in the immediate vicinity of the find shall cease and a qualified archaeologist meeting Secretary of Interior standards shall be hired to assess the find. Work on the overall project may continue during this assessment period.

    a. If significant Native American cultural resources are discovered, for which a Treatment Plan must be prepared, the developer or his archaeologist shall contact the Morongo Band of Mission Indians.

b. If requested by the Tribe[1], the developer or the project archaeologist shall, in good faith, consult on the discovery and its disposition (e.g. avoidance, preservation, return of artifacts to tribe, etc.).

If I may be of further assistance with regard to this matter, please do not hesitate to contact me at your convenience.

Very truly yours,

Raymond Huaute
Cultural Resource Specialist
MORONGO BAND OF MISSION INDIANS
Email: rhuaute@morongo-nsn.gov
Phone: (951) 755-5025

[1] The Morongo Band of Mission Indians realizes that there may be additional tribes claiming cultural affiliation to the area; however, Morongo can only speak for itself. The Tribe has no objection if the archaeologist wishes to consult with other tribes and if the city wishes to revise the condition to recognize other tribes.

TELEPHONE LOG

Name	Tribe/Affiliation	Telephone Contacts	Comments
Robert Martin, Chairperson	Morongo Band of Mission Indians	None	Raymond Huaute is the designated spokesperson for the tribe (see below).
Denisa Torres, former Interim Cultural Heritage Program Coordinator	Morongo Band of Mission Indians	10:56 am, February 23, 2015	Ms. Torres stated that Raymond Huaute was the new Cultural Heritage Program Coordinator for the Morongo Band and should be contacted instead.
Raymond Huaute, Cultural Heritage Program Coordinator	Morongo Band of Mission Indians	11:12 am, February 23, 2015	Mr. Huaute responded in a letter dated February 23, 2015 (copy attached).
Ernest Siva, Tribal Elder	Morongo Band of Mission Indians	11:34 am, February 23, 2015; 8:37 am, March 3, 2015	Left messages; no response to date.
John Valenzuela, Chairperson	San Fernando Band of Mission Indians	11:36 am, February 23, 2015; 8:40 am, March 3, 2015	Left messages; no response to date.
Lynn Valbuena, Chairperson	San Manuel Band of Serrano Mission Indians	None	Daniel McCarthy is the designated spokesperson for the tribe (see below).
Daniel McCarthy, Director of Cultural Resources Management Department	San Manuel Band of Serrano Mission Indians	None	Mr. McCarthy responded by e-mail on February 20, 2015 (copy attached).
Goldie Walker, Chairperson	Serrano Nation of Mission Indians	11:41 am, February 23, 2015; 8:42 am, March 3, 2015	Left messages; no response to date.

APPENDIX 3

MEMORANDUM OF UNDERSTANDING

San Manuel Band of Mission Indians
San Bernardino County Flood Control District
and Lewis Center for Educational Research

Memorandum of Understanding

San Manuel Band of Mission Indians,

San Bernardino County Flood Control District

And

Lewis Center for Educational Research

Contact Information

San Manuel Band of Mission Indians

Cultural Resources Management Department
26569 Community Center Drive
Highland, CA 92346
Daniel McCarthy, (909) 838-4175, dmccarthy@sanmanuel-nsn.gov
Ann Brierty, (909) 649-1585, abrierty@sanmanuel-nsn.gov

San Bernardino County Flood Control District

Kevin Blakeslee
Deputy Director – Flood Control
County of San Bernardino
825 East Third Street
San Bernardino, CA 92415-0835
Email: kblakeslee@dpw.sbcounty.gov
Phone: (909) 387-7918

Lewis Center for Educational Research

Rick Piercy
President/CEO
17500 Mana Road
Apple Valley, CA 92307
Email: rpiercy@lcer.org
Phone: 760-403-5342

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Attachment C – Area of Potential Effect (APE Map)

Attachment D – Reburial Agreement

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An Agreement between the

San Manuel Band of Mission Indians, San Bernardino County Flood Control District, And Lewis Center for Educational Research

I. PARTIES

This Agreement is entered into and made effective as of March 11, 2014, by and among the San Manuel Band of Mission Indians, a federally recognized Indian tribe ("Tribe"), the San Bernardino County Flood Control District ("DISTRICT"), and the Lewis Center for Educational Research("Landowner") (hereinafter collectively referred to as the "PARTIES."). Definitions of other common terms used throughout this Agreement are set forth in the glossary attached hereto as Attachment A and incorporated herein by reference.

II. PROJECT

This Agreement concerns the DISTRICT's Desert Knolls Wash Phase III Project ("Project"). The Project consists of improvements to, and the stabilization of, Desert Knolls Wash in order to provide flood control protection to surrounding privately held properties. These properties are located within the Tribe's traditional ancestral territory in Apple Valley, California.

III. PURPOSE

The purpose of this Agreement is to formalize protocols and procedures for the protection and treatment of cultural resources, including but not limited to, Native American human remains, funerary objects, and ceremonial items of cultural patrimony within the meaning of the Native American Graves Protection and Repatriation Act ("NAGPRA"), and cultural and religious landscapes within the Project area. The Agreement sets forth such protocols and procedures in the event that any such cultural resources are discovered in conjunction with any ground-disturbing activity related to the Project, including but not limited to, archaeological studies, excavation, geotechnical investigations, and grading. The Agreement also formalizes procedures for the Tribe's participation in monitoring all phases of ground-disturbing activities for the Project, including but not limited to, archaeological studies, grading, and excavation. (See, Native American Monitoring Protocol attached hereto as Attachment B and incorporated herein by reference). Any human remains discovered in connection with the Project shall be treated in accordance with Section VII of this Agreement, and any other cultural resources discovered in connection with the Project shall be treated in accordance with Section VIII of this Agreement.

IV. CULTURAL AFFILIATION

The PARTIES agree that the Project area consists of land that has been traced to and traditionally occupied by the Tribe, and which is now owned or controlled by the Landowner in relevant part. The Tribe's General Council has designated its Cultural

Resources Management Department (CRM) Staff and/or the Most Likely Descendant (MLD) to act on the Tribe's behalf with respect to the provisions of this Agreement.

V. COORDINATION WITH COUNTY CORONER

The Consultant and/or DISTRICT shall immediately contact the San Bernardino County Coroner and the Tribe in the event that any human remains are discovered at the Project site. The Coroner shall ensure that notification is provided to the Native American Heritage Commission ("NAHC") as required by California Health & Safety Code Section 7050.5 and Public Resources Code Section 5097.98(a).

VI. MOST LIKELY DESCENDANT (MLD)

Human remains have been previously identified on the Landowner's property located within the immediate vicinity of the Project's Area of Potential Effect (APE). The NAHC has already designated the Tribe as MLD within the meaning of California Public Resources Code Section 5097.98. If additional human remains are located during the Project, the NAHC will be kept informed by the Tribe, Consultant, and /or DISTRICT of each occurrence of the discovery of human remains at the Project site.

VII. TREATMENT OF NATIVE AMERICAN HUMAN REMAINS

The PARTIES acknowledge that for the purposes of this Agreement, the term "human remains" encompasses more than human bones. In ancient as well as historic times, Tribal traditions included, but were not limited to, the burial of associated cultural resources (funerary objects) with the deceased, and the ceremonial burning of Native American human remains, funerary objects, grave goods and animals. Ashes and other remnants of these burning ceremonies, as well as funerary objects associated with, or buried with, the Native American remains shall be treated in the same manner as bones or bone fragments that remain intact.

The Desert Knolls Wash Phase III Project APE Map attached hereto as Attachment C and incorporated herein by reference has been drawn to exclude previously identified Native American human remains on the Lewis Center property. The Tribe's CRM staff has been working with the DISTRICT and Landowner staff for more than five years to develop a plan for the protection of said remains which are within 50 feet of the Maximum Construction Impact Area. This MOU reflects that the boundary marking the APE as identified on the Project APE Map is acceptable to the Tribe and that construction activities shall be allowed to proceed within that APE boundary. If additional human remains are discovered at the same locations where they have been previously found, construction activities will be allowed to proceed, at the agreement of all parties.

In the event additional Native American human remains are found elsewhere within the Project area at locations where they have not previously been found, the following provisions shall apply:

Ground disturbing activities within 50 feet of the discovery shall immediately cease and the human remains shall be secured in place by Consultant, Project Coordinators and/or Native

American lead monitor. After notification is provided to the County Coroner, the Tribe, and the NAHC, the Consultant and/or the Native American lead monitor shall notify and coordinate with the MLD to schedule a site visit. The MLD, pursuant to California Public Resources Code Section 5097.98(a), shall be allowed to: (1) inspect the site of the discovery; and, (2) make determinations as to how the human remains and any associated grave goods should be treated and re-interred with appropriate dignity.

The MLD or his designee shall complete the inspection and provide written recommendations to the proper agencies within forty-eight (48) hours of being granted access to the site. The PARTIES agree to discuss in good faith what constitutes "appropriate dignity", as that term is used in the applicable statutes and in the Tribe's customs and traditions. The Tribe shall have the final determination as to the disposition and treatment of human remains and any associated grave goods following NAPGRA protocols.

The PARTIES acknowledge that the Tribe's highest priority is to avoid disturbing human remains, and agree to avoid such disturbance through consultation and good faith efforts whenever reasonably feasible. Mitigation shall be considered and each incident shall be treated individually on a case by case basis.

Whenever there is a discovery of human remains, the PARTIES acknowledge the Tribe's cultural practice and desire for the human remains to be left "in situ" and without further and future disturbance. The PARTIES will use good faith efforts to accommodate the Tribe's cultural practices in all circumstances.

No photographs may be taken of the human remains, except by written authorization from the Coroner and the Tribe. The archaeologist may create a drawing the human remains for cataloging purposes; however, no photographs or electronic means of recording the human remains shall be permitted.

The PARTIES agree that the reburial of any human remains and their associated funerary objects will be in an area as close as possible to the location of their discovery. If associated midden soil has been moved, it should also be returned to its original location along with any associated funerary objects. The human remains shall not be subject to any future disturbances and the PARTIES will take appropriate measures to ensure this, including recording information with the appropriate authorities and maintaining it as confidential. Reburial of human remains shall be accomplished in compliance with the California Public Resources Code Section 5097.98(a) and (b). The exact reburial location will be determined after consultation with the Tribe and the MLD. The exact location will be recorded in a manner to protect it, in accordance with Section VIII. DISTRICT shall be responsible for reburial costs up to a maximum of $600.00 per discovery as outlined in the reburial agreement attached hereto as Attachment D and incorporated herein by reference.

If immediate reburial is not reasonably feasible, the PARTIES agree that all human remains, associated funerary objects, and associated soils that may have been moved remain with the Coroner's Office until arrangements are made for a reburial.

VIII. NON-DISCLOSURE OF LOCATION OF REBURIALS

It is understood by the PARTIES that unless otherwise required by law, the site of any reburial of Native American human remains and/or associated funerary objects shall not be disclosed and shall be exempt from disclosure requirements of the California Public Records Act, California Government Code § 6250 et seq. The Coroner shall withhold public disclosure of information related to such reburial pursuant to the specific exemption set forth in California Government Code Section 6254.5(e).

IX. TREATMENT OF CULTURAL RESOURCES

The PARTIES acknowledge that the ceremonial and cultural items associated with human remains left by Tribe's ancestors reflect the religious beliefs, rituals, customs, and practices of the Tribe. If such items are discovered, then this location is deemed as part of a sacred, religious or cultural landscape. The Parties acknowledge and agree that Tribal religious beliefs are that such items were left at the location of discovery for a specific reason and purpose.

The PARTIES acknowledge that by law such items belong to the Landowner. The Landowner agrees to consult with the Tribe on the disposition of all cultural items, including ceremonial items, which may be found at the portion of the Project located on its property. If the Landowner wishes to keep and curate the materials in an institution meeting Federal and State curation guidelines, the Landowner agrees to do so at a location within the Tribe's ancestral territory.

The PARTIES agree that best archaeological practices shall be followed during cataloging and analysis of all archaeological materials recovered at the Project site, and that Consultant's study will be conducted in a timely manner, which will not exceed 3 months from the date of discovery of the materials and/or the completion of all fieldwork and monitoring. The PARTIES agree that possession of all cultural materials by the Consultant shall not exceed 90 calendar days after the final report has been submitted. The PARTIES agree that a preliminary draft report shall be submitted within 3 months of the end of the Project fieldwork, and that two copies of the draft archaeological report shall be provided to Tribe by the DISTRICT or Landowner. The Tribe shall be given an opportunity to provide comments for inclusion in the final report. All significant surface and subsurface artifacts and features are to be mapped and described in the final report following "best practices" archaeological guidelines. A professional archaeologist meeting the federal professional qualification standards and guidelines will supervise all work on the project, as well as develop the Final Report for the Project; the Final Report will follow state and federal guidelines in accordance with professional standards.

If a party claims there is a need for any cultural resources to be studied in more detail than beyond the standard "best archaeological practices" guidelines, their treatment and disposition must be agreed to by all PARTIES. Any such agreed-upon protocol must be defined in a Research Design included in an amendment to this Memorandum of Understanding agreed to and executed by all PARTIES.

X. UNRECORDED SIGNIFICANT SITES IMPACTED BY PROJECT

The PARTIES agree that significant or potentially significant sites or inadvertent discoveries not identified in the original environmental review process may be subject to further archaeological and cultural significance evaluation as determined by Consultant and/or the PARTIES. Further evaluation shall include a determination of additional mitigation measures to treat these discoveries in a culturally appropriate manner consistent with this Agreement. Mitigation of impacts to cultural resources will be consistent with requirements addressed in the appropriate environmental document prepared under the provisions of the federal National Historic Preservation Act, federal Archaeological Protection Act and/or the California Environmental Quality Act as appropriate.

XI. TRIBAL MONITORS

PARTIES agree to permit Native American participation at all phases of this investigation. The Tribe will provide all PARTIES with a list of approved Native American Monitors. The PARTIES agree that Native American Monitors will be hired at an appropriate rate of pay commensurate with their roles, responsibilities, experience and other qualifications. Compensation shall be paid by the DISTRICT, Consultant, and/or Landowner. The Monitors will represent Tribal interests and work closely with their archaeological counterparts following the Native American Heritage Commission Guidelines for Monitors, which shall include daily completion of the Native American Monitoring Daily Activity Report/Log attached hereto as Attachment E and incorporated herein by reference. Native American Monitors will serve as a liaison between the Tribe, MLD, Landowner, Consultant and DISTRICT.

Those working on the Landowner's property, being a public school site, will be required to be fingerprinted and have a DOJ background check. All information from this process will be provided to the Landowner

XII. ENVIRONMENTAL COMPLIANCE

Nothing in this Agreement shall excuse the PARTIES from their obligations under any applicable state or federal laws or regulations, including but not limited to the California Environmental Quality Act CEQA; California Public Resources Code§ 21000 et seq., the California Civil Code§ 815.3; the California Government Code§ 65040.2, 65092, 65351, 65352, 65560, 65352.3, 65352.4, 65562.5, the National Historic Preservation Act ("NHPA") 16 United States Code ("U.S.C.") § 470 et seq.; California Public Resources Code 5097.98, 5097.98©, and 5097.99; California Health and Safety Code Sections 7050.5©; California Government Code Section 6254; the Native American Graves Protection and Repatriation Act, 25 U.S.C. § 3001 et seq.; the California Native American Graves Protection and Repatriation Act of2001, California Health and Safety Code § 8010 et seq.; the Native American Free Practice of Religion Act, 16 U.S.C. § 1996, et seq.; and the First Amendment to the United States Constitution. Nothing in this Agreement is intended to make any of the above-referenced laws applicable where such laws would otherwise be inapplicable.

XIII. SEVERABILITY

Should any part of this Agreement be found by any court or agency of competent jurisdiction to be invalid or unenforceable, the remainder of this Agreement shall not be affected thereby and shall be valid and enforceable to the fullest extent permitted by law.

XIV. LIMITATION ON SCOPE

This Agreement is unique to this project only and does not set a precedent for other projects.

AUTHORITY TO EXECUTE

Each of the persons executing the Agreement expressly warrants that he or she is authorized to do so. This Agreement must be dated and fully executed prior to work commencing.

Signatures:

San Manuel Band of Mission Indians:

Carla Rodriguez
Print Name

Carla Rodriguez 2/10/14
Signature Date

SAN BERNARDINO COUNTY FLOOD CONTROL DISTRICT

Janice Rutherford
Print Name

Janice Rutherford MAR 1 1 2014
Signature Date

Tribal Project Coordinator(s):

Daniel McCarthy
Print Name

Daniel F McCarthy 10 Feb 14
Signature Date

Ann Brierty
Print Name

Ann Brierty 2/10/2014
Signature Date

LANDOWNER (Lewis Center for Educational Research)

Richard A. Piercy
Print Name

2/10/2014
Signature Date

Attachment A
Glossary of Terms

GLOSSARY OF TERMS
MOU Desert Knolls Wash Phase III Project

Area of Potential Effects (APE)
The geographic area or areas within which a Project undertaking may cause change in the character or use of cultural resources.

Associated Midden (See also Midden)
As referenced in the MOU, "associated midden" is here defined as soils in the immediate proximity to human remains or funerary objects discovered during the course of archaeological investigations related to the Project.

Consultant
An archaeological consulting firm shall be hired by the DISTRICT to direct archaeological investigations for the Project and prepare all final reports. The MOU, upon approval and signing by all PARTIES, shall be attached to a Request for Proposal (RFP) issued by the DISTRICT for the Project.

CRM
As specifically noted in the MOU, "CRM Staff" and/or CRM refers to members of the San Manuel Cultural Resources Department. In general, however, Cultural Resource Management (CRM), also referred to as cultural heritage management or salvage archaeology, is the survey for and documentation of archaeological sites initiated by the need to examine cultural resources and parcels of land before they are destroyed by construction or in the aftermath of natural disasters.

CRM Staff (See CRM)
As specifically noted in the MOU, this refers to San Manuel Band of Mission Indians employees only.

Cultural Resources
Generally defined as prehistoric and historic sites, structures, districts, or any other physical evidence associated with human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious or any other reason.

Human Remains
Human remains of a Native American may be an inhumation or cremation, and in any state of decomposition or skeletal completeness. Any items associated with human remains that are placed or buried with Native American human remains are to be treated in the same manner as the remains, but do not by themselves constitute human remains.

Investigation
The "Investigation" of cultural and archaeological resources on the Lewis Center property, within the APE of the Desert Knolls Wash Phase III Project, shall be described in an RFP issued for the Project. Archaeological investigations shall include continued coordination between the DISTRICT, Tribe, and

Landowner, a Consultant as selected by the DISTRICT, and all other interested parties until all Project construction has been completed.

Lead Agency
Desert Knolls Wash has been determined to be jurisdictional. It is here assumed, therefore, that the Lead Agency for cultural resources for this project shall be the United States Army Corps of Engineers (USACE).

Midden
Archaeological soils often associated with an ancient village, a campsite, place of repeated human activity, or historic home site. With regards to prehistoric archaeological resources this may include such materials as discarded artifacts, bone and shell, food refuse, coprolites, charcoal, ash, rock, human remains, structural elements, and other cultural materials.

Monitor(s)
Native Americans approved and trained by Tribe to observe or monitor project related construction. Tribe shall supply Consultant Archaeologist with a list of names. The purpose of the Monitors is to represent Tribal interests at the Project site.

Most Likely Descendent (MLD)
The NAHC has designated the San Manuel Band of Mission Indians as the Most Likely Descendent (MLD). In 1982, legislation was passed authorizing the Commission to identify a Most Likely Descendant (MLD) when Native American human remains were discovered any place other than a dedicated cemetery. MLDs were granted the legal authority to make recommendations regarding the treatment and disposition of the discovered remains. These recommendations, although they cannot halt work on the project site, give MLDs a means by which to ensure that the Native American human remains are treated in the appropriate manner.

Native American Lead Monitor (See Monitor)
If there are multiple Monitors employed at the Project site, it is assumed that Consultant and/or CRM staff shall designate one Monitor as a Lead Monitor or Supervising Monitor.

Principal Investigator (PI)
A designated Consultant archaeologist who shall oversee and is responsible for all aspects of any and all archaeological investigation and studies for the Project.

Project Archaeologist
The Consultant hired by the DISTRICT shall designate a Principal Investigator to oversee all archaeological investigations and studies for the Project. This individual, or their designee, shall be the Project Archaeologist.

Site Archaeologist
Same as Consultant

Treatment/Treatment Plan
Treatment refers to actions that lessen or eliminate the impacts of any undertaking or project on cultural and historic properties. These actions may include: 1) minimizing the impact by redesigning the undertaking (avoidance); 2) rectifying the impacts by repairing, rehabilitating, or restoring the affected cultural resource; 3) preservation and maintenance operations during the life of the action; and 4) compensating for the impact by moving or documenting the historic property or conducting data recovery.

Attachment B

Native American Monitoring Protocol
Project Name: Desert Knolls Wash Phase III Project

1. **SPECIFICATIONS**

The PARTIES agree to preserve and protect sensitive and sacred cultural resources. The Tribe's CRM staff has been working with the DISTRICT and Landowner staff for more than five years to develop a plan for the protection of cultural resources at the Desert Knolls Wash Phase III Project site ("Project"), and PARTIES agree that the Memorandum of Understanding (MOU) negotiated in conjunction with this monitoring protocol will specify the conditions for Native American monitoring at the Project prior to its commencement.

The Tribe will assign a "Project Coordinator(s)" to serve as the Tribe's contact person(s), provide a list of approved monitor(s), and be available to assist with the execution of the Treatment Plan. The Project Coordinator(s) for this Project are listed on the signature page (Page 9 of 17).

Native American monitors shall work as "contract employees" for the Consultant selected by the DISTRICT to conduct cultural resource investigations at the Desert Knolls Wash Phase III Project site. Compensation for Native American Monitoring services shall be the responsibility of the DISTRICT

Monitors shall be present during all archaeological testing, cultural resource studies and surveys, geological, geotechnical testing, grading and all other ground-disturbing activities associated with the Project that could potentially affect cultural resources. This includes soils not previously monitored and those soils relocated or disturbed, which could still contain cultural resources or human remains.

In the event that previously unknown Native American human remains are found during these activities, the Consultant, Project Coordinators and/or Lead Tribal Monitor are required to stop the activity and relocate excavation or other activities pending further investigation by an archaeologist or the Coroner and the Tribe's MLD as defined in the Memorandum of Understanding between the PARTIES. The Consultant and/or Lead Tribal Monitor are further required to recommend stoppage of all excavation activities, for short periods of time, as is reasonably necessary, in the immediate vicinity of the location where human remains are anticipated or likely and to conduct further controlled excavation of cultural deposits for evaluation.

If Native American human remains are found, coordination of the treatment of Native American remains and any associated funerary objects will be conducted in accordance with Sections V through X of the MOU.

The DISTRICT, Consultant, or its agent shall discuss with the Lead Tribal Monitor the

original Project Treatment Plan prior to commencement and work and all modifications to the Project's activities requiring soil disturbance should also be discussed with the Lead Tribal Monitor prior to the commencement of the work, in order to clarify mitigation measures and monitoring activities. The Project Coordinator(s) and/or the Tribe's designated representative shall be invited to participate in this discussion. If necessary, a written amendment to the treatment plan will be prepared and agreed to by the PARTIES.

If necessary, a qualified archaeologist may be required to be present during grading activities to identify and /or ascertain the significance of any subsurface cultural resources or to aid in the avoidance of sensitive areas.

The Native American monitor(s) identified by the Tribe shall be responsible for (1) assisting the archaeologists in the identification and protection of cultural resources where possible and/or (2) coordinating activities to minimize disturbances to the cultural deposits, and 3) notifying the parties of the discovery of any cultural resources, including human remains.

The Tribe recognizes that dangerous working conditions can exist at a work site, particularly during grading and excavation operations. The monitors will review safety procedures with the site supervisor, be instructed on applicable daily safety procedures as required by the site supervisor, and attend pre-construction safety training as necessary.

2. MONITORED PROJECTS

The PARTIES agree the Project may disturb significant unknown cultural resources and that the Project site is possibly a "cultural landscape" of importance to the Tribe. All soil disturbances within the Project's scope of work and the "Area of Potential Effect" (APE) as previously established in consultation with the Tribe, the Landowner, and as represented as Attachment C of this Agreement, shall be monitored to protect and preserve these cultural resources.

A notice of the work schedule for the Native American monitor(s) shall be provided by the DISTRICT, Consultant, or its agent to the Project Coordinator(s) as early as possible or a minimum of ten (10) working days prior to the specified work commencing. PARTIES agree to maintain a two week advance schedule in order to ensure availability of monitors.

4. COMPENSATION

Native American monitor(s) identified by the Tribe will work as "contract employee(s)" of the Consultant.

DISTRICT shall compensate Native American monitors at rates commensurate with their archaeological counterparts with similar job responsibilities, qualifications and experience. A minimum half-day charge (four hours) will be invoiced to the DISTRICT for unannounced work stoppages for monitors.

The hourly base rate will not be applicable to travel time to and from the Project site. If

weekend work is required the rate is 150% of the base rate. If work is required between the hours of 7:00 PM to 7:00AM or on a Federal or State holiday, the hourly rate is 200% of the base rate. These rates are commensurate with industry standards for pay during nonstandard times. It is assumed that monitors will receive per diem compensation at rates appropriate for this locality.

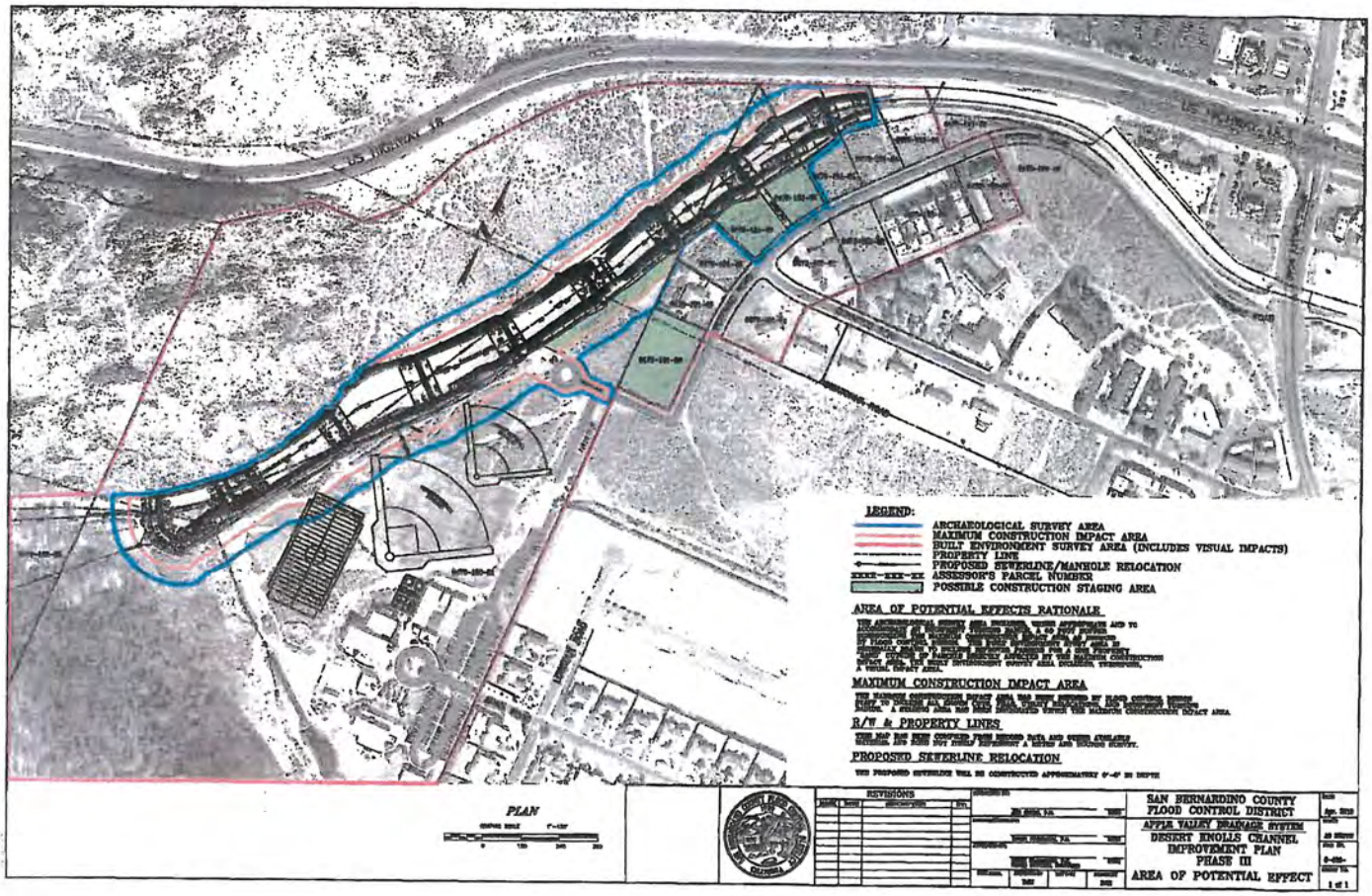
5. INSURANCE

Native American Monitors working as "contract employees" will be covered under the insurance policies of the Consultant Firm for their services provided on the Project.

The San Manuel Project Coordinators are:
Name: Daniel McCarthy or Ann Brierty
Phone: 909 838-4175 /909 649-1585 (both mobile phones)

Name of Monitor(s) assigned TBA

Attachment C
Area of Potential Effect (APE)



Attachment D

Reburial Agreement

The Memorandum of Understanding ("Agreement") specifies the procedures for the dignified handling of Native American human remains and associated funerary objects, if they are discovered either on the surface or beneath the present surface during Project construction. The following procedures and agreements are meant to facilitate efficient reburial of Tribe's Tribal ancestors.

1. Reburial will take place in a location determined through consultation between the PARTIES as specified in Section VII and VIII of the Agreement. (If necessary, the Lead Agency is responsible for securing permission from the Landowner after consultation with the Tribe).

2. The reburial is a private Tribal function and shall not be open to the public.

3. The DISTRICT will have the GPS coordinates of the burial location recorded and provide the information to the Tribe and to the San Bernardino County Archaeological Information Center. The confidentiality of such information shall be strictly maintained.

4. The DISTRICT will pay all costs to have the reinterrment location prepared according to the MLD's specifications.

5. The DISTRICT will compensate Tribal elder(s) to be present at the reburial ceremony. They will be reimbursed for mileage (calculated based on the mileage distance from the Tribal Office to the burial location and return) and a $55.00 per hour reburial fee (minimum of 4 hours).

6. The MLD will be compensated for their services at the rate of $55.00 per hour, up to a maximum of 4 hours. The total reburial amount, not including charges for digging the grave, the reburial activities and the MLD services shall not exceed Six Hundred dollars ($600.00) unless circumstances warrant a change and all parties are in agreement.

7. PARTIES agree to keep the location of the reburial confidential, in accordance with applicable laws.

The Financially Responsible Party initials: _____

Attachment E

NATIVE AMERICAN MONITORING

DAILY ACTIVITY REPORT/LOG

Date: _____

Monitor Name and Tribal affiliation:
Date(s) Worked: _____ Representing Tribe or Landlord? _____

_____

Project Name and Goal(s): _____

Tribal/Agency/Project Personnel present on site:

Activities: ☐ grading ☐ brush removal ☐ survey ☐ testing ☐ trenching ☐ data recording
☐ screening soil ☐ working with heavy machinery ☐ archaeological excavation ☐ other

Arrival Time on site: _____ Site location:

Departure Time from site:

Monitoring Tasks (see above); expected findings (Be Specific)

_____

_____

_____

Description of your daily activity/findings, including problems and concerns (AM; PM. and Hour, if appropriate): _____

_____

_____

_____

_____

_____

_____

Human Remains/Associated Burial Objects
Discovered? ☐ yes ☐ no ☐ maybe
Description (if appropriate): _____

_____

Action/Recommendations:

Signature: _____ Title: _____

Tribal Director/Manager Signature Date: _____

Write any Additional Comments on Back.

APPENDIX 4

CALIFORNIA HISTORICAL RESOURCES INVENTORY SITE RECORD FORMS

(Confidential)

State of California--The Resources Agency	Primary # 36-000967 (Update)
DEPARTMENT OF PARKS AND RECREATION	HRI #
CONTINUATION SHEET	Trinomial CA-SBR-967 (Update)

Page 1 **of** 1 **Resource name or #** (Assigned by recorder)

Recorded by Daniel Ballester **Date** March 23, 2015 ____ Continuation √ Update
Form Prepared by Bai "Tom" Tang **Date** June 25, 2015
Affiliation: CRM TECH, Colton **Project No:** CRM TECH 2888A

On March 23, 2015, an intensive-level field survey was conducted at the previously recorded location of Site 36-000967. As in 1992 and 2007, the survey encountered no evidence of the site.

Report Citation:

Bai "Tom" Tang, Deirdre Encarnación, Daniel Ballester, Terri Jacquemain, and Nina Gallardo
2015 Identification and Evaluation of Historic Properties: Desert Knolls Wash Phase III Project, Town of Apple Valley, San Bernardino County, California.

3/08

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # 36-000967
HRI #
Trinomial CA-SBR-967; Update
NRHP Status Code

Other Listings
Review Code Reviewer Date

*Resource Name or #: (Assigned by recorder)

Page 1 of 1

P1. Other Identifier:

*P2. Location: *a. County San Bernardino, CA ☒ Not for Publication ☐ Unrestricted

*b. USGS 7.5' Quad Victorville, CA Date 1956 (Revised 1993)

T 5 N; R 4 W; NE ¼ of SE ¼ of Sec 10; S.B.B.M.

c. Address: City Zip

d. Zone 11; NAD 27 474520 mE/ 3821475 mN

e. Other Locational Data (e.g., parcel #, legal description, directions to resource, additional UTMs, etc., when appropriate): CA-SBR-967 is (was) reportedly situated on an alluvial terrace along the western edge of Desert Knolls Wash and approximately 0.45 mi northeast of the "Upper Narrows" area of the Mojave River and the confluence of Desert Knolls Wash and the Mojave River, at the locational information provided above from the initial site record dated 1977.

*P3a. Description (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): CA-SBR-967 was recorded initially in 1977 by G.A. Smith, and described as a "large midden site with dark soil and scattered artifactual material" such as "flakes, mano fragments, bone (burned), and fire-cracked rock" measuring 10 m^2 or less (Smith 1977). In 1992, McKenna et al. attempted to relocate the site, without success. The updated site record for CA-SBR-967 provided by McKenna et al. suggests that the site may have been buried since initial recordation, but that it was more likely that the site had been destroyed. Alternatively, McKenna et al. also suggested that the site may have been plotted incorrectly by Smith in 1977. During the current survey, personnel from Applied EarthWorks, Inc. (AE) also attempted to relocate CA-SBR-967 at its recorded location, but were also unsuccessful in relocating the site area. The area where the site is (was) reportedly located is within an area that has been highly disturbed and mechanically graded during the channelization of Desert Knolls Wash, and AE agrees with McKenna et al. that the site was either destroyed or obscured during these drainage improvements to Desert Knolls Wash, or was plotted incorrectly by Smith in 1977. As in 1992, presently there is no evidence of CA-SBR-967 at its reported location.

*P3b. Resource Attributes (List all attributes and codes): None; site not relocated.

*P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☒ Other: None; site not relocated. Site has either been destroyed, or was plotted incorrectly during initial recordation efforts by Smith in 1977.

P5. Photograph or Drawing: (Photograph required for buildings, structures, and objects.)

*P6. Date Constructed/Age and Source: ☐ Prehistoric ☐ Historic ☐ Both

*P7. Owner and Address: Lewis Center for Educational Research, 17500 Mana Rd., Apple Valley, CA 92307.

*P8. Recorded by (Name, affiliation, address): D. McDougall, K. McLean, C. Bouscaren, Applied EarthWorks, Inc., 3292 E. Florida Ave., Suite A, Hemet, CA 92544.

P9. Date Recorded: 19 December 2007

*P10. Type of Survey: ☒ Intensive ☐ Reconnaissance ☐ Other
Describe: Maximum of 15 m pedestrian transects.

*P11. Report Citation (Provide full citation or enter "none"): None yet.

Attachments: ☒ None ☐ Location Map ☐ Site Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Site Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record Other:

P36-000761

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

ARCHEOLOGICAL SITE RECORD

Permanent Trinomial: CA-SBR-967 Supplement XX

Other Designations: SBCM-67B/Vic. North Midden

Page 1 of 3.

1. County: San Bernardino County

2. USGS Quad: Victorville (7.5') XXXXXXXXX (15') _____ Photorevised 1981

3. UTM Coordinates: Zone 11 | 4 7 4 5 2 0 m Easting | 3 8 2 1 4 7 5 m Northing

4. Township 5N Range 4W ; NE ¼ of NE ¼ of NE ¼ of SE ¼ of Section 10 Base Mer. SBBM

5. Map Coordinates: _____ mmS _____ mmE (from NW corner of map) 6. Elevation 2800'

7. Location: south of Apple Valley Road and east of the granitic outcrops located east of the Mojave River. Located at the crossing of RV roads in area heavily used in 1960s and 1970s.

8. Prehistoric XXXX Historic _____ Protohistoric _____ 9. Site Description Reported to be the site of a "large" midden site but only reported to cover a few (less than ten) square meters. Artifact scatter accompanied midden soils.

10. Area ---------- m( )x ---------- m( ) 0-10m2 m^2

Method of Determination: from earlier site form (Smith 1977)

11. Depth: unknown cm Method of Determination: earlier site form

12. Features: none identified (midden should be referred to as a feature)

13. Artifacts: reported to include flakes, mano fragments, burned bone, and fire affected rock. None observed during recent investigations.

14. Non-Artifactual Constituents and Faunal Remains: none

15. Date Recorded: March 7, 1992 16. Recorded By: Jeanette A. McKenna

17. Affiliation and Address: McKenna et al., 6008 Friends Ave., Whittier, CA (310) 696-3852 or (310) 693-4059 FAX

DPR 422 A (Rev. 4/86)

See Continuation Sheet (X)

P06-000407

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Permanent Trinomial: CA-SBR-967 3 92 (Mo. Yr.)

ARCHEOLOGICAL SITE RECORD

Other Designations: SBCM-67B; Vic. North Midde

18. Human Remains: none observed ( )

19. Site Disturbances: McKenna et al. could find no evidence for this site. The locational data was easily followed. However, there was no signs of midden soils and not artifact scatter evident. It is possible the site is buried, but indications are that the site has been destroyed. ( )

20. Nearest Water (type, distance and direction): Mojave River ¼ mile to west ( )

21. Vegetation Community (site vicinity): desert scrub Plant List ( )

22. Vegetation (on site): desert scrub ( )

23. Site Soil: sandy/decomposing granitics ( )

24. Surrounding Soil: sandy/decomposing granitics ( )

25. Geology: alluvial deposits on decomposing granite outcrops ( )

26. Landform: alluvial deposits ( )

27. Slope: less than 5 degrees ( ) 28. Exposure: open ( )

29. Landowner(s) (and/or tenants) and Address: Mojave Narrows development group ( )

30. Remarks: There is no evidence of this site in the area reported. McKenna et al. did record a site further east and this site may have been mismapped. Please refer to project report. ( )

31. References: Smith 1977; McKenna 1992 ( )

32. Name of Project: Mojave Narrows multi-use development program ( )

33. Type of Investigation: Phase I cultural resources investigations with supplemental paleontological studies ( )

34. Site Accession Number: N.A. Curated At: N.A. ( )

35. Photos: on file, McKenna et al., Whittier, CA. ( )

P36-000476

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

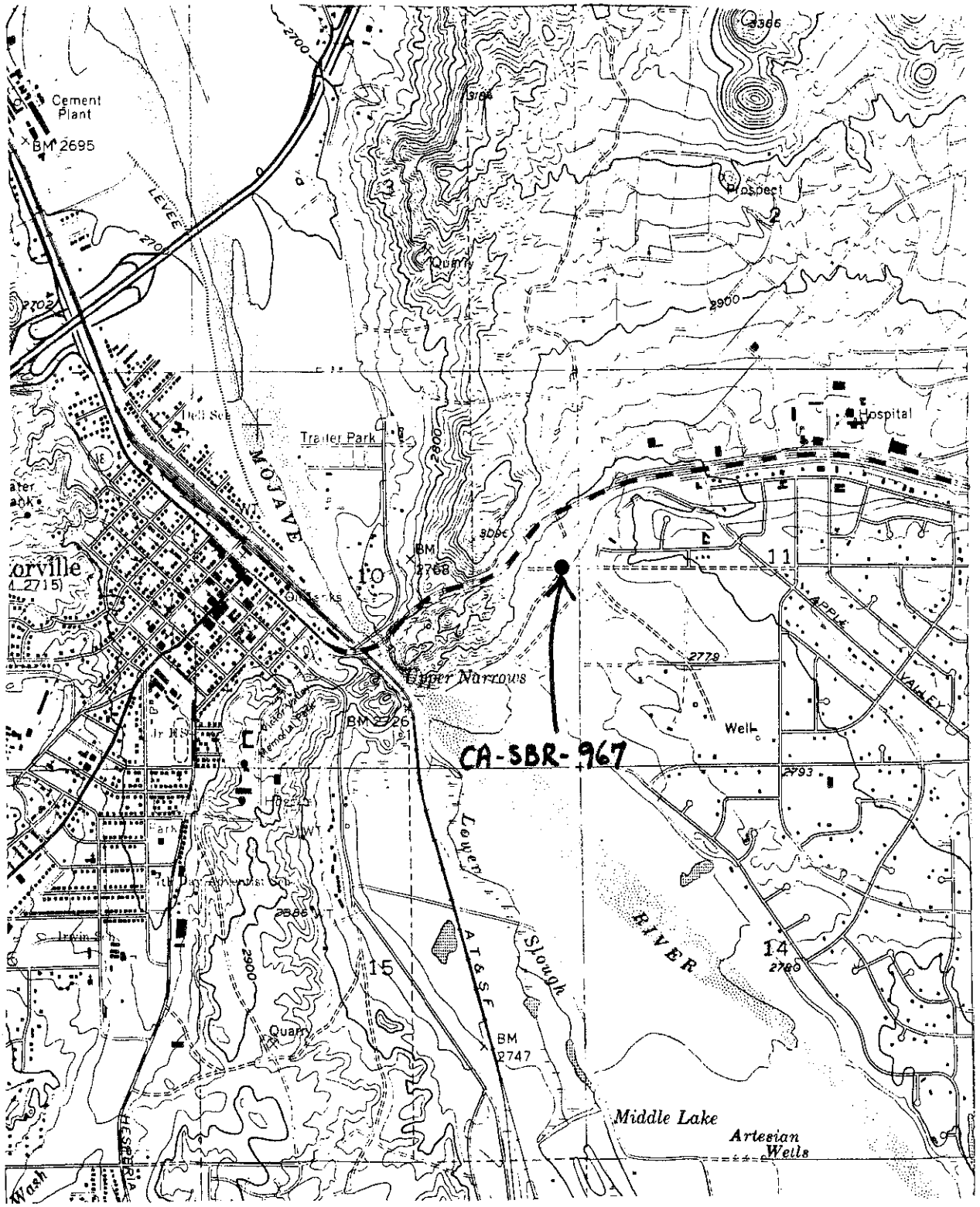
ARCHEOLOGICAL SITE LOCATION MAP

Page 3 of 3.

Permanent Trinomial: CA-SBR-967 / 3/92 (mo. yr.)

Temporary Number: SBCM-67B/Vic. North Midden

Agency Designation:



DPR 422G (Rev. 8/82)

P36-000701

SAN BERNARDINO COUNTY MUSEUM

ARCHAEOLOGICAL SITE SURVEY RECORD

[1] County SBr
[2] District
[3] Planning Unit
[4] Sample Unit
[5] Photos
[6] Date 6/77
[7] Recorder Smith

[8] Site # SBr-967 [9] Other # SBCM-6713

[10] Site Name Victorville North Midden

[11] Cadastral Location: Twn 5N Rng 4W NE 1/4 of NE 1/4 of NE 1/4 of ~~NE~~ SE 1/4 of Sec. 10

[12] Quadrangle VICTORVILLE - 7.5'- 15' [13] Elevation 2800 - feet

[14] UTM Grid Loc. Zone 11 Northing 3821475 Easting 474520

[15] Reference Points: South of Hiway 18, East of Victorville, at crossroads of dirt roads

[16] OWNER				
BLM	OTHER FED.	STATE	PRIVATE	UNKNOWN
			X	

[17] NAT'L REGISTER							
(A) STATUS					(B) TYPE		
LISTED	CANDIDATE	POTENTIAL	NOT ELG.	NO DET.	DISTRICT	SITE	OTHER
		X			X		

[18] DISTURB.				
DEVELOPMENT	ANIMAL	VANDALISM	ORV	OTHER
			X	

[19] CNDT		
GOOD	FAIR	POOR
	X	

[20] COMMENTS

[21] SITE TYPES																		
VILLAGE	TEMPORARY CAMP	SHELTER/CAVE	MILLING STA.	LITHIC SCATTER	QUARRY SITE	POTTERY LOCUS	CEMETERY	CREMATION LOCUS	INTAGLIO	ROCK ALIGNMENT	PETROGLYPH	PICTOGRAPH	TRAIL	ROASTING PIT	ISOLATED FIND	CAIRN	HISTORIC	OTHER
X				X									X					

[22] AREA					
0-10 Sq. M.	11-50	51-250	251-1000	1001-5000	over 5000
X					

[23] DEPTH				
SURFACE	1-20 Cm.	21-100	over 100	UNKNOWN
				X

[24] General Site Description:

Large midden site with dark soil and scattered artifactural material

[25] FEATURES										
STRUCTURAL DEP.	ROCK RING	ROCK STRUCTURE	CAIRN /SHRINE	ROASTING PIT/FAR	HEARTH	PETROGLYPHS	PICTOGRAPHS	BEDROCK MORTAR	GRINDING SLICK	OTHER

[26] ARTIFACTS										
PROJECTILE POINT	FLAKED STONE TOOL	CORE-DETRITUS	MILLING TOOL	OTHER GROUND STONE	CERAMIC	BONE	PERISHABLE	ORNAMENT	HISTORIC	OTHER
	X					X				

[27] ECO.			
FIRE AFFECTED ROCK	FAUNA	FLORA	OTHER
X		X	

[28] MAT.			
CRYPTOCRYSTALLINE	OBSIDIAN	FELSITE	OTHER
X		X	

[29] Describe: flakes, mano fragments, bone (burned) and fire cracked rock

[30] VEGETATION	
BARREN	
SALTBUSH	
CREOSOTE	
JOSHUA/CREOSOTE	
JOSHUA/YUCCA	
YUCCA/CACTUS	
BLACKBRUSH	
SAGEBRUSH	X
PINYON/JUNIPER	
CONIFER	
SHADSCALE	
CHAPARRAL	
OAK WOODLAND	
MESQUITE	X
RIPARIAN	
WASH	X
GRASSLAND	
OTHER	X

[31] COVERAGE	
CONTINUOUS (over75%)	X
INTERRUPTED (50-75%)	
PARK-LIKE (25-50%)	
RARE (6-25%)	
BARELY PRESENT (1-5%)	
ABSENT (0-1%)	

[32] WATER	
INTERMITTENT STREAM	X
PERMANENT STREAM	X
SPRING	
PLAYA	
OTHER	

[33] Describe

Wash area of side intermittent stream feeding into the Mojave River, Cottonwood trees and wash flora.

[34] LANDFORM	
MOUNTAIN	
HILL	
TERRACE	
RIDGE	
ALLUVIAL FAN	
CANYON	
ARROYO	X
SAND DUNE	
DESERT PAVEMENT	
BADLANDS	
PLAYA	
OTHER	

[35] BEDROCK	
EXTRUSIVE IG.	
INTRUSIVE IG.	X
METAMORPHIC	
SEDIMENTARY	
QUATERNARY ALLUV.	
OTHER	

[36] TEXTURE	
SAND	X
LOAM	
SILT	
CLAY	
OTHER	

[37] SOILS	
MIDDEN	X
ALLUVIAL	
COLLUVIAL	
EOLIAN	
BEDROCK	X
OTHER	

[38] Describe

Sandy wash area with exposed bedrock

[39] SLOPE	
POINT OF INFLEX	
LOWER 1/3	X
MID 1/3	
UPPER 1/3	
0-5°	X
6-15°	
16-30°	
31-60°	
over 60°	

[40] ASPECT	
NORTH	
NORTH/EAST	X
EAST	
SOUTH/EAST	
SOUTH	
SOUTH/WEST	X
WEST	
NORTH/WEST	

[41] EROSION	
DEFLATION	
RILLING	
GULLYING	X
SHEET/WASH	
ROCK/DEBRIS	
SLUMPING	
OTHER	

[42] DRAIN.	
CONVERGING	X
DIVERGING	
BRAIDED	
OTHER	

[43] Remarks

P36-000967

University of California

ARCHAEOLOGICAL SITE SURVEY RECORD

1. Site SBR967 2. Map VICTORVILLE - 7.5' 3. County SAN BERNARDINO

4. Twp. 5N Range 4W ; NE1/4 NE 1/4 of NE 1/4, SE 1/4 of Sec. 10

5. Location SOUTH OF HIWAY 18, EAST OF VICTORVILLE, AT CROSS ROADS OF ORV ROADS

UTM 11-474 520/3821475 6. On contour elevation

7. Previous designations for site SBCM 67

8. Owner 9. Address

10. Previous owners, dates

11. Present tenant

12. Attitude toward excavation

13. Description of site LARGE MIDDEN AREA

14. Area 6 METERS^2 15. Depth 16. Height

17. Vegetation COTTONWOODS 18. Nearest water MOJAVE RIVER

19. Soil of site SANDY-D/G 20. Surrounding soil type D/G & SAND

21. Previous excavation NONE

22. Cultivation NONE 23. Erosion SHEET WASH & FLOODING

24. Buildings, roads, etc. DIRT ROADS BISECT SITE

25. Possibility of destruction IMMINENT

26. House pits NONE OBSERVED

27. Other features

28. Burials

29. Artifacts CHIPS, BONE (BURNED), MANO FRAGMENTS

30. Remarks

31. Published references

32. Accession No. 33. Sketch map

34. Date 26 June 1977 35. Recorded by G. A. SMITH 36. Photos

State of California--The Resources Agency	Primary # 36-007147 (Update)
DEPARTMENT OF PARKS AND RECREATION	HRI #
CONTINUATION SHEET	Trinomial CA-SBR-7147H (Update)

Page 1 **of** 1 **Resource name or #** (Assigned by recorder)

Recorded by Daniel Ballester **Date** March 23, 2015 ____ Continuation √ Update
Form Prepared by Bai "Tom" Tang **Date** June 25, 2015
Affiliation: CRM TECH, Colton **Project No:** CRM TECH 2888A

On March 23, 2015, an intensive-level field survey was conducted in an area along the Desert Knolls Wash, which may include a portion of Site 36-007147. No artifacts associated with the site were observed during the survey.

Report Citation:

Bai "Tom" Tang, Deirdre Encarnación, Daniel Ballester, Terri Jacquemain, and Nina Gallardo
2015 Identification and Evaluation of Historic Properties: Desert Knolls Wash Phase III Project, Town of Apple Valley, San Bernardino County, California.

Update 3/08

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # 36-007147
HRI #
Trinomial CA-SBR-7147H; Update
NRHP Status Code

Other Listings
Review Code Reviewer Date

*Resource Name or #: (Assigned by recorder)

P1. Other Identifier:

*P2. Location: *a. County San Bernardino, CA ☒ Not for Publication ☐ Unrestricted
*b. USGS 7.5' Quad Victorville, CA Date 1956 (Revised 1993)
T 5 N; R 4 W; NE ¼ of SE ¼ of Sec 10; S.B.B.M.
c. Address: City Zip
d. Zone 11; NAD 83 474331 mE/ 3821636 mN at datum
e. Other Locational Data (e.g., parcel #, legal description, directions to resource, additional UTMs, etc., when appropriate): CA-SBR-7147H is situated on property owned by the Lewis Center for Educational Research on an alluvial terrace approximately 50 m west from the western edge of Desert Knolls Wash and approximately 0.45 mi northeast of the "Upper Narrows" area of the Mojave River and the confluence of Desert Knolls Wash and the Mojave River. A rutted two-track dirt road (utility access road) leading to a power line pole borders the eastern edge of the site. The highest central point of a low looter's backdirt pile located in the central site area at UTM coordinates 474331 mE/ 3821636 mN (NAD 83) serves as site datum. Utility pole no. 1756368E is located 26 m at 344° (TN) from the site datum.

*P3a. Description (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): CA-SBR-7147H was recorded initially in 1992 by McKenna et al. and described simply as a historic refuse scatter measuring 4 m² containing glass, metal, ceramics, household items, nails, tobacco tins, and fragments of a trunk. During a recent survey for the Desert Knolls Wash Improvements Project, personnel from Applied EarthWorks, Inc. (Æ) relocated CA-SBR-7147H at the UTM coordinates provided above; this update is a result of those efforts.

As a result of the current survey, CA-SBR-7147H is now known to measure 12 x 9 m (40 x 30 ft) (N-S x E-W), and to consist of a historical refuse deposit likely dating to the 1920s and 1930s, primarily containing domestic refuse (e.g., glass, ceramics, and metal items) as well as other debris and subsistence-related items (i.e., burned bone, eggshell fragments). Although datable items are few, the temporal placement of the debris (dating to the 1920s–1930s) is suggested by the presence of semi-Automatic Bottle Machine-made (ABM) bottle glass fragments (post 1904; Jones and Sullivan 1985), the presence of sun-colored amethyst (SCAMY) glass (ca. 1870–1920; Lockhart 2006), and one metal button with a stamped patent date of "1924" (see A5 for further descriptions of materials). Overall, approximately 100 artifacts were observed within the site boundaries. Site integrity appears to be impaired. One shallow looter's pit is present, and the site has undoubtedly been subjected to unauthorized surface collection.

*P3b. Resource Attributes (List all attributes and codes): AH 4: Trash Scatter.

*P4. Resources Present: ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other:

P5. Photograph or Drawing: (Photograph required for buildings, structures, and objects.)

*P6. Date Constructed/Age and Source: ☐ Prehistoric ☒ Historic ☐ Both

*P7. Owner and Address: Lewis Center for Educational Research, 17500 Mana Rd., Apple Valley, CA 92307.

*P8. Recorded by (Name, affiliation, address): D. McDougall, K. McLean, C. Bouscaren, Applied EarthWorks, Inc., 3292 E. Florida Ave., Suite A, Hemet, CA 92544.

P9. Date Recorded: 19 December 2007

*P10. Type of Survey: ☒ Intensive ☐ Reconnaissance ☐ Other
Describe: Maximum of 15 m pedestrian transects.

*P11. Report Citation (Provide full citation or enter "none"): None yet.

Attachments: ☐ None ☒ Location Map ☒ Site Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☒ Archaeological Site Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☒ Photograph Record Other:

*A1. **Dimensions: a. Length:** 40 ft (N x S) **b. Width:** 30 ft (E x W)
Method of Measurement: ☐ Paced ☐ Taped ☐ Visual estimate ☒ Other Trimble GPS mapping; sub-meter accuracy.
Method of Determination (Check any that apply): ☒ Artifacts ☐ Features ☐ Soil ☐ Vegetation ☐ Topography ☐ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ☐ Other (explain):
Reliability of Determination: ☒ High ☒ Medium ☐ Low Explain: Excellent ground surface visibility (80–95%).
Limitations (Check any that apply): ☐ Restricted access ☐ Paved/built over ☐ Disturbances ☐ Site limits incompletely defined ☐ Other (Explain): None.

A2. **Depth:** ☐ None ☒ Unknown Method of Determination: Surface examination only; however, the deposit appears to be either surficial or likely very shallow (<5 cm) in nature, as evidenced by the shallow looter's pit and lack of artifacts within the "side walls" of the looter's pit and within the associated backdirt pile.

*A3. **Human Remains:** ☐ Present ☒ Absent ☐ Possible ☐ Unknown (Explain): Historical refuse scatter.

*A4. **Features** (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map): None.

*A5. **Cultural Constituents** (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with feature): Approximately 100 historical items (mostly small and highly fragmented) were observed. Glass artifacts include: bottle glass fragments (green, clear, amber, and SCAMY); one clear glass ABM bottle base with an illegible "Owens-Illinois" maker's mark; flat pane glass; one fragment of a clear glass oil lamp chimney; melted glass; light bulb fragments; and one partial clear glass ABM rectangular medicinal bottle base embossed with "L.../PHARM...". Ceramics observed include fragments of plain white "Hotel Ware" (coffee mugs, saucers; some burned), and one porcelaineous stoneware condiment dish fragment (white with a double-ring annular transfer-print design [green] around the interior rim). Metal items include: crown caps; one two-hole metal button; one four-hole metal button stamped with "ANGELES 1000/A1" (A1 bordered by stars) on one side and patented "Dec. 3 1924" on the opposite side; one 22 caliber bullet casing with "US" stamped on the base; one compression can lid; one metal suspender or hosiery clip; one metal grommet; one corrugated wood staple; one small fragment of tin with a molded, scalloped rim; and one 4 ft length of curtain rod. Other materials observed include small fragments of burned bone, eggshell fragments, non-diagnostic fragments of ferrous metal, and pieces of slag-like material.

*A6. **Were Specimens Collected?** ☒ No ☐ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated.)

*A7. **Site Condition:** ☐ Good ☐ Fair ☒ Poor (Describe disturbances): Site integrity appears to be impaired. One looter's pit is present, and the deposit has likely been subject to unauthorized surface collection.

*A8. **Nearest Water** (Type, distance, and direction): Desert Knolls Wash is located approximately 50 m to the east; the Mojave River is located approximately 0.45 mi to the southwest.

*A9. **Elevation:** 2,770 ft amsl

A10. **Environmental Setting** (Describe vegetation, fauna, soils, geology, landform, slope, aspect, exposure, etc., as appropriate): CA-SBR-7147H is situated on a gently sloping (3–6°) alluvial terrace with a southeastern aspect. Soils consist of sandy-silty alluvium with common gravels of limestone, quartz, granite, and schist. Exposure is open/360°. Vegetation consists of desert scrub communities.

A11. **Historical Information** (Note sources and provide full citations in Field A15 below): None.

*A12. **Age:** ☐ Prehistoric ☐ Pre-Colonial (1500–1769) ☐ Spanish/Mexican (1769–1848) ☐ Early American (1848–1880) ☐ Turn of century (1880–1914) ☒ Early 20th century (1914–1945) ☐ Post WWII (1945+) ☐ Undetermined Factual or estimated dates of occupation (explain): See P3a.

A13. **Interpretations** (Discuss scientific, interpretive, ethnic, and other values of site, if known): CA-SBR-7147H appears to represent a single, casual episode of household refuse disposal dating to ca. 1920s–1930s. The deposit appears to be surficial, and to contain little data potential.

A14. **Remarks:** This site record update appears to have exhausted the site's data potential, and no further management of the resource is recommended.

A15. **References** (Give full citations including the names and addresses of persons interviewed, if possible):

Jones, O., and C. Sullivan
1985 *The Parks Canada Glass Glossary*. National Historic Parks and Sites, Canadian Parks Service, Environment Canada.

Lockhart, B.
2006 The Color Purple: Dating Solarized Amethyst Container Glass. In *Historical Archaeology* 40(2):45–56.

A16. **Photographs** (List subjects, direction of view, and accession numbers or attach a Photograph Record): See attached Photograph Record.

*A17. **Form Prepared by:** D. McDougall **Date:** 19 December 2007
Affiliation and Address: Applied EarthWorks, Inc., 3292 E. Florida Ave., Suite A, Hemet, CA 92544.

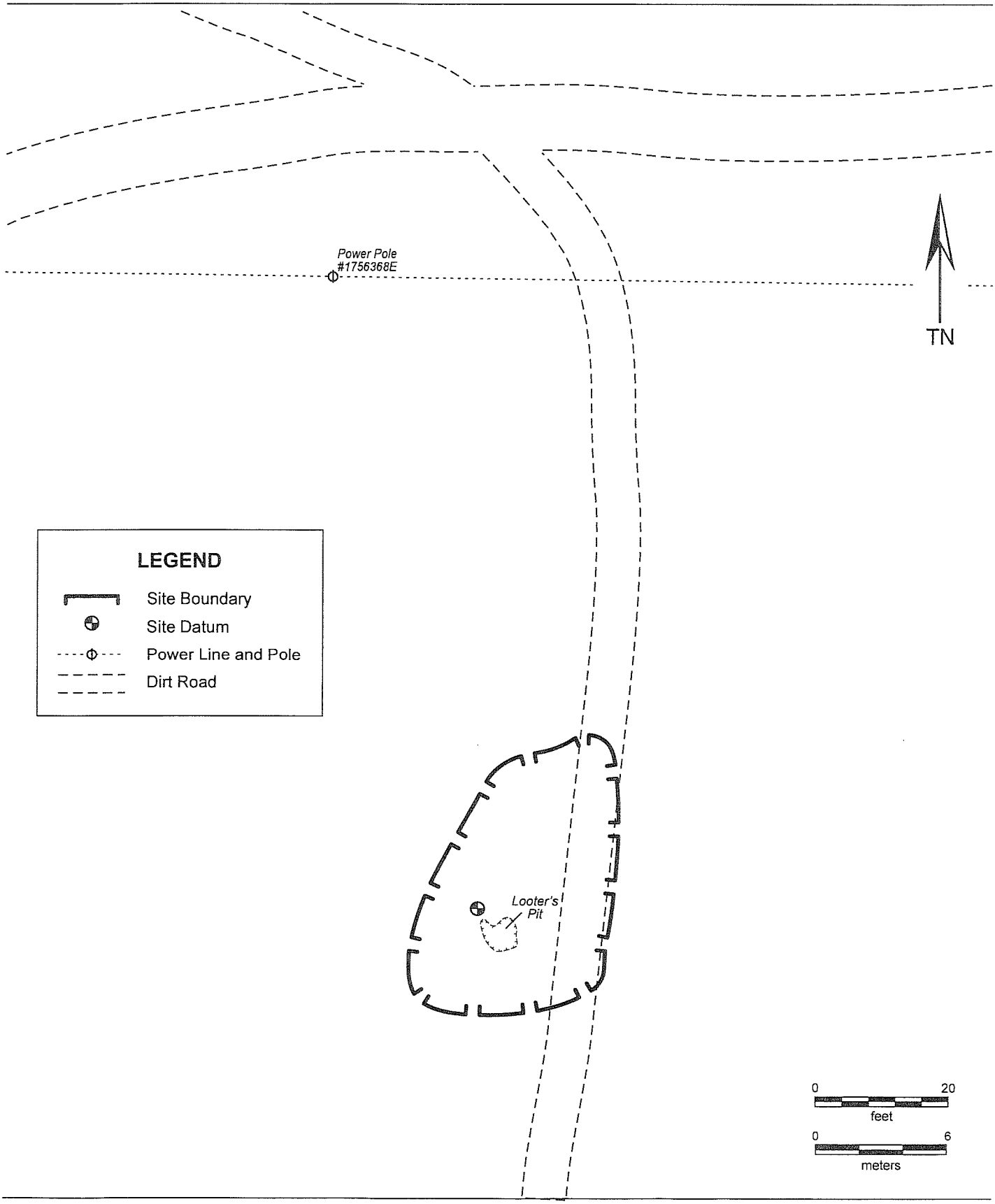
Temporary Number/Resource Name:
Project Name: Desert Knolls Wash **Photographer:** C. Bouscaren
Image Type: ☐ (**bw**) 35mm B&W film ☐ (**cp**) 35mm Color Print film ☐ (**cs**) 35mm Color Slide film
☐ (**df**) Digital-Floppy disk ☒ (**dm**) Digital-Memory flash card
Camera Type and Model: Nikon Coolpix L14
Film Type and Speed: SD disk **Roll Number:** DKW-1-dm
Year: 2007

Mo.	Day	Time	Frame/ File Name	Subject/Description	Facing
12	19	1315	DSCN0085	CA-SBR-7147H: site datum (looter's backdirt pile).	N
12	19	1317	DSCN0086 thru 89	CA-SBR-71477: site overview from datum.	N, E, S, W
12	19	1320	DSCN0090, 91	CA-SBR-7147H: detail of cultural materials in looter's pit.	Down

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary #
HRI #
Trinomial CA-SBR-7147H; Update

***Resource Name or #** (Assigned by recorder): CA-SBR-7147H
***Drawn by:** K. McLean **Scale:** 1" = 20' ***Date of map:** December 2007



*Required Information

State of Calfornia — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

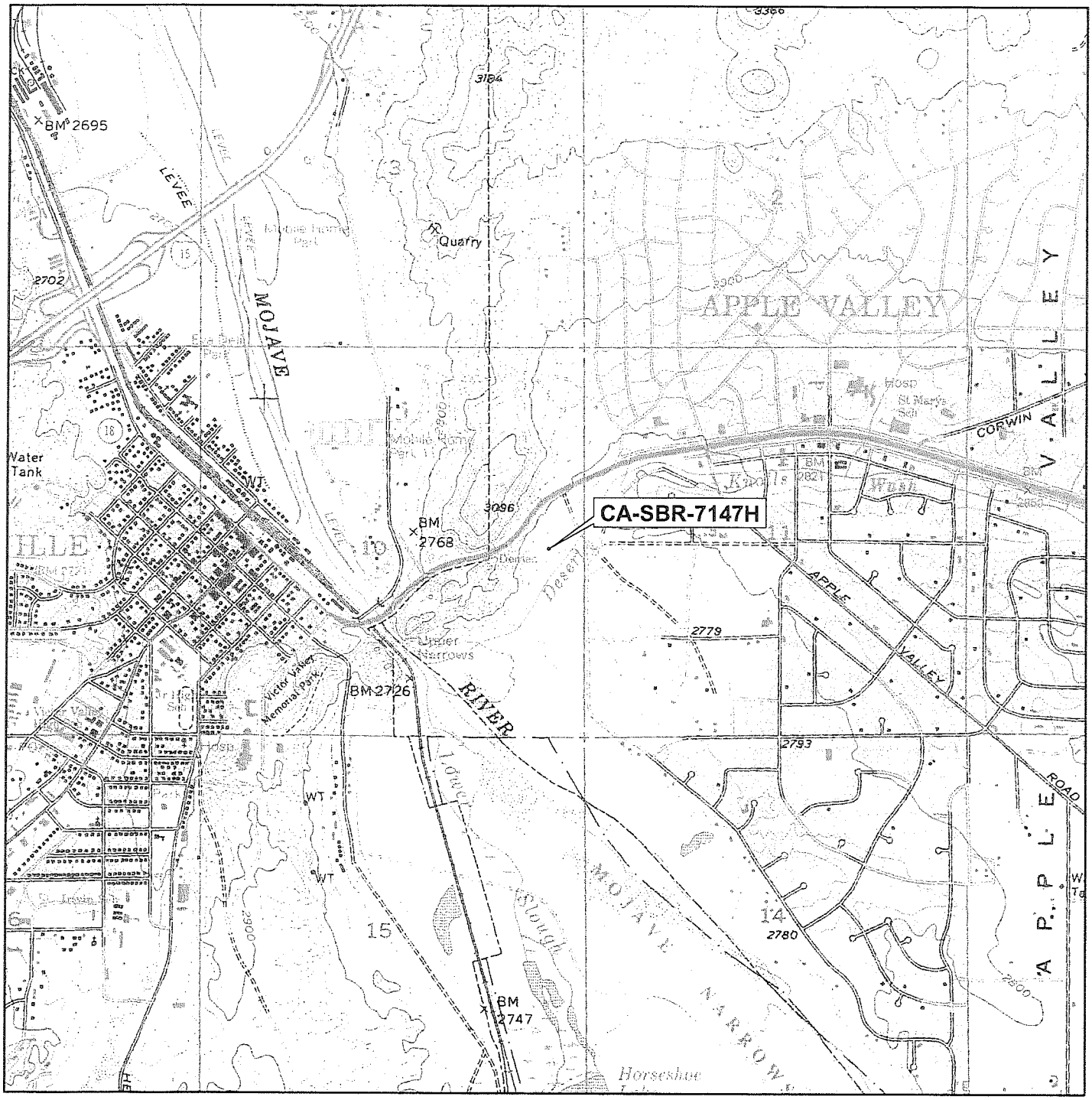
Primary # 36-007147
HRI#
Trinomial CA-SBR-7147H

***Resource Name or #:**

***Scale:** 1:24,000

***Map Name:** Victorvillea (1956-PR1993), CA

***Date:** 2007



SCALE 1:24,000

1 0.5 0 1 Miles

1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet

1 0.5 0 1 Kilometers

TRUE NORTH

***Required information**

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

ARCHEOLOGICAL SITE RECORD

1584

Page 1 of 3

Permanent Trinomial: CA-SBR-7147H Supplement ☐

Other Designations: Field No. M-2

1. County: San Bernardino

2. USGS Quad: Victorville (7.5') XXXXXXXXX (15') _____ Photorevised 1981

3. UTM Coordinates: Zone 11 474400 m Easting 3821410 m Northing ( )

4. Township 5N Range 4W ; NW ¼ of NE ¼ of NE ¼ of SE ¼ of Section 10 Base Mer SBBM ( )

5. Map Coordinates: 411 mmS 367 mmE (from NW corner of map) 6. Elevation 2780' ( )

7. Location: Located south of Apple Valley Road and east of large rock outcropping to the east of the MOjave River. Along dirt access (RV) road; west of transmission line. ( )

8. Prehistoric ____ Historic XXXX Protohistoric ____ 9. Site Description Ca. 1920s refuse scatter. ( )

10. Area 2m m( )x 2m m( ) 4m2 m²

Method of Determination: field measurements ( )

11. Depth: unknown cm Method of Determination: N.A. ( )

12. Features: none ( )

13. Artifacts: glass, metal, ceramics, household items, nails, tobacco tins, and fragments of a trunk (hinges, etc.) ( )

14. Non-Artifactual Constituents and Faunal Remains: none ( )

15. Date Recorded: March 7, 1992 16. Recorded By: Jeanette A. McKenna ( )

17. Affiliation and Address: McKenna et al., 6008 Friends Ave., Whittier, CA 90601 (310 696-3852 or (310) 693-4059 FAX ( )

DPR 422 A (Rev. 4/86)

See Continuation Sheet (X)

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Permanent Trinomial: SBR-7147H

Mo. Yr.

ARCHEOLOGICAL SITE RECORD

Other Designations: Field No. M-2

18. Human Remains: none observed

19. Site Disturbances: slight due to nearby road.

20. Nearest Water (type, distance and direction): Mojave River ¼+ mile to the west

21. Vegetation Community (site vicinity): desert scrub Plant List

22. Vegetation (on site): desert scrub

23. Site Soil: sand/decomposing granitics

24. Surrounding Soil: sandy/decomposing granitics

25. Geology: alluvial deposits

26. Landform: river terrace/flood plain

27. Slope: less then 5 degrees 28. Exposure: open

29. Landowner(s) (and/or tenants) and Address: MOjave Narrows development group

30. Remarks: Located during intensive survey - appears to be the remains of substantial refuse deposit.

31. References: McKenna 1992

32. Name of Project: Mojave Narrows multi-use development program

33. Type of Investigation: Phase I cultural resource investigation and supplemental paleontological studies

34. Site Accession Number: N.A. Curated At: N.A.

35. Photos: on file, McKenna et al., Whittier, CA.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

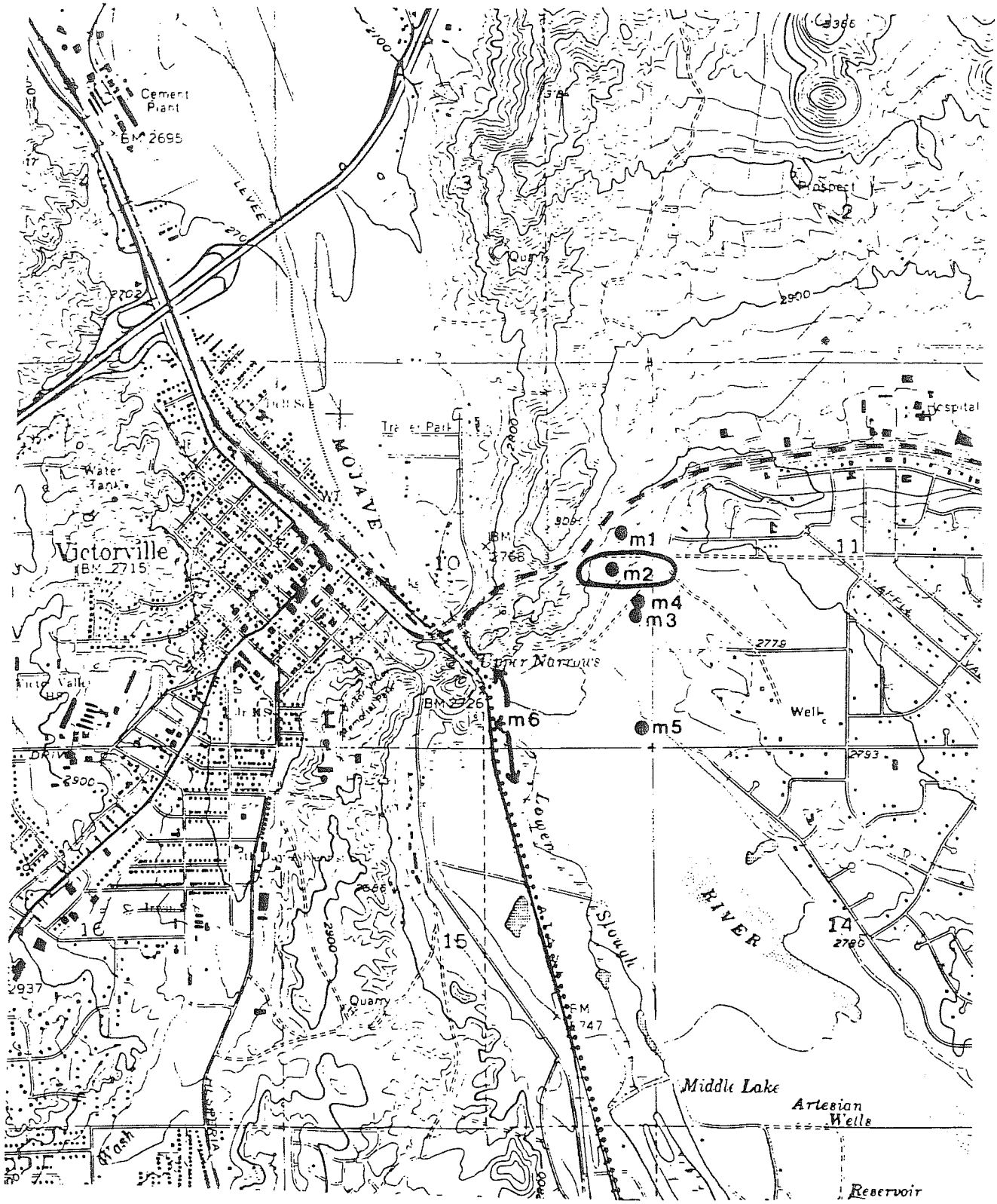
ARCHEOLOGICAL SITE LOCATION MAP

Page _____ of _____.

Permanent Trinomial: SBR-7147H / _____ (mo. / yr.)

Temporary Number: FIELD No. M-2

Agency Designation: _____



DPR 422G (Rev. 8/82)

Recorded by Daniel Ballester **Date** March 23-25, 2015 ____ Continuation √ Update
Form Prepared by Bai "Tom" Tang **Date** June 25, 2015
Affiliation: CRM TECH, Colton **Project No:** CRM TECH 2888A

On March 23, 2015, an intensive-level field survey was conducted in the portion of the site lying within and adjacent to the Desert Knolls Wash. On March 25, three exploratory trenches were excavated at that portion of the site in search for possible subsurface archaeological deposits. The trenches were placed on the east side of and mostly parallel to the wash, with two of them within the previously established site boundaries (see p. 2). One of the trenches measures 25 meters long and one meter wide, and the other two measured 27 meters long and one meter wide. The trenches were excavated with a backhoe in 50-centimeter levels, reach total depths of two to three meters. Excavated soils were screened through 1/8-inch and 1/4-inch hardware meshes, and sidewall profiles were drawn to record both the geological and archaeological stratigraphy.

During the survey, a complete granitic unifacial mano was observed in that area. The mano appears to have been exposed recently by vehicular traffic, and was subsequently collected. The trench profiles indicate that the subsurface sediments had been heavily disturbed by natural forces along the Desert Knoll Wash. A charcoal layer was found in the side walls of the two southerly trenches, but was apparently the result of a natural burn that covered the entire area. No artifacts were recovered throughout the trenching and screening process.

Report Citation:

Bai "Tom" Tang, Deirdre Encarnación, Daniel Ballester, Terri Jacquemain, and Nina Gallardo
2015 Identification and Evaluation of Historic Properties: Desert Knolls Wash Phase III Project, Town of Apple Valley, San Bernardino County, California.

Locations of exploratory trenches at Site 36-013879

Recorded by Daniel Perez and Daniel Ballester
Date January 10 and 29, 2013 ___ Continuation √ Update
Form Prepared by Daniel Perez and Daniel Ballester **Date** February 5, 2013
Affiliation: CRM TECH, Colton **Project No:** CRM TECH 2667/2669

Site 36-013879 was first recorded in 2007 during a Phase I study conducted by Applied EarthWorks. This complex prehistoric residential site incorporates two previously recorded prehistoric sites, 36-000058 and 36-000059, in their entirely, as well as the southern and eastern portions of a third prehistoric site, 36-000060.

During the exploratory trenching project for the Lewis Center for Educational Research Softball Field between January 7 to 10, 2013, located to the northeast and adjacent to the site boundary of 36-013879, a total of 13 prehistoric artifacts were recorded on the surface of the property (Hogan et al. 2013). These artifacts consist of flaked basalt, jasper, and quartzite pieces, basalt cores, mano fragments, and 1 complete uniface metate. An additional 88 subsurface prehistoric artifacts were recovered during the excavation of 11 backhoe trenches. These artifacts consist of groundstone fragments (manos and metates), lithic flakes and tools, a possible stone pendant, FARs, and a couple of fragments of freshwater mussel shells. Three possible fire hearth features were recorded in three different trenches. Due to these prehistoric artifacts being in close proximity to site 36-013879, the site boundaries have been modified to include the locations of the surface and subsurface artifacts recovered during the trenching project (see attached maps).

During monitoring for the Lewis Center for Educational Research's gymnasium on January 29 and 30, 2013, a unifacial metate fragment and a fire-affected, bifacial mano fragment were recovered (Tang 2013). These artifacts were found adjacent to the western end of the campus and approximately 30 meters east of the eastern extent of the previously recorded site boundary for 36-013879. The location of both artifacts was recorded using a Trimble GPS unit and the site boundaries have been modified to also include the locations of the groundstone artifacts (see attached maps).

Report Citations:

Hogan, Michael, Daniel Ballester, Deirdre Encarnación Slaughter, and John D. Goodman II
2013 Report on the Exploratory Trenching Program and Monitoring of Grubbing at the Proposed Softball Field for the Lewis Center for Educational Research, Town of Apple Valley, San Bernardino County, California.

Bai "Tom" Tang
2013 Archaeological Monitoring Program for the New Gym Construction Project, Lewis Center for Educational Research, Town of Apple Valley, San Bernardino County, California.

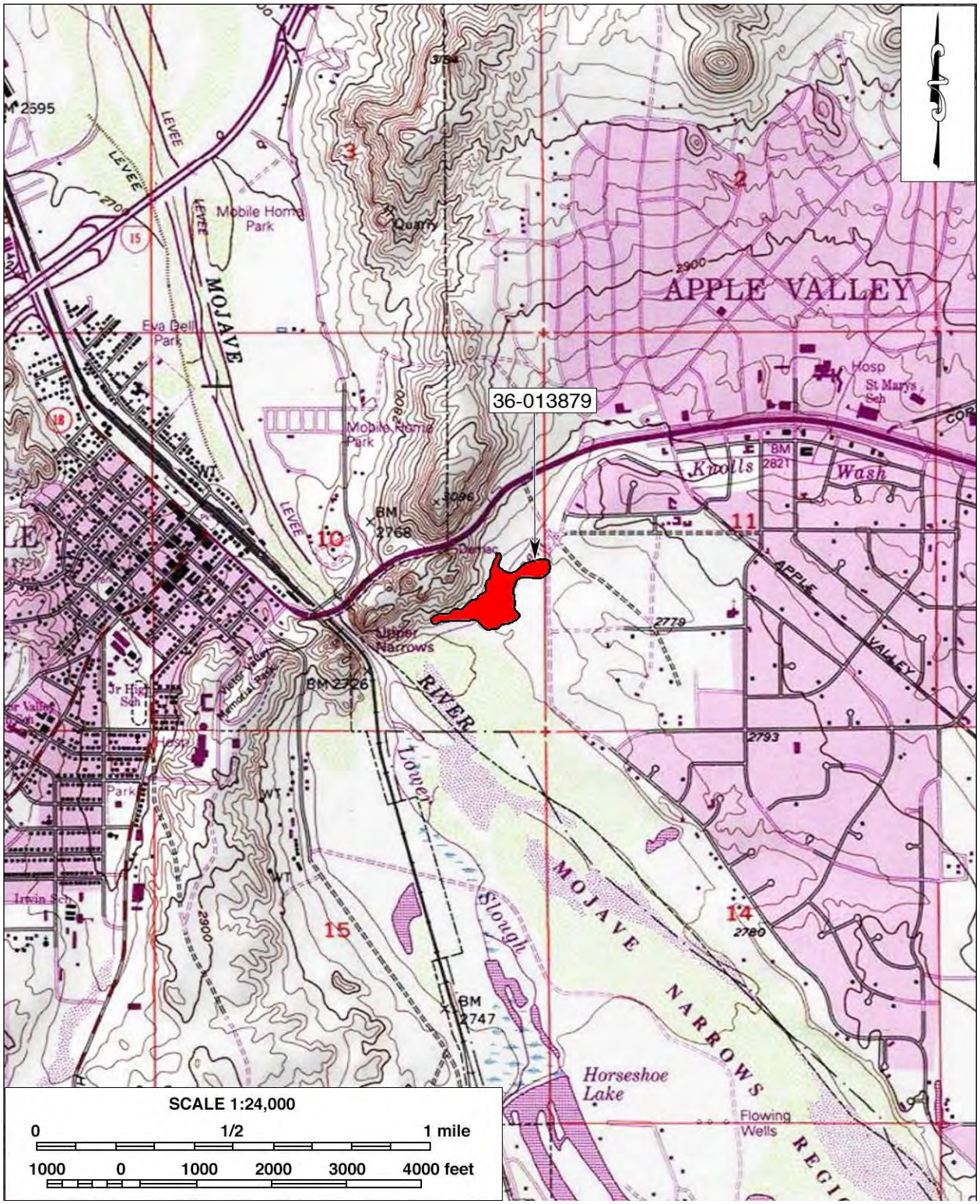
State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # 36-013879 (Update)
HRI #
Trinomial CA-SBR-12706 (Update)

Page 2 **of** 3 ***Resource Name or #** (Assigned by recorder)

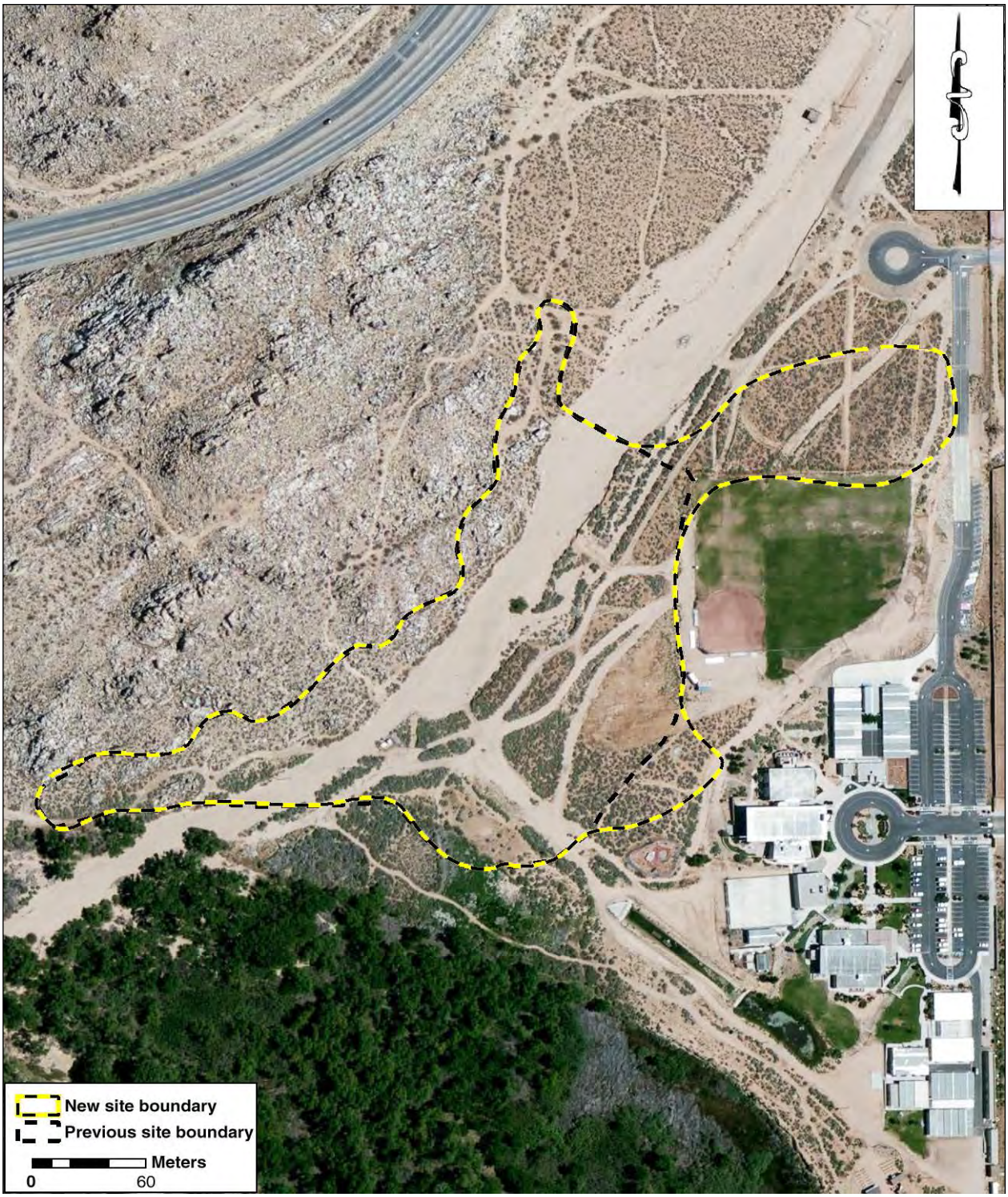
***Map Name:** Victorville ***Scale:** 1:24,000 ***Date of Map:** 1956/1993



State of California--The Resources Agency	Primary # 36-013879 (Update)
DEPARTMENT OF PARKS AND RECREATION	HRI #
SKETCH MAP	Trinomial CA-SBR-12706 (Update)

Page 3 of 3 *Resource Name or # (Assigned by recorder)

*Drawn by: Daniel Ballester *Date: February 5, 2013



2/08

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # 36-015879
HRI #
Trinomial CA-SBR-12706
NRHP Status Code

Other Listings
Review Code | Reviewer | Date

*Resource Name or #: (Assigned by recorder) Æ-DKW-1
Combine S SBR-59, -60 + A Portion of SBR-60

P1. Other Identifier:
*P2. Location: *a. County San Bernardino, CA ☒ Not for Publication ☐ Unrestricted
*b. USGS 7.5' Quad Victorville, CA Date 1956 (Rev. 1993)
T 5 N; R 4 W; NW & NE ¼ of SE ¼ of Sec 10; S.B.B.M.

c. Address: City Zip
d. Zone 11 474218 mE/ 3821311 mN (at Datum)
e. Other Locational Data (e.g., parcel #, legal description, directions to resource, additional UTMs, etc., when appropriate): Æ-DKW-1 is situated along Desert Knolls Wash on property owned by the Lewis Center for Educational Research to the immediate east of the "Upper Narrows" area of the Mojave River, and the confluence of the Mojave River and Desert Knolls Wash. Desert Knolls Wash flows generally in a northeast to southwesterly direction through the central site area. The main residential locus within the overall site area, designated herein as Locus 1, is situated along the relatively flat river terrace to the immediate east (or south) of Desert Knolls Wash. Loci 2-4 are located along the southern and eastern base of the steep, rocky slopes of the prominent northeast-to-southwest trending ridgeline bordering the western (or northern) edge of Desert Knolls Wash. A power pole (No. 81312S) located at the angle point of a power line approximately 15 meters (m) east (or south) of Desert Knolls Wash at the southwestern edge of Locus 1 at UTM coordinates 474218 mE / 3821311 mN (NAD 83) serves as site datum.

*P3a. Description (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries): Measuring approximately 404 x 148 m (NE-SW x NW-SE) or 9.81 acres, Æ-DKW-1 is a large, complex, prehistoric residential site that actually incorporates two previously recorded prehistoric sites (i.e., CA-SBR-58 and CA-SBR-59) in their entirety, as well as the southern and eastern portions of a third, large previously recorded prehistoric site (i.e., CA-SBR-60). It should be noted, however, that only the extreme southern and eastern portions of CA-SBR-60 located within and/or immediately adjacent to the current project area were examined and incorporated into Æ-DKW-1; CA-SBR-60 is recorded as encompassing the entire northeast-to-southwest trending ridgeline bordering Desert Knolls Wash to the west (or north) that forms the eastern side of the "Upper Narrows", thus, the western boundaries of Æ-DKW-1 should be considered somewhat tentative.

Four loci defined by concentrations of cultural debris, outcrops with bedrock milling features, other discrete cultural features (i.e., hearths and one probable cremation feature), and/or midden-altered sediments were identified within the site area. That portion of Æ-DKW-1 designated herein as Locus 1 corresponds to the site recorded previously as CA-SBR-58, while Locus 3 corresponds to the site recorded previously as CA-SBR-59; Loci 2 and 4 are situated along the southeastern and eastern boundaries, respectively, of the site recorded previously as CA-SBR-60. In addition, a "background noise" of cultural materials aud/or outcrops with bedrock milling features occurs between loci. Five discrete cultural features (i.e., Features 1–5) were also identified within the site area. Feature 1 consists of what appears to be a buried hearth exposed within the eastern cut-bank of Desert Knolls Wash along the western-central boundary of Locus 1. Feature 2 is a discrete concentration of fire-altered rock (probable eroded hearth) exposed on the ground surface within the northeastern portion of Locus 1. Feature 3 is an extremely dense, discrete concentration of highly calcined large mammal bone (probable Native American cremation) located within Locus 2. Feature 4 appears to be an eroded hearth exposed within a small erosional channel at Locus 4, while Feature 5 appears to be an intact hearth exposed within the cut-bank of this same erosional channel at Locus 4. In addition to Features 1-5, a total of 14 bedrock outcrops (i.e., Outcrops, or OCs 1–14) with a minimum of 30 bedrock milling features (26 milling slicks and 4 mortar cups) were identified within the site area. OCs 1–3 are located within Locus 2; OCs 4–8 are located within Locus 3; OCs 13 and 14 are located within Locus 4. The remaining outcrops with milling features (i.e., OCs 9–12) are scattered between/around Loci 2–4 within the eastern site area along the base of the rocky ridgeline. No outcrops with milling features are present within Locus 1. Further descriptions of Features 1–5 and OCs 1–14 are provided in A4. Loci 1–4 are described further below.

Locus 1. Measuring approximately 230 x 85 m (NE-SW x NW-SE) and located on the relatively flat river terrace bordering Desert Knolls Wash to the east (central UTM coordinates for Locus 1 are: 474291 mE / 3821344 mN), Locus 1 appears to be the focus of residential activity within the overall site area, and incorporates the site recorded

previously as CA-SBR-58. Copious amounts of fire-altered rock, as well as few flaked and ground stone tools, lithic debitage, small fragments of burned bone, and marine shellfish remains are scattered throughout Locus 1. In addition, buried midden-altered sediments capped by a thin (10-20 cm) layer of more recent, non-midden-altered sediments are exposed along the cut-banks of graded/bladed dirt roads and other areas of mechanized disturbance within portions of Locus 1, particularly within the central and southern portions of the locus. As noted above, Features 1 and 2 are also present within Locus 1. Cultural materials observed at Locus 1 include two granitic metate fragments, four bifacial mano fragments (granite and quartzite), one small, stemmed, foliate-shaped biface of siliceous limestone, one small bifacial drill/perforator (white chert) with a concave base that may have been fashioned or reworked from a projectile point, one unifacial flake tool of crystalline quartz, one jasper core, approximately 30 pieces of lithic debitage (quartzite, crystalline quartz, chert, and chalcedony), 15-20 small fragments of burned bone (widely scattered), and 25-30 fragments of marine shellfish (haliotis, mytilus, scallop, clam, and unidentified). It should be noted that the drill/perforator and the crystalline quartz flake tool noted above were found along the edge of a fairly recent looking, shallow (10 cm deep), 3 x 3 m square "surface scrape" oriented to true north with what appear to be piles of screened sediments within the southeastern portion of Locus 1 at UTM coordinates 474330 mE / 3821319 mN, suggesting that this area of the site has been "tested" in the recent past. However, no Extended Phase I or Phase II testing activities have been reported at this site, and it is likely that this "test unit" is the result of the Lewis Center for Educational Research conducting informal archaeological training classes on site. The integrity of Locus 1appears to range from retained to moderately impaired. The primary disturbances are attributed to the blading and grading of numerous dirt roads, other areas of mechanized disturbance (berms and push-piles), and sewer line and power line construction. However, more intact areas are present between the areas of disturbance, and due to what appears to be a buried midden component and at least one buried hearth feature (i.e., Feature 1) exposed within the cut-bank of Desert Knolls Wash, Locus 1 still appears to contain considerable data potential.

Locus 2. Situated along the western edge of Desert Knolls Wash along the southeastern base of the rocky ridgeline, Locus 2 defines the southwestern site boundary, and measures approximately 101 x 38 m (E-W x N-S); central UTM coordinates for Locus 2 are: 474064 mE / 3821290 mN. Locus 2 contains three bedrock outcrops (OCs 1–3) with five milling slick features. Few cultural materials (3–5 fragments of fire-altered rock, 3–5 fragments of marine shellfish , and one piece of prehistoric ceramics) were observed with Locus 2, and the sediments are eroded/deflated and likely shallow in nature. However, the sediments within some portions of the locus are much darker than the surrounding sediments, and may be midden-altered. Additionally, as noted previously, a dense concentration of highly fragmented, highly calcined large mammal bone (i.e., Feature 3) that appears to represent the eroded remains of a Native American cremation feature is present along the southern edge of Locus 2 and just above (west of) Desert Knolls Wash at UTM coordinates 474056 mE / 3821291 mN (see A4 for further description of Feature 3). One fragment of prehistoric ceramics (Colorado Redware) is also present within the calcined bone concentration; it is of interest to note that this is the only piece of prehistoric ceramics observed within the overall site area. The integrity of Locus 2 appears to be moderately impaired due to natural erosional processes (erosion/deflation of sediments, and weathering/exfoliation of the outcrops and milling features).

Locus 3. Located along the western-central site boundary to the immediate west of Desert Knolls Wash and along the eastern base of the prominent ridgeline at UTM coordinates 474167 mE / 3821341 mN (central point of Locus 3), Locus 3 measures approximately 38 x 40 m (N-S x E-W), and contains five bedrock outcrops (i.e., OCs 4–8) with a total of nine milling features (7 milling slicks and 2 incipient mortars). No cultural materials or midden-altered sediments were observed at Locus 3, and similar to Locus 2, the sediments at Locus 3 are eroded/deflated, and there appears to be little potential for subsurface cultural deposits. The integrity of Locus 3 appears to be moderately impaired due to erosion/deflation of sediments, and weathering/exfoliation of the outcrops with milling features.

Locus 4. Centrally located at UTM coordinates 474268 mE / 3821499 mN within the northern site area to the immediate west of Desert Knolls Wash and along the eastern base of the prominent ridgeline, Locus 4 measures 28 x 26 m (N-S x E-W), and contains two bedrock outcrops (i.e., OCs 13 and 14) with a total of seven milling features (6 milling slicks and 1 mortar cup). Additionally, one eroded hearth (Feature 4) and one intact, buried hearth (Feature 5) were noted within an incised erosional channel along the northern edge of Locus 4. Artifacts observed at Locus 4 include one quartzite multi-directional core and one mano fragment; no midden-altered sediments were observed. However, the sediments at Locus 4 appear to be comparatively thicker (deeper) than at Loci 2 and 3, and the presence of the buried hearth feature exposed within the cut-bank of the erosional channel approximately 1.0 m below ground surface indicates

the presence of subsurface cultural deposits in some areas. Locus integrity appears to be moderately impaired by gully incision, and weathering /exfoliation of the outcrops and milling features.

*P3b. **Resource Attributes** (List all attributes and codes): AP 2: Lithic Scatter; AP 4: Bedrock Milling Features; AP 8: Cairns/Rock Features; AP 9: Burials (Cremation); AP 11: Hearths; AP 15: Habitation Debris.

*P4. **Resources Present:** ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other:

P5. **Photograph or Drawing:** (Photograph required for buildings, structures, and objects.)

*P6. **Date Constructed/Age and Source:** ☒ Prehistoric ☐ Historic ☐ Both

*P7. **Owner and Address:** Lewis Center for Educational Research, 17500 Mana Road, Apple Valley, CA 92307.

*P8. **Recorded by** (Name, affiliation, address): D. McDougall, K. McLean, C. Bouscaren, Applied EarthWorks, Inc., 3292 E. Florida Ave., Suite A, Hemet, CA 92544.

P9. **Date Recorded:** 17-19 December, 2007

*P10. **Type of Survey:** ☒ Intensive ☐ Reconnaissance ☐ Other
Describe: Maximum of 15 m pedestrian transects.

*P11. **Report Citation** (Provide full citation or enter "none"): None yet.

Attachments: ☐ None ☒ Location Map ☒ Site Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☒ Archaeological Site Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☒ Photograph Record Other:

*A1. **Dimensions: a. Length:** 404 m (NE-SW) **b. Width:** 148 m (NW-SE) (or 9.81 acres)
Method of Measurement: ☐ Paced ☐ Taped ☐ Visual estimate ☒ Other Trimble GPS mapping; submeter accuracy.
Method of Determination (Check any that apply): ☒ Artifacts ☒ Features ☒ Soil ☐ Vegetation ☐ Topography ☒ Cut bank ☐ Animal burrow ☐ Excavation ☐ Property boundary ☒ Other (explain): The site boundaries are defined by the visible extent of surficial artifacts and features, and features and middens exposed in erosional cut-banks; however, only that portion of the site area within and/or immediately adjacent to the current project area was inspected. Additional cultural loci recorded previously as componeuts of CA-SBR-60 and associated with this large site complex are scattered throughout the prominent ridgeline located to the west of Æ-DKW-1.
Reliability of Determination: ☐ High ☒ Medium ☐ Low Explain: Additional components of this site lacking surface expression may be present in subsurface contexts.
Limitations (Check any that apply): ☐ Restricted access ☒ Paved/built over ☒ Disturbances ☐ Site limits incompletely defined ☐ Other (Explain): See discussion above. Additionally, construction of the Lewis Center for Educational Research, located to the immediate east from the site area, may have disturbed, destroyed, or capped portions of the site area.

A2. **Depth:** ☐ None ☒ Unknown Method of Determination: Surface examination only; however, some depth of cultural deposits is indicated by the buried midden-altered sediments exposed along the bladed/graded dirt roads in Locus 1, and the presence of discrete cultural features (i.e., Features 1 and 5) exposed in subsurface contexts in the cut-banks of washes and gullies at Locus 1 and Locus 4.

*A3. **Human Remains:** ☒ Present ☐ Absent ☐ Possible ☐ Unknown (Explain): What appears to be the scattered remains of a Native American cremation feature was identified at Locus 2 (see Feature 3 description in A4).

*A4. **Features** (Number, briefly describe, indicate size, list associated cultural constituents, and show location of each feature on sketch map): Five discrete features (i.e. Features 1–5) and 14 bedrock outcrops with milling features (i.e., OCs 1–14) were identified and recorded within the site area (see descriptions below).

Feature Descriptions

Feature 1: Located along the eastern (or southern) cut-bauk of Desert Knolls Wash along the western edge of Locus 1 at UTM coordinates 474277 mE / 3821370 mN, Feature 1 consists of discrete lense of ashy, charcoal-laden sediments that appears to represent the remains of an intact hearth that is exposed 40-50 cm below ground surface within the cut-bank of Desert Knolls Wash. Sediments slumped into the wash immediately below the feature are also dark, charcoal-laden, with numerous pieces of fire-altered rock. The exact dimensions of the intact portion of the feature exposed in the cut-bank could not be determined without further disturbing the feature.

Feature 2: Located within the northern portion of Locus 1 at UTM coordinates 474331 mE / 3821430 mN, Feature 2 appears to be an eroded hearth consisting of approximately 20 fire-affected granitic cobbles exposed on the ground surface, and scattered over an area measuring approximately 5 x 4 m. Some of the fire-affected cobbles are partially buried, suggesting that more intact portions of the hearth may still be present in subsurface context.

Feature 3: Located within Locus 2 at UTM coordinates 474056 mE / 3821291 mN, Feature 3 consists of a scatter of highly fragmented, highly calcined large mammal bone spread over an area measuring approximately 8.0 x 5.5 m (NE-SW x NW-SE) that appears to represent the remains of a prehistoric Native American cremation burial. Due to the highly fragmented nature of the remains, no truly diagnostic elements were observed ou the ground surface within the visible boundaries of the feature. However, it is of interest to note that the only piece of prehistoric ceramics (a fragment of Colorado Redware) observed within the overall site area is (was) present within the boundaries of the bone scatter. It should also be noted that all the visible remains (as well as the ceramic sherd) were examined, documented, and collected by David Van Norman, Supervising Deputy Coroner of the San Bernardino County Sheriff's Department on 19 December, 2007 (Coroner's Case No. 700709406 VN). Mr. Van Norman agreed that the remains were not of forensic interest, and likely represented a prehistoric cremation, but that the bone fragments were too small to make any definitive conclusions. Mr. Van Norman transported the remains to the Coroner's office where the remains were examined by the Coroner's forensic anthropologist Dr. Alexis Gray. Dr. Gray could not conclusively rule that the remains were human

due to their highly fragmented nature, but did agree that the calcined fragments were old, not of forensic value, and likely of Native American origin. The Coroner's office subsequently informed Mr. David Singleton of the Native American Heritage Commission (NAHC) of the discovery for determination of Most Likely Native American Descendent (MLD).

Feature 4: Located within Locus 4 at UTM coordinates 474272 mE / 3821508 mN, Feature 4 appears to represent an eroded hearth located near the upper end of an erosional channel incised along the northern edge of Locus 4. Approximately 10 moderately-to-extremely fire-altered granitic cobbles scattered by erosional processes are situated within a 3 m diameter area within the erosional channel. No cultural materials were observed within the immediate vicinity of the feature.

Feature 5: Also located within Locus 4 at UTM coordinates 474276 mE / 3821494 mN, Feature 5 appears to be portions of an intact hearth exposed within the northern cut-bank of the same erosional channel incised along the northern edge of Locus 4 where Feature 4 has been exposed and scattered. Feature 5 consists of a discrete concentration of nine fire-altered cobbles measuring approximately 45 cm horizontally by 6–12 cm in thickness; the feature is exposed within the cut-bank of the erosional channel approximately one meter below the surrounding ground surface. Additional pieces of fire-altered rock are present below the feature within the base of the channel and along the edge of Desert Knolls Wash (located about 3 m to the south of the feature), suggesting that portions of the feature may have been removed/scattered during channel incision. No cultural materials were observed within the immediate vicinity of the feature.

Outcrop Descriptions (Note: Most milling features are moderately-to-extensively ground/polished, and moderately-to-extensively weathered/exfoliated. Additionally, many of the outcrops and milling features are covered with a coating or "rind" of hardened cement dust from a nearby cement factory, making identification of the milling features somewhat difficult in many cases. See A7 for further discussion).

OC 1: Located within Locus 2 at UTM coordinates 474012 mE / 3821284 mN, OC 1 measures approximately 1.3 x 1.0 x 0.14 m (L x W x H), and contains one well polished milling slick measuring 44 x 33 cm that is partially truncated along its northern edge by exfoliation. Both the outcrop and milling feature are covered by a "rind" of hardened cement dust.

OC 2: Also located within Locus 2 at UTM coordinates 474039 mE / 3821297 mN, OC 2 measures approximately 1.6 x 1.1 x 0.75 m (L x W x H), and contains one moderately polished milling slick measuring 55 x 38 cm. One additional milling slick may be present, but similar to OC 1, OC 2 is covered by a "rind" of hardened cement dust, making confirmation of the second feature difficult.

OC 3: Located within Locus 2 at UTM coordinates 474078 mE / 3821291 mN, OC 3 measures approximately 2.5 x 1.6 x 0.9 m (L x W x H), and contains three minimally-to-moderately polished milling slicks ranging from 20 x 10 cm to 40 x 37 cm. Two of the milling slicks are minimally weathered/exfoliated, while the third slick is extensively weathered/exfoliated. Similar to the other outcrops at Locus 2, OC 3 is covered by a "rind" of hardened cement dust.

OC 4: Measuring approximately 1.3 x 1.12 x 0.4 m (L x W x H) and located within Locus 3 at UTM coordinates 474152 mE / 3821316 mN, OC 4 contains two incipient mortars ranging from 6.5 to 9.5 cm in diameter, and 1.8 to 2.6 cm in depth. Both the outcrop and mortars are extensively eroded.

OC 5: Located within Locus 3 at UTM coordinates 474159 mE / 3821332 mN, OC 5 measures approximately 1.17 x 0.75 x 0.9 m (L x W x H), and contains one minimally-to-moderately polished milling slick measuring 20 x 18 cm. Both the outcrop and milling feature are extensively exfoliated, and covered by a "rind" of hardened cement dust.

OC 6: Measuring approximately 1.22 x 1.08 x 0.92 m (L x W x H) and located within Locus 3 at UTM coordinates 474158 mE / 3821348 mN, OC 6 contains one minimally-to-moderately polished milling slick measuring 30 x 18 cm. Both the outcrop and milling feature are extensively exfoliated.

OC 7: Also located within Locus 3 at UTM coordinates 474173 mE / 3821399 mN, OC 7 measures approximately 3.1 x 2.0 x 0.62 m (L x W x H), and contains four milling slicks ranging from 14 cm in diameter to 60 x 45 cm. The slicks range from minimally-to-extensively polished, and minimally-to-highly weathered/exfoliated.

OC 8: Measuring approximately 1.65 x 0.9 x 0.83 m (L x W x H) and also located within Locus 3 at UTM coordinates 474172 mE / 3821350 mN, OC 8 contains the possible remnants of one extensively exfoliated milling slick.

OC 9: Located within a non-locus site area at UTM coordinates 474215 mE / 3821378 mN, OC 9 measures 1.6 x 1.25 x 0.55 m (L x W x H), and contains two milling slicks and one incipient mortar. The slicks range from 15 x 10 cm to 45 x 30 cm, are moderately-to-extensively polished, and moderately-to-extensively weathered/exfoliated. The incipient mortar measures 7 cm in diameter and 1 cm in depth, is extensively ground, and moderately weathered.

OC 10: Also located within a non-locus site area at UTM coordinates 474216 mE / 3821377 mN, OC 10 contains two milling slicks ranging from 23 x 19 cm to 30 cm in diameter; one slick is minimally-to-moderately polished, while the second is moderately-to-extensively polished. Both are extensively weathered. One unifacial mano fragment is located approximately 1.3 m south of the outcrop. Dimensions of the outcrop were not documented.

OC 11: Measuring 3.15 x 1.15 x 1.40 m (L x W x H) and located in a non-locus site area at UTM coordinates 474207 mE / 3821380 mN, OC 11 contains two minimally polished milling slicks ranging from 23 x 16 cm to 38 x 18 cm; one is minimally weathered, while the second one is extensively weathered.

OC 12: Located within a non-locus site area at UTM coordinates 474272 mE / 3821414 mN, OC 12 measures 2.85 x 2.1 x 1.6 m (L x W x H), and contains two moderately-to-extensively polished, minimally weathered milling slicks ranging from 40 x 26 cm to 62 x 30 cm.

OC 13: Located within Locus 4 at UTM coordinates 474273 mE / 3821491 mN, OC 13 measures approximately 3.25 x 3.0 x 1.2 m (L x W x H), and contains two milling slicks and one incipient mortar. The slicks range from 45 x 30 cm to 63 x 51 cm; both are extensively polished, and moderately weathered/exfoliated. The mortar measures 9 cm in diameter and 1.5 cm in depth, is moderately ground, and minimally weathered.

OC 14: Also located within Locus 4 at UTM coordinates 474258 mE / 3821498 mN, OC 14 measures approximately 5.9 x 4.5 x 0.5 m (L x W x H), and contains four milling slicks ranging 9 cm in diameter to 29 x 22 cm. Two of the slicks are minimally polished, while the two remaining are extensively polished. Only one slick is extensively weathered; the three remaining are minimally weathered.

*A5. **Cultural Constituents** (Describe and quantify artifacts, ecofacts, cultural residues, etc., not associated with feature): See discussion in P3a.

*A6. **Were Specimens Collected?** ☐ No ☒ Yes (If yes, attach Artifact Record or catalog and identify where specimens are curated.): See Feature 3 discussion in A4.

*A7. **Site Condition:** ☒ Good ☒ Fair ☐ Poor (Describe disturbances): Overall, site integrity appears to range from retained to moderately impaired. The primary disturbances at Locus 1 are attributed to the blading and grading of dirt roads and other mechanical disturbance, construction of the Lewis Center for Educational Research, sewer line and power line construction, and the continuing widening and incision of Desert Knolls Wash. However, between the roads and other disturbance at Locus 1, intact cultural deposits are present in both surficial and subsurface contexts. The primary disturbances at Loci 2-4 include the erosion/deflation of sediments, and weathering/exfoliation of the bedrock outcrops and milling features. Additionally, gully incision is impacting subsurface cultural features at Locus 4. It is also suspected that the entire site area has been subjected to years of unlawful surface collection by local "relic hunters." It should also be noted that many of the bedrock outcrops and milling features within and surrounding the site area are covered with a "rind" of cement dust from a nearby factory that has been hardened by rain over the years. The milling features are still evident to the eye and by touch, and this thin coating of cement may actually be helping to prevent the further weathering and exfoliation of these features. However, this cement coating may be obscuring additional bedrock milling features in the area.

*A8. **Nearest Water** (Type, distance, and direction): The site is situated on the river terrace along the eastern edge of the "Upper Narrows" area of the Mojave River, at the confluence of the Mojave River and Desert Knolls Wash.

*A9. **Elevation:** 2,740–2,770 ft amsl.

A10. **Environmental Setting** (Describe vegetation, fauna, soils, geology, landform, slope, aspect, exposure, etc., as appropriate): Æ-DKW-1 is situated just above the floodplain on the first river terrace along the eastern edge of the "Upper Narrows" area of the Mojave River, at the confluence of the Mojave River and Desert Knolls Wash, and extends west onto and along the eastern base of the steep, prominent, northeast-to-southwest trending rocky ridgeline bordering Desert Knolls Wash to the north and west. Geology consists of recent Quaternary sandy alluvium (on the river terrace) and colluvium (along the base of the steep ridgeline) with common outcrops of granite and limestone. Gravels of quartzite, quartz, limestone, granite, and schist are common within the site sediments. Additionally, the alluvial sediments at Locus 1 consist of a thin (10-20 cm) veneer of non-midden-altered sediments capping a layer of organic-rich, charcoal-laden midden-altered sediments of unknown depth. Midden-altered sediments may also be present at Locus 2. Slope ranges from 1-2° with generally a southwestern aspect (towards the Mojave River) in the eastern site area (i.e. Locus 1), to 10-30° with generally a southeastern aspect within the western site areas (i.e., Loci 2-4) along the eastern base of the prominent ridgeline. Vegetation consists of desert scrub communities (on site), with Cottonwood-willow riparian communities present to the immediate south along the course of the Mojave River.

A11. **Historical Information** (Note sources and provide full citations in Field A15 below): None.

*A12. **Age:** ☒ Prehistoric ☐ Pre-Colonial (1500–1769) ☐ Spanish/Mexican (1769–1848) ☐ Early American (1848–1880) ☐ Turn of century (1880–1914) ☐ Early 20th century (1914–1945) ☐ Post WWII (1945+) ☐ Undetermined Factual or estimated dates of occupation (explain):

A13. **Interpretations** (Discuss scientific, interpretive, ethnic, and other values of site, if known): Æ-DKW-1 appears to represent an extensive prehistoric residential location as evidenced by buried middens, varied artifact and ecofact assemblages, copious amounts of fire-altered rock, as well as several hearth features and one Native American cremation burial. These indicators of residential use are evident at Locus 1 (which appears to be the primary focus of residential activity), and possibly at Loci 2 and 4. Bedrock milling features (both milling slicks and mortar cups) indicative of floral resources procurement/processing activities occur at Loci 2–4. With the exception of the single piece of prehistoric ceramics found associated with Feature 3 (cremation) at Locus 2, no temporally diagnostic artifacts were identified. The lack of Late Prehistoric indicators (i.e. arrow points, ceramics) within most site areas suggests that the site may pre-date the Late Prehistoric period. Alternatively, temporally diagnostic artifacts may have been removed over years of unlawful surface collection by local "relic hunters." Chronological placement of the site deposits could be determined by radiometric analyses of charcoal from subsurface cultural features (i.e., hearths).

A14. **Remarks:** Despite the disturbance noted in many site areas, Æ-DKW-1 appears to contain considerable data potential relating to chronology, settlement-subsistence strategies, lithic technology, site formation processes, inter- and intra-site variability, and mortuary practices. Subsurface testing would be required to determine the horizontal and vertical extent, content, and integrity of the buried midden deposits at Locus 1, and the presence of intact cultural deposits at Loci 2–4. The site is situated within the Area of Potential Effect (APE) of the Desert Knolls Wash Improvements project (particularly Locus 1, which is within the APE of a large retention basin), and avoidance is recommended. If avoidauce is not a feasible option, Phase II testing is recommended.

A15. **References** (Give full citations including the names and addresses of persons interviewed, if possible): None.

A16. **Photographs** (List subjects, direction of view, and accession numbers or attach a Photograph Record): See attached Photograph Record.

*A17. **Form Prepared by:** D. McDougall **Date:** 12/19/07
Affiliation and Address: Applied EarthWorks, Inc., 3292 E. Florida Ave., Suite A, Hemet, CA 92544.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PHOTOGRAPH RECORD

Primary # 36-013879
Trinomial SBR-12706

 *Resource Name or # (Assigned by recorder) Æ-DKW-1

Temporary Number/Resource Name: Æ-DKW-1
Project Name: Desert Knolls Wash **Photographer:** C. Bouscaren
Image Type: ☐ (bw) 35mm B&W film ☒ (cp) 35mm Color Print film ☐ (cs) 35mm Color Slide film
☐ (df) Digital-Floppy disk ☐ (dm) Digital-Memory flash card
Camera Type and Model: Nikon Coolpix L14 digital
Film Type and Speed: SD disk **Roll Number:** DKW-1-dm
Year: 2007

Mo.	Day	Time	Frame/ File Name	Subject/Description	Facing
12	19	0746	DSCN0002	Locus 1: site datum, utility pole 81312S.	WSW
12	19	0752	DSCN0003	Locus 1: Feature 1, overview.	S
12	19	0753	DSCN0004	Locus 1: Feature 1, detail.	S
12	19		DSCN0005	Locus 1: Feature 1, detail.	S
12	19	0800	DSCN0006	Locus 1: Feature 2, FAR scatter (hearth?).	E
12	19	0801	DSCN0007	Locus 1: Feature 2, overview.	S
12	19	0812	DSCN0008 thru 11	Locus 1: chert drill, close-up.	Down
12	19	0819	DSCN0012, 13	Locus 1: 3 x 3 m x 10 cm surface scrape, overview.	N, E
12	19	0834	DSCN0014, 15	Locus 1: site overview from northwest corner of ball field.	WSW, SW
12	19	0836	DSCN0016, 17	Locus 1: burned chert biface, close-up.	Down
12	19	0856	DSCN0018	Locus 2: Feature 3, cremated bone scatter.	S
12	19	0857	DSCN0019	Locus 2: Feature 3, overview.	W
12	19	0859	DSCN0020 thru 22	Locus 2: overview from OC 1.	NW, NE, E
12	19	0902	DSCN0023	Locus 2: OC 1.	N
12	19	0903	DSCN0024	Locus 2: overview from OC 1.	SW
12	19	0907	DSCN0025	Locus 2: OC 2, detail.	N
12	19	0908	DSCN0026	Locus 2: OC 2, overview.	S
12	19	0910	DSCN0027	Locus 2: OC 3, detail.	ESE
12	19	0911	DSCN0028	Locus 2: OC 3, overview.	E
12	19	0919	DSCN0029	Locus 2: overview from east end of Locus 2.	W
12	19	0921	DSCN0030	Locus 3: overview from west end of Locus 3.	NE
12	19	0927	DSCN0031	Locus 3: OC 4, overview.	NW

Mo.	Day	Time	Frame/ File Name	Subject/Description	Facing
12	19	0928	DSCN0032	Locus 3: OC 4, detail.	SE
12	19	0931	DSCN0033	Locus 3: OC 5, detail.	NW
12	19	0932	DSCN0034	Locus 3: OC 5, overview.	S
12	19	0933	DSCN0035	Locus 3: OC 6, detail.	SW
12	19	0934	DSCN0036	Locus 3: OC 6, overview.	SE
12	19	0939	DSCN0037	Locus 3: OC 7, detail.	SE
12	19	0940	DSCN0038	Locus 3: OC 7, overview.	SW
12	19	0943	DSCN0039	Locus 3: OC 8, detail.	W
12	19	0944	DSCN0040	Locus 3: OC 8, overview.	NE
12	19	0953	DSCN0041	Locus 3: overview from northeast end of Locus 3.	WSW
12	19	0955	DSCN0042	Non-locus: OC 9, detail.	SW
12	19	0956	DSCN0043	Non-locus: OC 9, overview.	W
12	19	0958	DSCN0044	Non-locus: OC 10, detail.	SSE
12	19	0959	DSCN0045	Non-locus: OC 10, overview.	NW
12	19	1004	DSCN0046	Non-locus: OC 12, detail.	E
12	19	1005	DSCN0047	Non-locus: OC 12, overview.	N
12	19	1014	DSCN0048	Non-locus: OC 11, detail.	E
12	19	1015	DSCN0049	Non-locus: OC 11, overview.	N
12	19	1021	DSCN0050	Locus 4: overview.	NE
12	19	1026	DSCN0051	Locus 4: OC 13, detail.	N
12	19	1027	DSCN0052	Locus 4: OC 13, detail.	NE
12	19	1028	DSCN0053	Locus 4: OC 13, overview.	E
12	19	1032	DSCN0054	Locus 4: OC 14, detail.	SW
12	19	1034	DSCN0055	Locus 4: OC 14, overview.	S
12	19	1036	DSCN0056, 57	Locus 4: Feature 4, overview.	N, E
12	19	1039	DSCN0058, 59	Locus 4: Feature 5, detail.	N, NW
12	19	1042	DSCN0060	Locus 4: overview from northeast end.	SSW

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPH RECORD

Primary # 36-013879
Trinomial SBR-12706

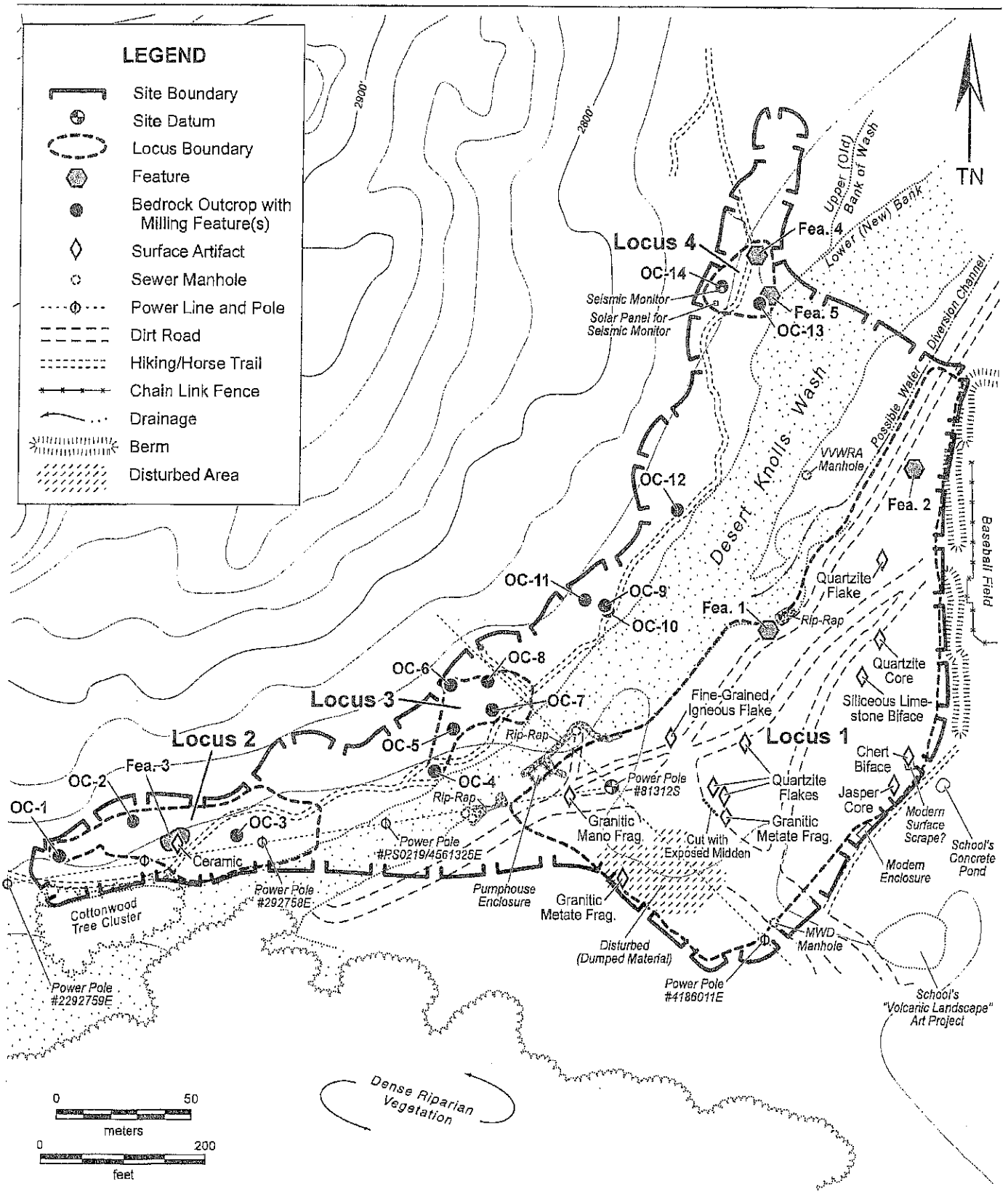
 *Resource Name or # (Assigned by recorder)

Mo.	Day	Time	Frame/ File Name	Subject/Description	Facing
12	19	1043	DSCN0061	Site overview from northeast end of Locus 4.	NW
12	19		DSCN0062	Site overview from northeast end of Locus 4.	N
12	19	1044	DSCN0063	Site overview from northeast end of Locus 4.	ENE
12	19		DSCN0064	Site overview from northeast end of Locus 4.	SE
12	19		DSCN0065	Site overview from northeast end of Locus 4.	S
12	19	1140	DSCN0066	Site overview from upslope.	N
12	19	1141	DSCN0067 thru 70	Site overview from upslope.	E, S, SW, W
12	19	1145	DSCN0071	Detail of pictograph.	NW
12	19	1151	DSCN0072	Site overview: overlooking Loci 1 and 3 (datum iu center).	SE
12	19		DSCN0073, 74	Site overview: overlooking Locus 3.	S, SW
12	19	1156	DSCN0075	Site overview: overlooking Locus 2.	SE
12	19		DSCN0076, 77	Site overview: overlooking Locus 2 (figures at Feature 3).	S, SW
12	19	1204	DSCN0078	Site overview from datum toward Locus 4.	N
12	19		DSCN0079	Site overview from datum toward Locus 1.	E
12	19		DSCN0080	Site overview from datum toward Mojave River.	S
12	19		DSCN0081	Site overview toward Loci 2 and 3.	W
12	19	1300	DSCN0082 thru 84	Chert drill/tool detail.	Down

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
SKETCH MAP

Primary # 36-013879
HRI #
Trinomial SBR-12706

*Resource Name or # (Assigned by recorder): Æ-DKW-1
*Drawn by: K. McLean
Scale: 1" = 50 m
*Date of map: December 2007



*Required Information

State of Calfornia —The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # 36-013879
HRI#
Trinomial SBR-12706

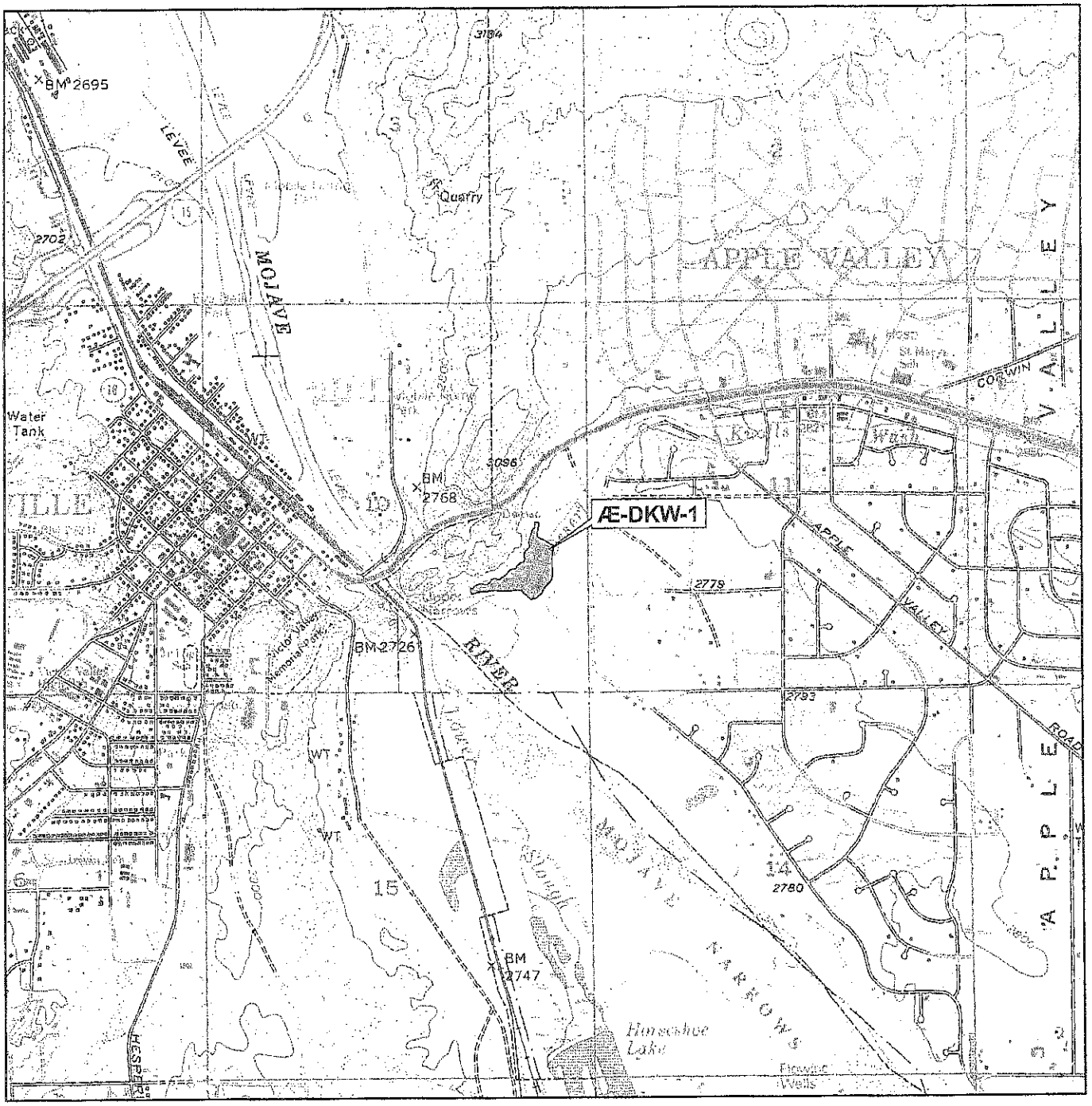
Page 12 of 12

*Resource Name or #: Æ-DKW-1

*Scale: 1:24,000

*Map Name: Victorville (1956-PR1993), CA

*Date: 2007



SCALE 1:24,000

1 0.5 0 1 Miles

1,000 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 Feet

1 0.5 0 1 Kilometers

TRUE NORTH

*Required information

State of California--The Resources Agency	Primary # N/A
DEPARTMENT OF PARKS AND RECREATION	HRI #
CONTINUATION SHEET	Trinomial N/A

Page 1 **of** 1 **Resource name or #** (Assigned by recorder) PSBR-16

Recorded by Daniel Ballester **Date** March 23, 2015 ____ Continuation √ Update
Form Prepared by Bai "Tom" Tang **Date** June 25, 2015
Affiliation: CRM TECH, Colton **Project No:** CRM TECH 2888A

On March 23, 2015, an intensive-level field survey was conducted along a segment of the Desert Knolls Wash, covering the northwestern end of Site PSBR-16 as reported in 1941. No archaeological features or artifacts were found in that area during the survey.

Report Citation:

Bai "Tom" Tang, Deirdre Encarnación, Daniel Ballester, Terri Jacquemain, and Nina Gallardo
2015 Identification and Evaluation of Historic Properties: Desert Knolls Wash Phase III Project, Town of Apple Valley, San Bernardino County, California.

FSBC-16

SAN BERNARDINO COUNTY MUSEUM

SBr-2527

Archaeological Site Survey Record

Site C (SBCM) 68-B 2. Map Apple Valley South 7.5. County S.B.

Twp. 5N Range 3W center ¼ of NW ¼ of Section 31

5. Location Along bluff above Mohave River, 2 mi. S. of Victorville. Apple Valley Road 6. On contour elevation 2750'

7. Previous designation for site Verde Ranch Bluff

8. Owner 9. Address

10. Previous owners, dates

11. Present tenant

12. Attitude toward excavation

13. Description of site

14. Area 4 mi. long (narrow strip)

15. Depth 16. Height

17. Vegetation Joshua tree and brush.

18. Nearest water Mohave River 1 mi. W.

19. Soil of site coarse, sandy 20. Surrounding soil type

21. Previous excavation yes - ASA

Cultivation — 23. Erosion —

24. Buildings, roads, etc. construction

Possibility of destruction

26. House pits or rings

27. Other features clusters of stones, (fire pits?)

28. Burials none

29. Artifacts metates, manos, mortars, pestles,

30. Remarks 1 lg. point reported to have been found

31. Published reference

32. Other museum reference 33. Sketch map no

34. Date 1941 35. Recorded by O. A. Smith 36. Photos no

37. Informant

See also SBr 180

DEPARTMENT OF ANTHROPOLOGY

Archaeological Survey Site Record

Site VERDE RANCH BLUFF Topog. Sheet ~~BARSTOW~~ No. 68

Township 5 N. Range 4 W. Section 16 & 17

Owner Miles 2 from Victorville

General surroundings High bluff above the Mojave. Joshua trees and brush. Coarse sandy soil.

Type of Site Area of Site Narrow strip--4 mi. long

Elevation 2750' Nearest Water 1/8 mile

Houses Burials

Remarks: Clusters of stones, metates, manos, mortars, pestles. The clusters of stones probably represent fire pits as they in some cases appear to have been in a fire. Some of the local ranchers believe them to be burials, but as some of them have been dug up or plowed up and no bones have been exposed this appears rather doubtful. No burned bones have been found either which might identify them as cremations. One very large point was reported to have been found. No pottery has been found at this site, but pottery is found in camp sites both above and below along the river. This is probably a very much older site, and may have been occupied when there was more of a lake formed by the water backing up from the upper narrows.

Date January 1941 Reported by Gerald A. Smith

Apple Valley School
Apple Valley Community Center
Cotners Corner
Lone Wolf Colony
VALLEY
CENTRAL
ROAD
Circle M Ranch
TUSSING RANCH RD
SANTA FE
BOWEN RANCH
BM 3422
BM 3330
BM 3098
BM 2886
MOJAVE
RIVER
DEEP CREEK
TOPEKA AND
ATCHISON RD
ROCK SPRINGS
Antelope Valley
Sand Pit
VABM 4883
Juniper
VABM 4836
Sand Prospect
Ord Mountains
Juniper Flats
BM 2920
Reservoir
(HESPERIA 1:24 000)

Verde Ranch Site
(1941)

Mojave River Bluff

M.D.B.&M. Hesperia
C.-S.B.
Tsp. 5N R. 3W
Concrete Mill, orter. 3

1 mi. W. of
Victorville

Along bluff above Mojave
River, 2 mi. S. of
Victorville. Apple Valley
Road. 2750'

6. Visit
2. Court house

8. owner
9. address
10. previous owners
11. present tenant
12. altitude
13. description of site.
15. depth
16. height
20. surrounding soil type
25. possibility of destruction
26. house pits or rings
~~27. [illegible]~~

31.
32. References

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary # (Pending)
HRI #
Trinomial
NRHP Status Code 6Z
Other Listings
Review Code Reviewer Date

*Resource Name or # (Assigned by recorder) CRM TECH 2888-1H

P1. Other Identifier: 15753 Potomac Road

***P2. Location:** ____ **Not for Publication** √ **Unrestricted** ***a. County** San Bernardino
and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Victorville, Calif. **Date** 1993
T5N; **R**4W; SW **1/4 of** NW **1/4 of Sec** 11 ; S.B. **B.M.**
Elevation: Approximately 2,784 feet above mean sea level

c. Address 15753 Potomac Road **City** Apple Valley **Zip** 92370

d. UTM: (Give more than one for large and/or linear resources) **Zone** 11 ; 474641 **mE/** 3821786 **mN**
UTM Derivation: ____ USGS Quad ____ GPS √ Google Earth

e. Other Locational Data: (e.g., parcel #, directions to resource, etc., as appropriate) APN 0473-153-01; on the northeastern corner of Potomac Road and Quantico Road

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries) This single-story fourplex of wood-frame construction is rectangular in plan and faces the street corner to the southwest. The low-pitched, side-facing gable-on-hip roof is sheathed with composition shingles and features wide eaves with fascia boards. The exterior walls are clad with stucco except at the gable peaks, which are filled with vertical wood siding. The stucco surface is painted bluish gray in contrast to the white trim. Shallow, recessed entry porches shelter the side-facing entrances to the units. Fenestration consists predominantly of large aluminum-framed sliding window.

Situated to the southwest of the fourplex, connected by a privacy wall built of decorative concrete blocks, is a four-car garage of similarly

(Continued on p.4)

***P3b. Resource Attributes:** (List attributes and codes) HP3: Multiple family property

***P4. Resources Present:** √ Building ____ Structure ____ Object ____ Site ____ District ____ Element of District ____ Other (isolates, etc.)

P5a. Photograph or Drawing (Photograph required for buildings, structures, and objects.)

P5b. Description of Photo: Photo taken on March 23, 2015; view to the northeast

***P6. Date Constructed/Age of Sources:** √ Historic ____ Prehistoric ____ Both
Ca. 1966 (see Items B6 and B12 for details)

***P7. Owner and Address:** Unknown

***P8. Recorded by** (Name, affiliation, and address): Daniel Ballester and Terri Jacquemain, CRM TECH, 1016 East Cooley Drive, Suite A/B, Colton, CA 92324

***P9. Date Recorded:** March 23, 2015

***P10 Survey Type:** Phase I survey for Section 106 compliance

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") Bai "Tom" Tang, Deirdre Encarnación, Daniel Ballester, Terri Jacquemain, and Nina Gallardo (2015): Identification and Evaluation of Historic Properties: Desert Knolls Wash Phase III Project, Town of Apple Valley, San Bernardino County, California

***Attachments:** ____ None √ Location Map √ Continuation Sheet √ Building, Structure, and Object Record
____ Archaeological Record ____ District Record ____ Linear Resource Record ____ Milling Station Record
____ Rock Art Record ____ Artifact Record ____ Photograph Record ____ Other (List):

State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

Primary # _____
HRI # _____

BUILDING, STRUCTURE, AND OBJECT RECORD

***NRHP Status Code** 6Z

***Resource Name or #** (Assigned by recorder) CRM TECH 2888-1H

B1. Historic Name: _____ B2. Common Name: _____

B3. Original Use: Fourplex B4. Present Use: Fourplex

***B5. Architectural Style:** Ranch

***B6. Construction History:** (Construction date, alterations, and date of alterations) Real property tax assessment records indicate that this residence was constructed around 1966, which is supported by aerial photographs showing both buildings extant by 1968. No documentation for any alterations was found in the Town of Apple Valley building permit records. The property was owned by the Purser and Clemons families in the 1970s, but the lack of available records precludes confirmation on whether they were the original owners when the fourplex was built.

***B7. Moved?** √ No ___ Yes ___ Unknown **Date:** ____ **Original Location:** _____

***B8. Related Features:** See Item P3a.

B9a. Architect: Unknown b. Builder: Unknown

***B10. Significance: Theme** Mid-20th century rural residential development

Area Apple Valley **Period of Significance** 1960s

Property Type Fourplex **Applicable Criteria** N/A

(Discuss importance in terms of historical or architectural context as defined by theme, period, and geographic scope. Also address integrity.) Historical research has yielded no evidence that this fourplex is closely associated with any persons or events of recognized significance in national, state, or local history. The building is a common example of the then-popular Ranch-style residential architecture, but does not stand out as an important example of that style or of its type, period, region, or method of construction. It does not appear eligible for listing the National Register of Historic Places or the California Register of Historical Resources.

B11. Additional Resource Attributes: (List attributes and codes) _____

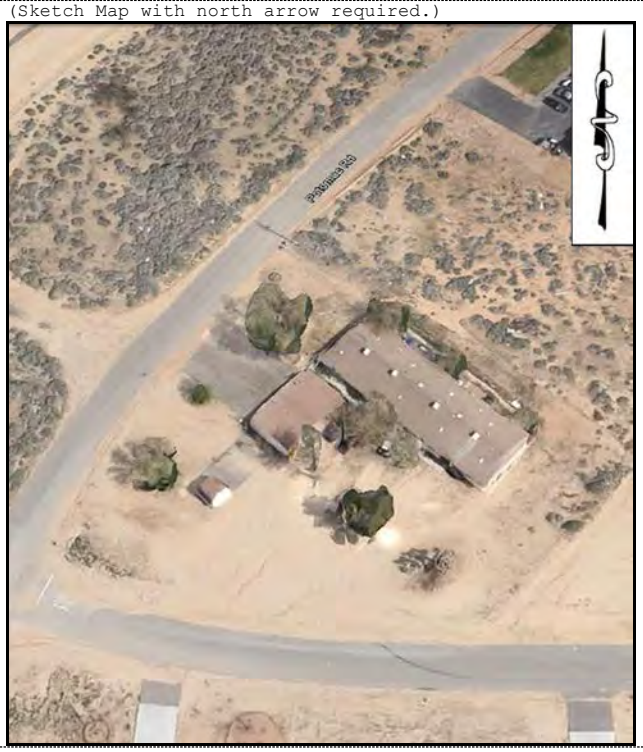
***B12. References:** San Bernardino County Assessor's real property tax assessment database; Town of Apple Valley building permit records; aerial photographs taken in 1968 (http://www.historicaerials.com).

B13. Remarks: _____

***B14. Evaluator:** Terri Jacquemain

***Date of Evaluation:** May 2015

(Sketch Map with north arrow required.)



(This space reserved for official comments.)

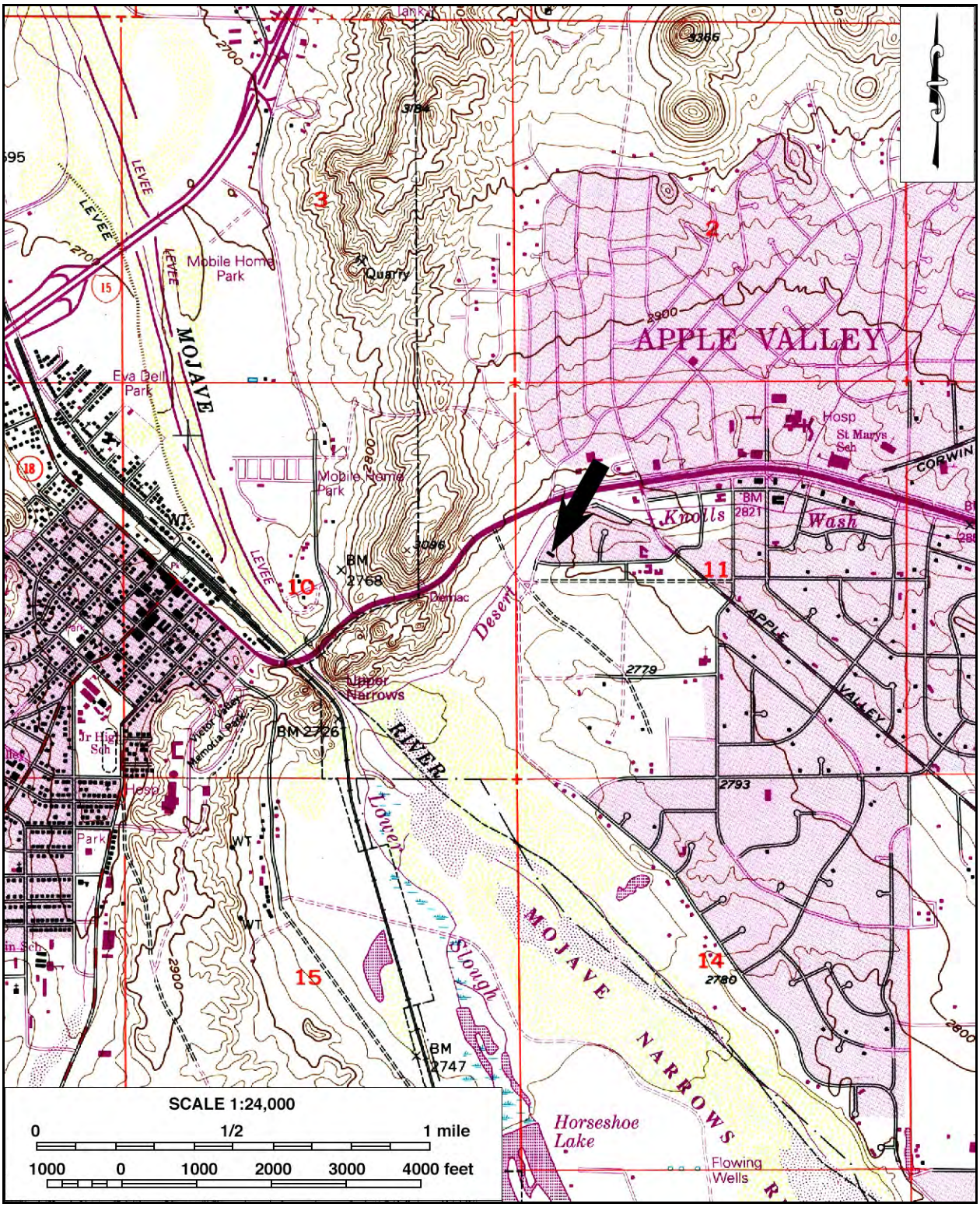
State of California--The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary # _____
HRI # _____
Trinomial _____

Page 3 of 4 *Resource Name or # (Assigned by recorder) CRM TECH 2888-1H

*Map Name: Victorville, Calif. *Scale: 1:24,000 *Date of Map: 1993



DPR 523J (1/95) *Required information

Recorded by: Terri Jacquemain and Daniel Ballester
***Date:** May 2105 √ Continuation ___ Update

***P3a. Description** (continued): materials and appearance. Facing Potomac Road to the northwest, the garage is surmounted by a front-gable roof of such a low pitch that it is almost flat. The southwestern wall of the garage is covered with vertical wood siding, while the rest of the exterior is clad in stucco. Four sectional garage doors occupy essentially the entire northwestern façade. The two buildings are accompanied by a small shed of apparently modern origin and very little landscaping except for a few mature trees. The surrounding area contains a mixture of well-spaced residential and commercial buildings of modern origin.

APPENDIX F

Paleontological Resources Report

PALEONTOLOGICAL RESOURCES ASSESSMENT REPORT

DESERT KNOLLS WASH PHASE III PROJECT

Town of Apple Valley
San Bernardino County, California

Prepared for:

Environmental Management Division
San Bernardino County Department of Public Works
825 East Third Street
San Bernardino, CA 92415

Prepared by:

Harry M. Quinn, Paleontologist/Geologist
Deirdre Encarnación, Report Writer
CRM TECH
1016 E. Cooley Drive, Suite A/B
Colton, CA 92324

Michael Hogan, Principal Investigator
Bai "Tom" Tang, Principal Investigator

June 25, 2015
Revised July 30, 2015

County Contract No. 14-947
CRM TECH Contract No. 2888P
USGS Victorville, Calif., 7.5' (1:24,000) Quadrangle
Sections 10 and 11, T5N R4W, San Bernardino Baseline and Meridian

MANAGEMENT SUMMARY

Between January and June 2015, at the request of the San Bernardino County Department of Public Works (SBCDPW), CRM TECH performed a paleontological resource assessment on the Area of Potential Effects (APE) for the proposed Desert Knolls Wash Phase III Project in the Town of Apple Valley, San Bernardino County, California. The project entails a series of flood control improvements to the Desert Knolls Wash, including the installation of trapezoidal channel stabilizers, side slope grading and protection, the construction of culverts and a stilling basin, along with associated relocation of sewer lines. The objective of the project is to stabilize the existing wash and provide flood protection to the neighboring properties.

The APE is delineated to encompass the maximum extent of ground disturbance required by project design, including construction staging areas, and consists of approximately 14 acres of vacant land along the course of the Desert Knolls Wash near its confluence with the Mojave River, within Sections 10 and 11 of T5N R4W, San Bernardino Baseline and Meridian. The SBCDPW, as the project proponent and the lead agency, initiated the study in compliance with the California Environmental Quality Act (CEQA). In anticipation of future federal review of the project, this study was performed in compliance with both CEQA and the National Environmental Policy Act (NEPA).

The purpose of the study is to provide the SBCDPW and other responsible public agencies with the necessary information and analysis to determine whether the proposed project would potentially disrupt or adversely affect any significant paleontological resources, as required by NEPA and CEQA regulations, and to design a paleontological mitigation program, if necessary. In order to identify any paleontological resource localities that may exist in or around the APE and to assess the possibility for such resources to be encountered in future excavation and construction activities, CRM TECH initiated records searches at the appropriate paleontological information repositories, conducted a literature search, and carried out a systematic field survey of the APE in accordance with the guidelines of the Society of Vertebrate Paleontology.

The results of these research procedures indicate that the proposed project's potential to impact significant nonrenewable paleontological resources ranges from low in the igneous rocks and Holocene-age surface sediments to high in the Pleistocene-age sediments at depth below the Recent alluvium. Based on these findings, CRM TECH recommends that a paleontological mitigation program (see Conclusions and Recommendations) be implemented for the project in order to reduce or eliminate adverse impacts to any significant, nonrenewable paleontological resources that may be unearthed. As the primary component of the mitigation program, earth-moving operations impacting the older Pleistocene-age sediments should be monitored for paleontological resources. The igneous rocks in the southwestern portion of the APE and the surface alluvium do not require monitoring.

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INTRODUCTION

Between January and June 2015, at the request of the San Bernardino County Department of Public Works (SBCDPW), CRM TECH performed a paleontological resource assessment on the Area of Potential Effects (APE) for the proposed Desert Knolls Wash Phase III Project in the Town of Apple Valley, San Bernardino County, California (Fig. 1). The project entails a series of flood control improvements to the Desert Knolls Wash, including the installation of trapezoidal channel stabilizers, side slope grading and protection, the construction of culverts and a stilling basin, along with associated relocation of sewer lines. The objective of the project is to stabilize the existing wash and provide flood protection to the neighboring properties.

The APE is delineated to encompass the maximum extent of ground disturbance required by project design, including construction staging areas, and consists of approximately 14 acres of vacant land along the course of the Desert Knolls Wash near its confluence with the Mojave River, within Sections 10 and 11 of T5N R4W, San Bernardino Baseline and Meridian (Fig. 2). The SBCDPW, as the project proponent and the lead agency, initiated the study in compliance with the California Environmental Quality Act (CEQA). In anticipation of future federal review of the project, this study was performed in compliance with both CEQA and the National Environmental Policy Act (NEPA).

The purpose of the study is to provide the SBCDPW and other responsible public agencies with the necessary information and analysis to determine whether the proposed project would potentially disrupt or adversely affect any significant paleontological resources, as required by NEPA and CEQA regulations, and to design a paleontological mitigation program, if necessary. In order to identify any paleontological resource localities that may exist in or around the APE and to assess the possibility for such resources to be encountered in future excavation and construction activities, CRM TECH initiated records searches at the appropriate paleontological information repositories, conducted a literature search, and carried out a systematic field survey of the APE in accordance with the guidelines of the Society of Vertebrate Paleontology. The following report is

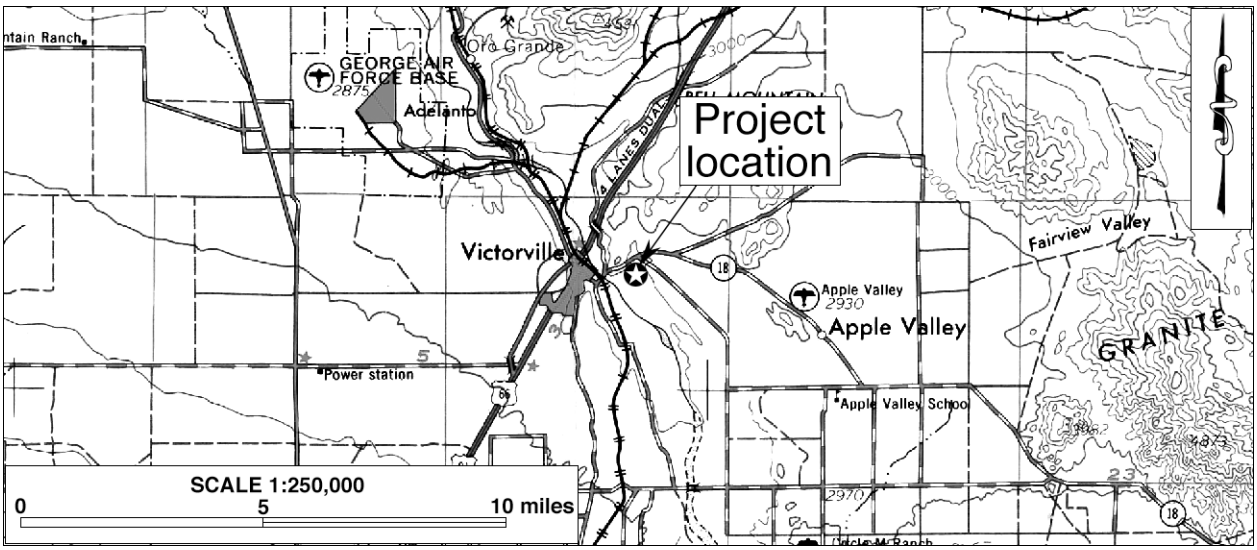

Figure 1. Project vicinity. (Based on USGS San Bernardino, Calif., 1:250,000 quadrangle, 1969 edition)

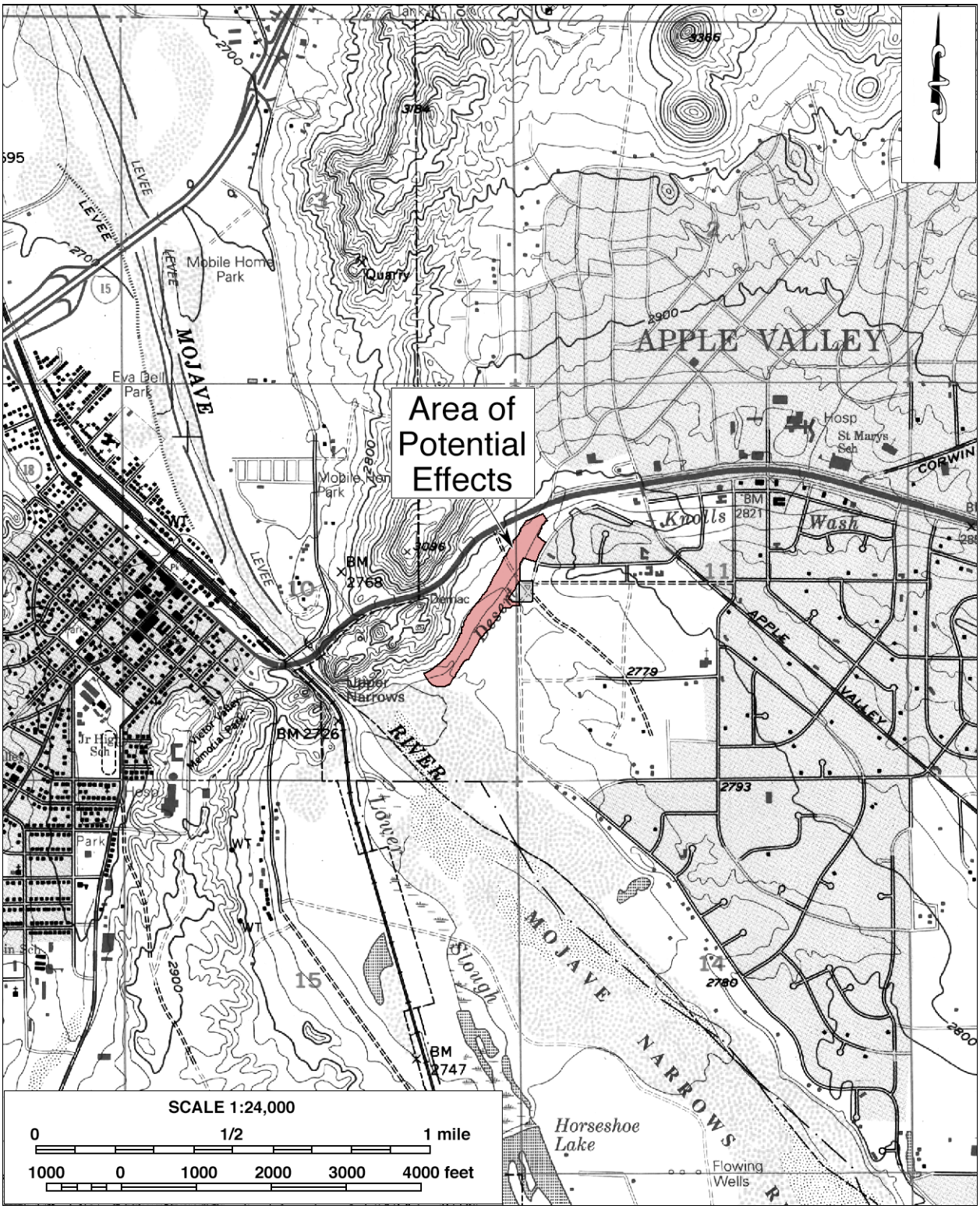

Figure 2. Area of Potential Effects. (Based on USGS Victorville, Calif., 7.5' quadrangle, 1993 edition)

a complete account of the methods and results of the various avenues of research, and the final conclusion of the study.

INTERPRETING PALEONTOLOGIC SENSITIVITY

DEFINITION OF PALEONTOLOGICAL RESOURCES

Paleontological resources represent the remains of prehistoric life, exclusive of any human remains, and include the localities where fossils were collected as well as the sedimentary rock formations in which they were found. The defining character of fossils or fossil deposits is their geologic age, which is typically—but not always—regarded as older than 10,000 years, the generally accepted temporal boundary marking the end of the last late Pleistocene glaciation and the beginning of the current Holocene epoch.

Despite the tremendous volume of sedimentary rock deposits preserved worldwide, and the enormous number of organisms that have lived through time, preservation of plant or animal remains as fossils is an extremely rare occurrence. Because of their rarity, and because of the scientific information they can provide, fossils are highly significant records of ancient life. They can provide information about the interrelationships of living organisms, their ancestry, their development and change through time, and their former distribution. Progressive morphologic changes observed in fossil lineages may provide important information regarding how new species arise and adapt to changing environmental circumstances; that is, they may provide important information regarding the evolutionary process itself. Fossils can also serve as important guides to the ages of the rocks and sediments in which they are contained, which has been useful in determining the temporal relationships of rock deposits from one area to another, as well as the timing of geologic events. Time scales established by fossils provide chronologic frameworks for geologic studies of many kinds.

Common fossil remains include marine shells; the bones and teeth of fish, reptiles, and mammals; leaf imprint assemblages; and petrified wood. Fossil traces, another type of paleontological resources, include internal and external molds (impressions) and casts created by these organisms. Fossil resources generally occur only in areas of sedimentary rock (e.g., sandstone, siltstone, mudstone, claystone, or shale). Because of the infrequency of fossil preservation, fossils, particularly vertebrate fossils, are considered to be nonrenewable paleontological resources. Occasionally fossils may be exposed at the surface through the process of natural erosion or as a result of human disturbances, but they generally lay buried beneath the surficial soils. Thus, the absence of surface fossils does not preclude the possibility of fossils being present within subsurface deposits, while the presence of fossils at the surface is often a good indication that more remains may be found in the subsurface.

SIGNIFICANCE CRITERIA

According to guidelines proposed by Eric Scott and Kathleen Springer (2003) of the San Bernardino County Museum, paleontological resources can be considered to be of significant scientific interest if they meet one or more of the following criteria:

1. The fossils provide information on the evolutionary relationships and developmental trends exhibited among organisms, living or extinct;
2. The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;
3. The fossils provide data regarding the development of biological communities or the interactions between paleobotanical and paleozoological biotas;
4. The fossils demonstrate unusual or spectacular circumstances in the history of life; and/or
5. The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.

DETERMINATIONS OF PALEONTOLOGICAL SENSITIVITY

Sedimentary units that are paleontologically sensitive are those with a high potential for containing significant paleontological resources; that is, rock units within which significant vertebrate or invertebrate fossils have been determined to be present or are likely to be present by previous studies. These units include, but should not be limited to, sedimentary formations that contain significant paleontological resources anywhere within their geographical extent, as well as sedimentary rock units temporally or lithologically suitable for the preservation of fossils. Determinations of paleontological sensitivity must therefore consider not only the potential for yielding abundant vertebrate fossils but also the potential for production of a few significant fossils, large or small, vertebrate or invertebrate, which may provide new and significant taxonomic, phyologenetic, and/or stratigraphic data. Areas that may contain datable organic remains older than the Holocene and areas that may contain unique new fossil deposits, traces, and/or trackways must also be considered paleontologically sensitive.

Invertebrate Fossils

It is common for invertebrate fossils recovered from marine sediments to be widely distributed throughout a given outcrop or formation. Their presence, then, can be predicted in those locations, where they are often both abundant and well preserved. Invertebrate fossils, particularly marine invertebrate fossils, can number in the millions, and can be exposed in miles of outcrop. Some invertebrate fossils are so prolific that they constitute major rock material, such as chalk, diatomaceous earth, and radiolarian chert.

Given these general observations, sedimentary rock exposures that contain abundant, well preserved, and extensively distributed invertebrate remains can be less paleontologically sensitive than limited exposures containing only a few fossils, especially vertebrate fossils, from a more restricted depositional zone. Thus, fossils from limited exposures and/or restricted depositional environments might be more significant since the resources might not be found elsewhere.

Vertebrate Fossils

Vertebrate fossils, or fossils representing animals with backbones, including mammals, birds, reptiles, amphibians, and fish, are much more rare than invertebrate fossils and are often more poorly preserved. Paleontological resource localities yielding vertebrate fossils are usually found in

terrestrial (non-marine) deposits. These continental deposits are generally less depositionally uniform than the marine deposits, and fossilization is therefore even more infrequent. Even in life today vertebrates are often far less abundant than invertebrate species. As an example, one can consider the differences between a herd of bison with hundreds to even thousands of animals and a marine bed that might contain thousands to millions of bivalves. Also, the marine environment offers a better environment for fossilization and preservation than do the open areas of a terrestrial environment. For these reasons, vertebrate fossil resources are generally considered to have very high paleontologic significance, and geologic formations that have the potential to yield vertebrate fossil remains are considered to have the highest paleontological sensitivity.

Sensitivity of Geologic Formations

As a result of the natural geologic, physical, and chemical processes, the fossil record is unpredictable, and the preservation of organic remains is rare, requiring a particular sequence of events involving physical, biological, and chemical factors. Skeletal tissue with a high percentage of mineral matter is the most readily preserved within the fossil record; soft tissues not intimately connected with the skeletal parts, in contrast, are the least likely to be preserved (Raup and Stanley 1978). For this reason, the fossil record contains a biased selection not only of the types of organisms preserved but also of the parts of the organisms. As a consequence, paleontologists are unable to know with certainty the quantity of fossils or the quality of their preservation within any given geologic unit.

Sedimentary units that are paleontologically sensitive are those geologic units (mappable rock formations) with a high potential to contain significant nonrenewable paleontological resources. More specifically, these are geologic units within which vertebrate fossils or significant invertebrate fossils have been determined by previous studies to be present or are likely to be present. These units include, but are not limited to, sedimentary formations that contain significant paleontological resources anywhere within their geographical extent as well as sedimentary rock units temporally or lithologically amenable to the preservation of fossils.

A geologic formation is defined as a stratigraphic unit identified by its lithic characteristics (e.g., grain size, texture, color, and mineral content) and stratigraphic position. There is a direct relationship between fossils and the geologic formations in which they are found, and with sufficient knowledge of the geology and stratigraphy of a particular area, it is possible for paleontologists to reasonably determine its potential to contain significant nonrenewable vertebrate, invertebrate, marine, or plant fossil remains.

In other words, the paleontological sensitivity for a geologic formation is, in part, determined by the potential for that formation to produce significant nonrenewable fossils. This determination is based on what fossil resources the particular geologic formation has produced in the past at other nearby locations. However, determinations of paleontologic sensitivity must consider not only the potential for yielding vertebrate fossils but also the potential for a few significant fossils that may provide new and significant taxonomic, phylogenetic, and/or stratigraphic data.

The Society of Vertebrate Paleontology (1995:22-27) issued a set of standard guidelines to help paleontologists assess and mitigate any adverse effects/impacts to nonrenewable paleontological

resources. The society defined three potential categories of paleontological sensitivity for geologic units that might be impacted by a proposed project. These categories are described below, along with the criteria used to establish their sensitivity.

- **High sensitivity**: Geologic units assigned to this category are considered to have a high potential for significant nonrenewable vertebrate, invertebrate, marine, or plant fossils. Sedimentary rock units in this category contain a relatively high density of recorded fossil localities, have produced fossil remains in the vicinity, and are very likely to yield additional fossil remains.
- **Low sensitivity**: Geologic units are assigned to this category when they have produced no or few recorded fossil localities and are not likely to yield any significant nonrenewable fossil remains.
- **Undetermined sensitivity**: Geologic units are assigned to this category when there is limited exposure of the rock units in the area and/or the rock units have been poorly studied.

FEDERAL STATUTORY AND REGULATORY GUIDELINES

Federal legislative protection for paleontological resources stems from the Antiquities Act of 1906 (Public Law [P.L.] 59-209; 16 United States Code [U.S.C.] 431 et seq.; 34 Stat. 225), which calls for protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federal land. The Antiquities Act of 1906 forbids disturbance of any object of antiquity on federal land without a permit issued by the responsible managing agency. This act also establishes criminal sanctions for unauthorized appropriation or destruction of antiquities. The Federal Highways Act of 1958 clarified that the Antiquities Act applied to paleontological resources and authorized the use of funds appropriated under the Federal-Aid Highways Act of 1956 to be used for paleontological salvage in compliance with the Antiquities Act and any applicable state laws.

In addition to the Antiquities Act, other federal statutes protect fossils. The Historic Sites Act of 1935 (P.L. 74-292; 49 Stat. 666, 16 U.S.C. 461 et seq.) declares it national policy to preserve objects of historical significance for public use and gives the Secretary of the Interior broad powers to execute this policy, including criminal sanctions. The National Environmental Policy Act of 1969 (P.L. 91-190, 31 Stat. 852, 42 U.S.C. 4321-4327) requires that important natural aspects of the national heritage be considered in assessing the environmental consequences of any proposed project. The Federal Land Policy Management Act of 1976 (P.L. 94-579; 90 Stat. 2743, U.S.C. 1701-1782) requires that public lands be managed in a manner that protects the quality of their scientific values. Paleontological resources are also afforded federal protection under 40 Code of Federal Regulations 1508.27 as a subset of scientific resources.

ENVIRONMENTAL SETTING

GEOLOGIC CONTEXT

The APE is located within the Western Mojave Desert area of the Mojave Desert Geomorphic/ Geologic Province in southeastern California (Dibblee 1967; Jenkins 1980:40-41; Harms 1996; Coombs et al. 1997:7). The landscape in this high desert region is marked by scattered, isolated mountains and numerous broad and shallow basins, some with dry lakebeds at the low points

(Dibblee 1967; Coombs et al. 1997:7). Many of these basins have pediment surfaces developed along the margins, separating the mountains from the actual basins (Coombs et al. 1997:9). These pediment surfaces are commonly covered by desert pavement that protects the area from sheetwash and channeling (*ibid*.). These mountains and intermountain valleys generally have a northwest-southeast trend that is mainly controlled by faulting (*ibid*.:7; Harms 1996).

CURRENT NATURAL SETTING

The Town of Apple Valley is located in the Victor Valley, on the southern rim of the Mojave Desert and to the north of the San Bernardino-San Gabriel mountain ranges. Dictated by this geographic setting, the climate and environment of the area is typical of southern California high desert region, so named because of its higher elevation than the Colorado Desert to the southeast. The climate is marked by extremes in temperature and aridity, with summer highs reaching well over 110ºF and winter lows dropping below freezing. Average annual precipitation is less than five inches.

The APE lies on the southwestern edge of the Town of Apple Valley, near the confluence of the Mojave River and the Desert Knolls Wash, as mentioned above. Most of the APE lies within or immediately adjacent to the existing channel of the Desert Knolls Wash, with two staging areas located further to the east along Potomac Road. The entire APE remains largely undeveloped, and the surrounding land uses include both residential and, to a lesser extent, commercial development, other parcels of vacant land, and the campus of the Lewis Center for Educational Research. The ground surface in the APE has evidently been disturbed by construction activities associated with past channel improvement along the wash (Fig. 3).

Elevations in the APE range approximately from 2,745 feet to 2,785 feet above mean sea level, with an incline towards the north. Soils in the APE consist of light grayish brown, medium-grained sands

Figure 4. Overview of the current natural setting of the APE, view to the southwest along the Desert Knoll Wash. (Photograph taken on March 23, 2015)

with decomposing granite in most areas, with coarse fluvial sand within the wash. Vegetation observed in the APE consists of creosote bushes, cottonwood trees, foxtails, datura, and other small desert shrubs and grasses (Fig. 3).

RESEARCH METHODS AND PROCEDURES

RECORD SEARCH

The records search service was provided by the San Bernardino County Museum in Redlands and the Natural History Museum of Los Angeles County in Los Angeles. These institutions maintain files of regional paleontological localities as well as supporting maps and documents. The records search results were used to identify geological exposures and formations, as well as known paleontological localities in the vicinity.

LITERATURE REVIEW

In conjunction with the records searches, a literature search was conducted using materials in the CRM TECH library, including unpublished reports produced during surveys of other properties in the Victor Valley, and materials in the personal library of project geologist/paleontologist Harry M. Quinn, M.S., California Professional Geologist #3477 (see App. 1 for further qualifications).

FIELD SURVEY

On March 23, 2015, CRM TECH paleontological surveyors Daniel Ballester and Nina Gallardo (see App. 1 for further qualifications) carried out the field survey of the APE under the direction of Harry M. Quinn. The survey was completed on foot at an intensive level by walking a series of parallel transects oriented northeast-southwest and spaced 10 meters (approx. 33 feet) apart. In this way, the ground surface in the entire APE was systematically examined to determine soil types, to verify the geological formations, and to search for indications of any paleontological remains visible at the surface. Ground visibility during the survey varied from poor (0%) to excellent (90%), depending on the density of vegetation growth.

RESULTS AND FINDINGS

RECORDS SEARCH

The records search conducted by the Natural History Museum of Los Angeles County and the San Bernardino County Museum revealed no known paleontological localities within the APE, but the museums reported that paleontological localities had been found nearby from sediment lithologies similar to those in existence at depth within the APE (McLeod 2015; Scott 2015; see App. 2). The records search results indicate that most of the surface deposits in the APE have a low potential for containing significant fossil remains (*ibid.*).

In the southwestern portion of the APE, the plutonic igneous bedrock will not contain fossil remains (McLeod 2015). Similarly, the Holocene alluvium located on the surface of the APE is unlikely to

contain fossils (Scott 2015). However, these Holocene surface deposits can be a veneer that rests directly on top of Pleistocene-age sedimentary rocks (*ibid*.). Scott (*ibid*.) considers the Pleistocene Mojave River sediments to have a very high paleontological sensitivity. McLeod (2015) also notes that older Quarternary deposits potentially located below the Quarternary gravels and sand in the low-lying portions of the APE may contain significant vertebrate fossil remains. These older sediments located at depth below the surface materials are assigned a high paleontological sensitivity by both museums (Scott 2015; McLeod 2015).

LITERATURE REVIEW

Surface soils within the APE have been mapped by Bowen (1954) as **Qoal**, or older alluvium of Pleistocene age. Dibblee (1967:Plate 1) maps the sediments in the APE as **Qoa** with some **Qa**. The **Qoa** is defined as older alluvium of Pleistocene age, and the **Qa** as alluvium of Holocene age (*ibid.*). Bortugno and Spittler (1986) map the soils in the APE as **Qo** and **Qa**. They describe the **Qo** as older alluvium of Pleistocene age and the **Qa** as alluvium of Holocene age (*ibid.*). Dibblee (2008) maps the surface geology at this location as **Qoa** and **Qa**. He describes the **Qoa** as alluvial gravel, sand, and silt, light gray to buff, moderately to poorly bedded or unbedded, in part indurated by white caliche and to be of Pleistocene age, and the **Qa** as sacrificial sediments of Holocene age (*ibid.*).

Tugel and Woodruff (1986:Sheet 25) map the surface soils within the APE as mainly Type 138 with some Type 132 and Type 158, and with minors amount of Type 113 and Type 114 in the northeastern portion. Type 138 belongs to the Kimberlina loamy fine sand, cool, 2-5 percent slopes, which forms on alluvial fans (*ibid*.:47). Type 132 belongs to the Helendale loamy sand, 2-5 percent slopes, which forms on terraces and alluvial fans (*ibid*.:41). Type 158 belongs to the rock outcrop-lithic Torriorthents complex, 15-50 percent slopes, which forms on mountains and hills (*ibid*.:59). Type 113 and Type 114 soils belong to the Cajon Series and form on alluvial fans (*ibid*.:27-28).

The various surface soils found along the Mojave River in the surrounding area were studied by Connell et al. (1994: 95-105) and assigned to Holocene or Pleistocene origin. Based on their studies, Type 138 soils are assigned a Holocene age, Type 132 a Pleistocene age, and Types 113 and 114 a Holocene age, while Type 158 is not listed (*ibid*.:88). These findings, however, do not appear consistent with most of the other mappings reviewed for this study.

FIELD SURVEY

The field survey produced negative results for paleontological resources. The entire APE was closely inspected for any evidence of fossil remains, but none was found. As mentioned above, surface soils observed in the APE were generally light grayish-brown, medium-grained sands and decomposing granite, with coarse fluvial sands near the channel of the Desert Knolls Wash.

DISCUSSION

The results of the records search and the literature research indicate that the surface soils within the APE are almost entirely Holocene-age (Recent) alluvium, with some igneous rocks present in the southwestern portion. The Holocene alluvium is known to have developed on top of, and in some cases from, older, potentially fossil-bearing sedimentary rocks, including the ancestral Pleistocene

Mojave River sediments, and to have a variable thickness. The igneous rocks naturally have a low potential for significant fossil remains, as does the Recent alluvium, but the older Pleistocene sediments have been assigned a high potential for fossil yield.

CONCLUSION AND RECOMMENDATIONS

Based on the research results presented above, the proposed project's potential to impact significant nonrenewable paleontological resources is determined to range from low in the igneous rocks and Holocene-age surface sediments to high in the Pleistocene-age sediments at depth below the Recent alluvium. In light of this conclusion, CRM TECH recommends that a paleontological mitigation program be implemented for the project in order to reduce or eliminate adverse impacts to any significant, nonrenewable paleontological resources that may be unearthed. As the primary component of the mitigation program, earth-moving operations impacting the older Pleistocene-age sediments should be monitored for paleontological resources. The igneous rocks in the southwestern portion of the APE and the surface alluvium do not require monitoring.

The monitor(s) should be prepared to quickly salvage fossil remains, if they are unearthed, to avoid construction delays, but must have the authority to temporarily halt or divert construction equipment to allow for removal of abundant or large specimens. Representative samples of unearthed fossil remains should be collected as a part of the monitoring procedures, and the recovered specimens should be identified and curated at a repository with permanent retrievable storage that would allow for additional research in the future. A curation agreement should be established with an appropriate repository prior to the commencement of any ground disturbance.

Soil samples should also be collected periodically and processed to recover small invertebrate and vertebrate fossils. A report of findings, including, when appropriate, an itemized inventory of recovered specimens and a discussion of their significance, should be prepared upon completion of these procedures. The report and the inventory, once approved by the appropriate public agency or agencies, will signify completion of the mitigation program.

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1986 *Soil Survey of San Bernardino County, California: Mojave River Area*. U.S. Department of Agriculture, Soil Conservation Service, Washington, D.C.

APPENDIX 1

PERSONNEL QUALIFICATIONS

PROJECT GEOLOGIST/PALEONTOLOGIST
Harry M. Quinn, M.S., California Professional Geologist #3477

Education

1968 M.S., Geology, University of Southern California, Los Angeles, California.
1964 B.S, Geology, Long Beach State College, Long Beach.
1962 A.A., Los Angeles Harbor College, Wilmington, California.

- Graduate work oriented toward invertebrate paleontology; M.S. thesis completed as a stratigraphic paleontology project on the Precambrian and Lower Cambrian rocks of Eastern California.

Professional Experience

2000- Project Paleontologist, CRM TECH, Riverside/Colton, California.
1998- Project Archaeologist, CRM TECH, Riverside/Colton, California.
1992-1998 Independent Geological/Geoarchaeological/Environmental Consultant, Pinyon Pines, California.
1994-1996 Environmental Geologist, E.C E.S., Inc, Redlands, California.
1988-1992 Project Geologist/Director of Environmental Services, STE, San Bernardino, California.
1987-1988 Senior Geologist, Jirsa Environmental Services, Norco, California.
1986 Consulting Petroleum Geologist, LOCO Exploration, Inc. Aurora, Colorado.
1978-1986 Senior Exploration Geologist, Tenneco Oil E & P, Englewood, Colorado.
1965-1978 Exploration and Development Geologist, Texaco, Inc., Los Angeles, California.

Previous Work Experience in Paleontology

1969-1973 Attended Texaco company-wide seminars designed to acquaint all paleontological laboratories with the capability of one another and the procedures of mutual assistance in solving correlation and paleo-environmental reconstruction problems.
1967-1968 Attended Texaco seminars on Carboniferous coral zonation techniques and Carboniferous smaller foraminifera zonation techniques for Alaska and Nevada.
1966-1972, 1974, 1975 Conducted stratigraphic section measuring and field paleontological identification in Alaska for stratigraphic controls. Pursued more detailed fossil identification in the paleontological laboratory to establish closer stratigraphic controls, mainly with Paleozoic and Mesozoic rocks and some Tertiary rocks, including both megafossil and microfossil identification, as well as fossil plant identification.
1965 Conducted stratigraphic section measuring and field paleontological identification in Nevada for stratigraphic controls. Pursued more detailed fossil identification in the paleontological laboratory to establish closer stratigraphic controls, mainly with Paleozoic rocks and some Mesozoic and Tertiary rocks. The Tertiary work included identification of ostracods from the Humboldt and Sheep Pass Formations and vertebrate and plant remains from Miocene alluvial sediments.

Memberships

Society of Vertebrate Paleontology; American Association of Petroleum Geologists; Association of Environmental Professionals; Rocky Mountain Association of Geologists, Pacific Section; Society of Economic Paleontologists and Mineralogists; San Bernardino County Museum.

Publications in Geology

Five publications in Geology concerning an oil field study, a ground water and earthquake study, a report on the geology of the Santa Rosa Mountain area, and papers on vertebrate and invertebrate Holocene Lake Cahuilla faunas.

PALEONTOLOGICAL SURVEYOR/FIELD DIRECTOR/GIS SPECALIST
Daniel Ballester, M.S.

Education

2013 M.S., Geographic Information System (GIS), University of Redlands, California.
1998 B.A., Anthropology, California State University, San Bernardino.
1997 Archaeological Field School, University of Las Vegas and University of California, Riverside.
1994 University of Puerto Rico, Rio Piedras, Puerto Rico.

2007 Certificate in Geographic Information Systems (GIS), California State University, San Bernardino.

- Cross-trained in paleontological field procedures and identifications by CRM TECH Geologist/Paleontologist Harry M. Quinn.

Professional Experience

2002- Field Director/GIS Specialist, CRM TECH, Riverside/Colton, California.
- Report writing, site record preparation, and supervisory responsibilities over all aspects of fieldwork and field crew. Manages and updates CRM TECH's GIS database, produces maps and extracts data using GIS. Manages field crews for field surveys, testing and data recovery projects. Oversees work to ensure correct procedures.

2011-2012 GIS Specialist for Caltrans District 8 Project, Garcia and Associates, San Anselmo, California.
- Created archaeological site maps based off points taken with hand-held GPS unit; responsible for accurately inputting data.

2009-2010 Field Crew Chief, Garcia and Associates, San Anselmo, California.
2009-2010 Field Crew, ECorp, Redlands.
1999-2002 Project Archaeologist, CRM TECH, Riverside, California.
- Conducted field surveys, site recording, site testing and data recovery; familiar with all types of prehistoric and historic period sites.

1998-1999 Field Crew, K.E.A. Environmental, San Diego, California.
- Two and a half months of excavations on Topomai village site, Marine Corp Air Station, Camp Pendleton.

1998 Field Crew, A.S.M. Affiliates, Encinitas, California.
- Two weeks of excavations on a site on Red Beach, Camp Pendleton, and two weeks of survey in Camp Pendleton, Otay Mesa, and Encinitas.

1998 Field Crew, Archaeological Research Unit, University of California, Riverside.
- Two weeks of survey in Anza Borrego Desert State Park and Eureka Valley, Death Valley National Park.

REPORT WRITER
Deirdre Encarnación, M.A.

Education

2003	M.A., Anthropology, San Diego State University, California.
2000	B.A., Anthropology, minor in Biology, with honors; San Diego State University, California.
1993	A.A., Communications, Nassau Community College, Garden City, N.Y.
2001	Archaeological Field School, San Diego State University.
2000	Archaeological Field School, San Diego State University.

Professional Experience

2004-	Project Archaeologist/Report Writer, CRM TECH, Riverside/Colton, California.
2001-2003	Part-time Lecturer, San Diego State University, California.
2001	Research Assistant for Dr. Lynn Gamble, San Diego State University.
2001	Archaeological Collection Catalog, SDSU Foundation.

PALEONTOLOGICAL SURVEYOR
Nina Gallardo, B.A.

Education

2004 B.A., Anthropology/Law and Society, University of California, Riverside.

Professional Experience

2004- Project Archaeologist, CRM TECH, Riverside/Colton, California.
- Surveys, excavations, mapping, and records searches.

Honors and Awards

2000-2002 Dean's Honors List, University of California, Riverside.

APPENDIX 2

RECORDS SEARCHES RESULTS

2024 Orange Tree Lane, Redlands, California 92374 | Phone: 909.798.8608
www.SBCounty.gov

SAN BERNARDINO COUNTY

Museum

Leonard X. Hernandez
Interim Museum Director

29 January 2014

CRM Tech
attn: Nina Gallardo
1016 E. Cooley Drive, Suite "B"
Colton, CA 92324

re: **PALEONTOLOGY LITERATURE AND RECORDS REVIEW, DESERT KNOLLS WASH PHASE III FLOOD CONTROL IMPROVEMENT PROJECT, CITY OF VICTORVILLE, SAN BERNARDINO COUNTY, CALIFORNIA**

Dear Ms. Gallardo,

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) has completed a literature review and records search for the above-referenced development in the City of Victorville, San Bernardino County, California. The proposed project is located in portions of sections 10 and 11, Township 5 North, Range 4 West, San Bernardino Base and Meridian, as seen on the Victorville, California 7.5' United States Geological Survey topographic quadrangle map (1956 edition, photorevised 1981).

Previous geologic mapping of the region by Bortugno and Spittler (1986) indicates that the proposed project is situated upon surface exposures of Pleistocene older alluvium (= unit **Qo**), overlain in some portions of the study area by a thin sedimentary veneer of Holocene alluvium (= **Q**). Of these, only the Pleistocene older alluvium has potential to contain significant nonrenewable paleontologic resources.

Pleistocene sediments present at the surface and in the subsurface in the Victorville region were laid down by two separate depositional regimes: the ancestral Mojave River and the Victorville Fan (Cox and Tinsley, 1999; Sibbett, 1999; Cox and Hillhouse, 2000; Cox and others, 2003). Previous paleontologic investigations (Jefferson, 1989; Reynolds, 1989; Scott and others, 1997; Scott and Cox, 2008) have repeatedly demonstrated the high paleontologic sensitivity of the ancient Mojave River sediments in the Victorville region of the Mojave Desert. The following is a composite list of taxa recovered from Pleistocene older alluvial sediments in Victorville (Reynolds, 1989; Scott and others, 1997; Scott and Cox, 2008):

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Sorex sp.	shrew
Paramylodon harlani	extinct giant ground sloth
Lepus sp.	jack rabbit
Sylvilagus sp.	cotton tail
cf. Ammospermophilus leucurus	possible antelope ground squirrel
Spermophilus townsendi	ground squirrel
Thomomys sp.	pocket gopher
Perognathus sp.	pocket mouse
Dipodomys sp.	kangaroo rat
Neotoma sp. cf. N. lepida	possible desert wood rat
Sigmodon medius or minor	extinct cotton rat
Microtus sp.	meadow vole
Arctodus sp. cf. A. simus	extinct short-faced bear
Mammuthus meridionalis	extinct southern mammoth
Equus sp. cf. E. scotti	possible Scott's horse
cf. Titanotylopus sp.	extinct long-limbed giant camel
Hemiauchenia sp.	extinct llama
Camelops sp.	extinct camel

Most of the vertebrate fossils recovered from the Victorville and Hesperia regions of the Mojave Desert were initially presumed to derive from "distal equivalents" of the Victorville Fan (Jefferson, 1989; Reynolds, 1989). However, recent studies of sediments in the Victorville and Hesperia regions (Cox and Tinsley, 1999; Sibbett, 1999; Cox and Hillhouse, 2000; Cox and others, 2003) have determined that two distinct sedimentary lithologies are present in this region: sediments of the Victorville Fan and alluvium deposited by the Pleistocene Mojave River. Research conducted by the SBCM in and around the Victorville area has determined that Pleistocene fossils from the region appear to be derived exclusively from exposures of the Mojave River sediments, rather than from the Victorville Fan. Exposures of the Victorville Fan may therefore be less fossiliferous than previously reported, save in those areas where the nature of the sediments of the Fan suggests an environment conducive to the preservation of fossil remains.

For this review, I conducted a search of the Regional Paleontologic Locality Inventory (RPLI) at the SBCM. The results of this search indicate that no previously known paleontologic resource localities are recorded by the SBCM from within the boundaries of the proposed project property. However, locality LACM 3352 is situated near the existing interstate corridor; this locality yielded fossil remains of extinct horse (Equus sp.) from Pleistocene older alluvium. The proximity of this locality to the proposed project property demonstrates the high paleontologic sensitivity of Pleistocene alluvium in this region.

Additionally, numerous localities west and south of the project property, mapped (Cox and Tinsley, 1999; Cox and Hillhouse, 2000; Cox and others, 2003) as derived from the Mojave River, yielded fossil remains of Mammuthus meridionalis (extinct mammoth), Paramylodon harlani (giant ground sloth), Equus sp. cf. E. scotti (extinct horse), Hemiauchenia (extinct llama), Camelops hesternus

(extinct large camel), Lepus (jackrabbit), Sylvilagus (cottontail rabbit), Thomomys (pocket gopher), Dipodomys (kangaroo rat), Perognathus (pocket mouse), Vulpes (fox), Phrynosoma (desert horned "toad"), and Crotalus (rattlesnake). Here, too, the high paleontologic sensitivity of Pleistocene older alluvium in this part of Victorville is clearly demonstrated.

Recommendations

The results of the literature review and the check of the RPLI at the SBCM demonstrate that excavation into undisturbed Pleistocene sediments deposited by the ancestral Mojave River has high potential to impact paleontologic resources. Such excavation will require a qualified vertebrate paleontologist to develop a program to mitigate impacts to significant nonrenewable paleontologic resources, including curation of recovered resources (Scott and others, 2004). Such a mitigation program must be consistent with the provisions of the California Environmental Quality Act (Scott and Springer, 2003), as well as with regulations currently implemented by the County of San Bernardino.

The County of San Bernardino (Development Code §82.20.040) defines a qualified vertebrate paleontologist as meeting the following criteria:

Education: An advanced degree (Masters or higher) in geology, paleontology, biology or related disciplines (exclusive of archaeology).

Professional experience: At least five years professional experience with paleontologic (not including cultural) resources, including the collection, identification and curation of the resources.

The County of San Bernardino (Development Code §82.20.030) requires that paleontologic mitigation programs include, but not be limited to:

(a) Field survey before grading. In areas of potential but unknown sensitivity, field surveys before grading shall be required to establish the need for paleontologic monitoring.

(b) Monitoring during grading. A project that requires grading plans and is located in an area of known fossil occurrence, or that has been demonstrated to have fossils present in a field survey, shall have all grading monitored by trained paleontologic crews working under the direction of a qualified professional, so that fossils exposed during grading can be recovered and preserved. Paleontologic monitors shall be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors shall be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring is not necessary if the potentially-fossiliferous units described for the property in question are not present, or if present are determined upon exposure and examination by qualified paleontologic personnel to have low potential to contain fossil resources.

(c) Recovered specimens. Qualified paleontologic personnel shall prepare recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation and stabilization of all recovered fossils is essential in order to fully mitigate adverse impacts to the resources.

(d) Identification and curation of specimens. Qualified paleontologic personnel shall identify and curate specimens into the collections of the Division of Geological Sciences, San Bernardino County Museum, an established, accredited museum repository with permanent retrievable paleontologic storage. These procedures are also essential steps in effective paleontologic mitigation and CEQA compliance. The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not considered complete until curation into an established museum repository has been fully completed and documented.

(e) Report of findings. Qualified paleontologic personnel shall prepare a report of findings with an appended itemized of specimens. A preliminary report shall be submitted and approved before granting of building permits, and a final report shall be submitted and approved before granting of occupancy permits. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into the collections of the San Bernardino County Museum, will signify completion of the program to mitigate impacts to paleontologic resources.

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Please do not hesitate to contact us with any further questions you may have.

Sincerely,

Eric Scott, Curator of Paleontology
Division of Geological Sciences
San Bernardino County Museum

Natural History Museum
of Los Angeles County
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Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

Vertebrate Paleontology Section
Telephone: (213) 763-3325
FAX: (213) 746-7431
e-mail: smcleod@nhm.org

3 February 2015

CRM Tech
1016 East Cooley Drive, Suite B
Colton, CA 92324

Attn: Nina Gallardo

re: Paleontological resources for the proposed Desert Knolls Wash Phase III Flood Control Improvement Project, CRM Tech Contract # 2888P, in the City of Apple Valley, San Bernardino County, project area

Dear Nina:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for the proposed Desert Knolls Wash Phase III Flood Control Improvement Project, CRM Tech Contract # 2888P, in the City of Apple Valley, San Bernardino County, project area as outlined on the portion of the Victorville USGS topographic quadrangle map that you sent to me via e-mail on 19 January 2015. We do not have any vertebrate fossil localities that lie directly within the proposed project boundaries, but we do have localities nearby from the same sedimentary deposits that probably occur subsurface in the proposed project area.

In the slightly elevated terrain in the southern portion of the proposed project area the bedrock on the eastern side of the Upper Narrows consists of plutonic igneous rocks that will be devoid of fossils. Most of the proposed project area occurs within the lower lying terrain around the Desert Knolls Wash and, in the very southwestern part, the Mojave River, where the surficial deposits consist of younger Quaternary gravels and sands in the active channels and overbank areas. These younger Quaternary gravels and sands in an active drainage typically do not contain significant vertebrate fossils, at least in the uppermost layers, and we have no vertebrate fossil localities anywhere nearby from these types of deposits. Immediately to the east of the proposed project area, however, there are surface deposits of older Quaternary sediments that may underlie the younger Quaternary deposits in the proposed project area, but at unknown depth. Our closest fossil vertebrate

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localities in these older Quaternary deposits are LACM 3352-3353 and 3498, all situated in the bluffs on the west side of the Mojave River northwest to north-northwest of the proposed project area. Specimens of extinct horse, *Equus occidentalis*, and extinct bison, *Bison latifrons* were recovered from these sites.

Excavations in the plutonic igneous bedrock exposed in the southwestern portion of the proposed project area will not encounter any fossils. Grading or shallow excavations in the younger Quaternary gravels and sand exposed in the lower lying portions of the proposed project area that occur in the Desert Knolls Wash and Mojave River drainage proper are unlikely to uncover significant vertebrate fossils. Deeper excavations in those areas that extend down into older Quaternary deposits, however, may well uncover significant fossil vertebrate remains. Any substantial excavations in the sedimentary deposits in the proposed project area, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Also, sediment samples should be collected and processed to determine the small fossil potential in the proposed project area. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

Samuel A. McLeod

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: invoice

APPENDIX G

Noise Report

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/29/2016
Case Description: Desert Knolls: Clearing and Grubbing

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 20'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	20	0
Grader	No	40	85		40	0
Front End Loader	No	40		79.1	60	0
All Other Equipment > 5 HP	No	50	85		80	0
Chain Saw	No	20		83.7	100	0
Pickup Truck	No	40		75	120	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq	Night Lmax	Leq
Dozer	89.6	85.6	N/A	N/A	N/A	N/A	N/A	N/A
Grader	86.9	83	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	77.5	73.5	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	80.9	77.9	N/A	N/A	N/A	N/A	N/A	N/A
Chain Saw	77.7	70.7	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	67.4	63.4	N/A	N/A	N/A	N/A	N/A	N/A
Total	89.6	88.2	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Acoustical Center 195'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	195	0
Grader	No	40	85		195	0
Front End Loader	No	40		79.1	195	0
All Other Equipment > 5 HP	No	50	85		195	0

Chain Saw	No	20	83.7	195	0
Pickup Truck	No	40	75	195	0

			Results					
	Calculated (dBA)		Noise Limits (dBA)					
			Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Dozer	69.8	65.9	N/A	N/A	N/A	N/A	N/A	N/A
Grader	73.2	69.2	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	67.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A
All Other Equipment > 5 HP	73.2	70.2	N/A	N/A	N/A	N/A	N/A	N/A
Chain Saw	71.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A
Total	73.2	74.6	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/29/2016
Case Description: Desert Knolls: Concrete Structure

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 20'	Residential	65	60	55

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Pickup Truck	No	40		75	20	0
Concrete Mixer Truck	No	40		78.8	40	0
*Calculated Lmax is the Loudest val	No	20		81.4	60	0

			Results					
	Calculated (dBA)		Noise Limits (dBA)					
			Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Pickup Truck	83	79	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	80.7	76.8	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Pump Truck	79.8	72.8	N/A	N/A	N/A	N/A	N/A	N/A
Total	83	81.6	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night

Acoustical Center 195'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Pickup Truck	No	40		75	195	0
Concrete Mixer Truck	No	40		78.8	195	0
Concrete Pump Truck	No	20		81.4	195	0

Results

	Calculated (dBA)		Noise Limits (dBA)					
			Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Pickup Truck	68.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Mixer Truck	67.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A
Concrete Pump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Total	69.1	73.2	N/A	N/A	N/A	N/A	N/A	N/A

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/29/2016
Case Description: Desert Knolls: Excavation

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Receiver 20'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	20	0
Scraper	No	40		83.6	40	0
Dozer	No	40		81.7	60	0
Dozer	No	40		81.7	80	0
Pickup Truck	No	40		75	100	0

Results

	Calculated (dBA)		Noise Limits (dBA)					
			Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper	91.5	87.6	N/A	N/A	N/A	N/A	N/A	N/A
Scraper	85.5	81.5	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	80.1	76.1	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	77.6	73.6	N/A	N/A	N/A	N/A	N/A	N/A

Pickup Truck		69	65	N/A	N/A	N/A	N/A	N/A	N/A
	Total	91.5	88.9	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Acoustical Center 195'	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Scraper	No	40		83.6	195	0
Scraper	No	40		83.6	195	0
Dozer	No	40		81.7	195	0
Dozer	No	40		81.7	195	0
Pickup Truck	No	40		75	195	0

Results

		Calculated (dBA)		Noise Limits (dBA)					
				Day		Evening		Night	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Scraper		71.8	67.8	N/A	N/A	N/A	N/A	N/A	N/A
Scraper		71.8	67.8	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		69.8	65.9	N/A	N/A	N/A	N/A	N/A	N/A
Dozer		69.8	65.9	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck		63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A
	Total	71.8	73.1	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/29/2016
Case Description: Desert Knolls: Fill. Backfill & Recompaction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 20'	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	20	0
Dump Truck	No	40		76.5	40	0

Dump Truck	No	40	76.5	60	0
Dump Truck	No	40	76.5	80	0
Grader	No	40	85	100	0
Roller	No	20	80	120	0
Pickup Truck	No	40	75	160	0

Results

	Calculated (dBA)		Noise Limits (dBA)					
			Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	87.1	83.1	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	81	77.1	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	74.9	70.9	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A
Grader	70.4	66.5	N/A	N/A	N/A	N/A	N/A	N/A
Roller	68.8	64.9	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	66.3	62.4	N/A	N/A	N/A	N/A	N/A	N/A
Total	87.1	84.6	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Acoustical Center 195'	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Grader	No	40	85		195	0
Roller	No	20		80	195	0
Pickup Truck	No	40		75	195	0

Results

	Calculated (dBA)		Noise Limits (dBA)					
			Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	67.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Grader	73.2	69.2	N/A	N/A	N/A	N/A	N/A	N/A
Roller	68.2	61.2	N/A	N/A	N/A	N/A	N/A	N/A

Pickup Truck		63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A
	Total	73.2	72.1	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/29/2016
Case Description: Desert Knolls: Loading & Hauling

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 20'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	20	0
Front End Loader	No	40		79.1	40	0
Dump Truck	No	40		76.5	60	0
Dump Truck	No	40		76.5	80	0
Dump Truck	No	40		76.5	100	0
Dump Truck	No	40		76.5	120	0
Dump Truck	No	40		76.5	160	0
Dump Truck	No	40		76.5	180	0
Dump Truck	No	40		76.5	200	0
Dump Truck	No	40		76.5	220	0
Dozer	No	40		81.7	240	0
Pickup Truck	No	40		75	260	0
Pickup Truck	No	40		75	280	0

	Calculated (dBA)		Results Noise Limits (dBA)					
			Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	87.1	83.1	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	81	77.1	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	74.9	70.9	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	70.4	66.5	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	68.8	64.9	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	66.3	62.4	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	65.3	61.3	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.4	60.4	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	68	64.1	N/A	N/A	N/A	N/A	N/A	N/A

Pickup Truck		60.7	56.7	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck		60	56.1	N/A	N/A	N/A	N/A	N/A	N/A
	Total	87.1	84.6	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Acoustical Center 195'	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Front End Loader	No	40		79.1	195	0
Front End Loader	No	40		79.1	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dozer	No	40		81.7	195	0
Pickup Truck	No	40		75	195	0
Pickup Truck	No	40		75	195	0

Results

	Calculated (dBA)		Noise Limits (dBA)					
			Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Front End Loader	67.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	67.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dozer	69.8	65.9	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A
Total	69.8	72.8	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/29/2016
Case Description: Desert Knolls: Rock Slope Protection

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 20'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	20	0
Front End Loader	No	40		79.1	40	0
Dump Truck	No	40		76.5	60	0
Dump Truck	No	40		76.5	80	0
Dump Truck	No	40		76.5	100	0
Dump Truck	No	40		76.5	120	0
Dump Truck	No	40		76.5	160	0
Dump Truck	No	40		76.5	180	0
Dump Truck	No	40		76.5	200	0
Dump Truck	No	40		76.5	220	0
Dump Truck	No	40		76.5	240	0
Dump Truck	No	40		76.5	260	0
Pumps	No	50		80.9	280	0

Results

	Calculated (dBA)		Noise Limits (dBA)					
			Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	88.7	84.7	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	81	77.1	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	74.9	70.9	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	72.4	68.4	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	70.4	66.5	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	68.8	64.9	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	66.3	62.4	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	65.3	61.3	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.4	60.4	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	63.6	59.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	62.8	58.8	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	62.1	58.2	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	66	63	N/A	N/A	N/A	N/A	N/A	N/A
Total	88.7	85.8	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Acoustical Center 195'	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	195	0
Front End Loader	No	40		79.1	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Dump Truck	No	40		76.5	195	0
Pumps	No	50		80.9	195	0

Results

	Calculated (dBA)		Noise Limits (dBA)					
			Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator	68.9	64.9	N/A	N/A	N/A	N/A	N/A	N/A
Front End Loader	67.3	63.3	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Dump Truck	64.6	60.6	N/A	N/A	N/A	N/A	N/A	N/A
Pumps	69.1	66.1	N/A	N/A	N/A	N/A	N/A	N/A
Total	69.1	73.2	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/29/2016
Case Description: Desert Knolls: Sewer Relocation

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 20'	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	20	0
Pickup Truck	No	40		75	40	0
Pickup Truck	No	40		75	60	0

Results

	Calculated (dBA)		Noise Limits (dBA)					
			Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe	85.6	81.6	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	79.2	76.1	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A
Total	85.6	83.6	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Acoustical Center 195'	Residential	65	60	55

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Backhoe	No	40		77.6	195	0
Pickup Truck	No	40		75	195	0
Pickup Truck	No	40		75	195	0

Results

	Calculated (dBA)		Noise Limits (dBA)					
			Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Backhoe	65.7	61.8	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A
Total	65.7	65	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 9/29/2016
Case Description: Desert Knolls: Street Improvement/Miscellaneous works

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Nearest Receiver 20'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	20	0
Paver	No	50		77.2	40	0
Pickup Truck	No	40		75	60	0
Pickup Truck	No	40		75	80	0
Pickup Truck	No	40		75	100	0
Grader	No	40	85		120	0
Roller	No	20		80	140	0

Results

Equipment	Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq	Night Lmax	Leq
Compressor (air)	85.6	81.6	N/A	N/A	N/A	N/A	N/A	N/A
Paver	79.2	76.1	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	73.4	69.4	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	70.9	66.9	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	69	65	N/A	N/A	N/A	N/A	N/A	N/A
Grader	77.4	73.4	N/A	N/A	N/A	N/A	N/A	N/A
Roller	71.1	64.1	N/A	N/A	N/A	N/A	N/A	N/A
Total	85.6	83.6	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Acoustical Center 195'	Residential	65	60	55

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)

Compressor (air)	No	40		77.7	195	0
Paver	No	50		77.2	195	0
Pickup Truck	No	40		75	195	0
Pickup Truck	No	40		75	195	0
Pickup Truck	No	40		75	195	0
Grader	No	40	85		195	0
Roller	No	20		80	195	0

			Results					
	Calculated (dBA)		Noise Limits (dBA)					
			Day		Evening		Night	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)	65.8	61.9	N/A	N/A	N/A	N/A	N/A	N/A
Paver	65.4	62.4	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A
Pickup Truck	63.2	59.2	N/A	N/A	N/A	N/A	N/A	N/A
Grader	73.2	69.2	N/A	N/A	N/A	N/A	N/A	N/A
Roller	68.2	61.2	N/A	N/A	N/A	N/A	N/A	N/A
Total	73.2	71.9	N/A	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

APPENDIX H

Hydrology Report

Desert Knolls Wash

Concept Analysis and Ecological Management Plan

Prepared by

RIVERTECH INC

and

URS

October 2011 - FINAL

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1.0 DESERT KNOLLS WASH IMPROVEMENT PROJECT BACKGROUND INFORMATION

1.1 Introduction and Overview

1.1.1 Project Location and Characteristics

Watershed

Desert Knolls Wash is located in the Mojave River watershed, which encompasses approximately 4,500 square miles and is located entirely within San Bernardino County. The primary geographic and hydrologic feature of this large watershed is the Mojave River. The Mojave River is the largest drainage system in the Mojave Desert; the mountain originated watershed has an area of 217 square miles, of which 142 square miles are drained by Deep Creek or the East Fork, and 75 square miles are drained by the West Fork. The Mojave River channel, through both surface and subsurface flow, transects the watershed a linear distance of approximately 120 miles to its terminus at Silver Dry Lake near the Community of Baker.

Climate

The Mojave Desert has four distinct seasons with temperature extremes. Winter months bring temperatures dipping to below 20 °F (-7 °C) on valley floors, and below 0 °F (-18 °C) at higher elevations. In longer periods between storm systems, winter temperatures in valleys can approach 80 °F (27 °C). By early June, it is rare for Pacific storms to have a significant impact on the region's weather, and temperatures after mid-May are normally above 90 °F (32 °C) and frequently above 100 °F (38 °C). Autumns are generally pleasant and dry, with temperatures usually remaining between 70 °F (21 °C) and 90 °F (32 °C) on the valley floors.

1.1.2 Desert Knolls Improvement Project

The Desert Knolls Improvement Project (Project) consists of the San Bernardino Flood Control District's (District) proposed flood control improvements to approximately 9,100 linear feet along the Desert Knolls Wash (Wash) in the town of Apple Valley, CA, from the confluence with the Mojave River west to Tao Road upstream on the east (Figure 1-1). The Project is located in the Town of Apple Valley and adjoining areas west of the Town, and subdivided into three (3) reaches as follows:

- Reach 1: includes the Wash between the receiving waters of the Mojave River and the existing concrete channel at Apple Valley Road;
- Reach 2 includes Apple Valley Road upstream to Tuscola Road; and
- Reach 3 includes Tuscola Road upstream to Tao Road.

The purpose of the flood improvements is to provide flood protection to property adjacent to the wash and to maintain, as much as possible, the integrity of the riparian habitat; a sensitive wetland downstream; cultural and biological resources as well as maintain watershed beneficial uses and water quality standards in accordance with the Lahontan Regional Water Quality Control Board (Lahontan Board) Basin Plan.

The overall objective of this Plan is to present the dynamics of Desert Knolls Wash and its relationship to the Mojave River in sufficient detail and then to develop and evaluate various alternatives for channel stabilization.

1.1.3 Mojave River and Desert Knolls Wash Relationship

The Mojave River has been historically designated by the United States Army Corps of Engineers as a navigable water of the U.S., and is subject to their jurisdiction under the Clean Water Act. Because the Wash is a significant tributary to the Mojave River and has a significant impact to the riparian/wetland habitat downstream, it is also subject to the Clean Water Act. As a result, any construction-related dredge and fill activities in the Wash will require several State and federal permits, including a Water Quality Certification (401 Permit) from the Lahontan Board, a Lake and Streambed Alteration Agreement (1602 Permit) from the California Department of Fish and Game, and a permit for dredge and fill activities (Section 404 Permit) from the U.S. Army Corps of Engineers.

1.1.4 Permitting Issues

The San Bernardino County Board of Supervisors reviewed the Project in 2006 and approved the District's recommended design at that time. The District subsequently applied for a 401 Permit from the Lahontan Board consistent with the Clean Water Act and the application was denied on the grounds that insufficient environmental and hydrogeologic analysis were submitted to demonstrate the chosen preferred design alternative provided the least environmentally damaging practical alternative, in accordance with Section 404 (b) (1) of the Clean Water Act.

Figure 1-1

Desert Knolls Wash Improvement Project Area

1.2 Alternatives Reviewed May 2008

The District requested Lahontan Board reconsideration of their design through an alternative analysis submitted in 2008, and again was denied on similar grounds. The Lahontan Board concluded that an additional alternative analysis was required, with a focus on fluvial geomorphology and environmental issues. The additional alternatives reviewed at that time are identified below.

1.2.1 Preferred Alternative: Concrete-Lined Trapezoidal Channel

The District identified six possible alternative improvement plans, and selected a preferred alternative for submittal to the Lahontan Board for further review and assessment. The preferred alternative involved a trapezoidal channel with concrete lined side slopes and invert with an estimated cost of $1,980,000. The preferred alternative required a basic right-of-way (ROW) width of 89 feet, including 20 foot wide access roads at the sides of the channel.

The preferred alternative was rejected by the Lahontan Board on the grounds that insufficient environmental analyses were conducted on the project area, particularly in terms of water quality and environmental impacts from the proposed project.

1.2.2 No-Project Alternative

A no-project alternative would maintain the same flow conditions of the Desert Knolls Wash, and according to the FEMA Flood Insurance Rate Map (FIRM) dated March 18, 1996, approximately 58 acres would be inundated by a 100-year flood upstream of Apple Valley Road and downstream of Tao Road. Within this overflow area, 33 commercial, nine multi-family residential, and seven single-family properties could be impacted.

1.2.3 Unlined Earth Channel Alternative

A natural, unlined earth channel was considered but considered impractical due to the width required to achieve a non- erodible velocity. A width of about 650 feet would be required to convey an acceptable drainage standard of 3,090 cubic feet per second (cfs) with a velocity of under five feet per second, with a flow depth of one foot. The width of the flood plain shown on the FEMA Flood Insurance Rate Map for the subject reach is about 400 feet.

1.2.4 Basin Plan Alternatives

Two locations were considered for the construction of basins, based on the availability of vacant land and the proximity to Desert Knolls Wash (see Figure 1-2). The site for Basin 1 is approximately 16.5 acres and the Basin 2 site is approximately 12.5 acres. Hydraulic modeling was conducted, and identified that a basin alternative is not financially feasible. Construction of Basin 1 or 2 would only reduce flows (in cfs) downstream by about 11% and 24%, respectively, at a projected cost of $4,290,000 for Basin 1, and $4,345,000 for Basin 2 for land acquisition alone.

A natural floodplain alternative and construction of a downstream basin in Reach 1 was deemed not feasible. Previous archeological studies have determined there are significant cultural resources within or directly adjacent to the proposed project area. These significant resources could potentially result in a significant adverse impact to cultural resources, depending on the outcome of Native American consultation. Under NEPA, a statement of overriding considerations cannot be made. As a result of potentially significant cultural impacts, the Lewis Center has spent several years consulting with the San Manuel Band of Mission Indians in an effort to avoid impacts to cultural resources, and a plan has been developed whereby Native American monitors shall be present during ground disturbing activities, the majority of all previously identified archaeological sites shall be avoided, and major portions of a previously identified site shall be “capped” as a means of both preserving the site and avoiding impacts to the site. In addition, the Lewis Center is working with a San Manuel representative to develop a Cultural Center on the north side of Desert Knolls Wash. Current Lewis Center educational school field trips have seen almost 300,000 children visit the Lewis Center over the years. The Cultural Center is anticipated to generate considerable interest and increases both in visits as well as on-line virtual fieldtrips for schools around the world. Fixing a monetary amount to this project is only speculative at this time, but it is believed that the Cultural Center will be a potential destination site that has the capacity to generate significant revenue to the local area. Representatives of the San Manuel Band of Mission Indians spoke recently in support of this plan at a public hearing for the Lewis Center’s Specific Plan.

Further, the construction of flood control improvements within a specific area will allow for the construction of recreational improvements that will enhance Lewis Center’s ability to meet

ongoing and future students' needs. The Lewis Center's Specific Plan, which includes recreational facilities for its public charter school, Academy for Academic Excellence (AAE), has already been approved by the Town of Apple Valley. Recreational facilities are necessary for the school to continue to retain students at the higher grade levels, who often transfer to other schools with more comprehensive sports programs. The Lewis Center's Academy for Academic Excellence (AAE) provides significant economic benefit to the local economy. The school contributes nearly $9 million dollars into the local economy, including $8 million in payroll. Further, the specific plan documents identify a proposed college campus to the west of Reach 1. It is anticipated that creation of the college will generate an additional 100 new jobs. The completion of the flood control channel is essential to the growth and viability of both the K-12 campus and also the future college campus.

1.3 Current Conceptual Alternatives Analysis and Ecological Management Plan

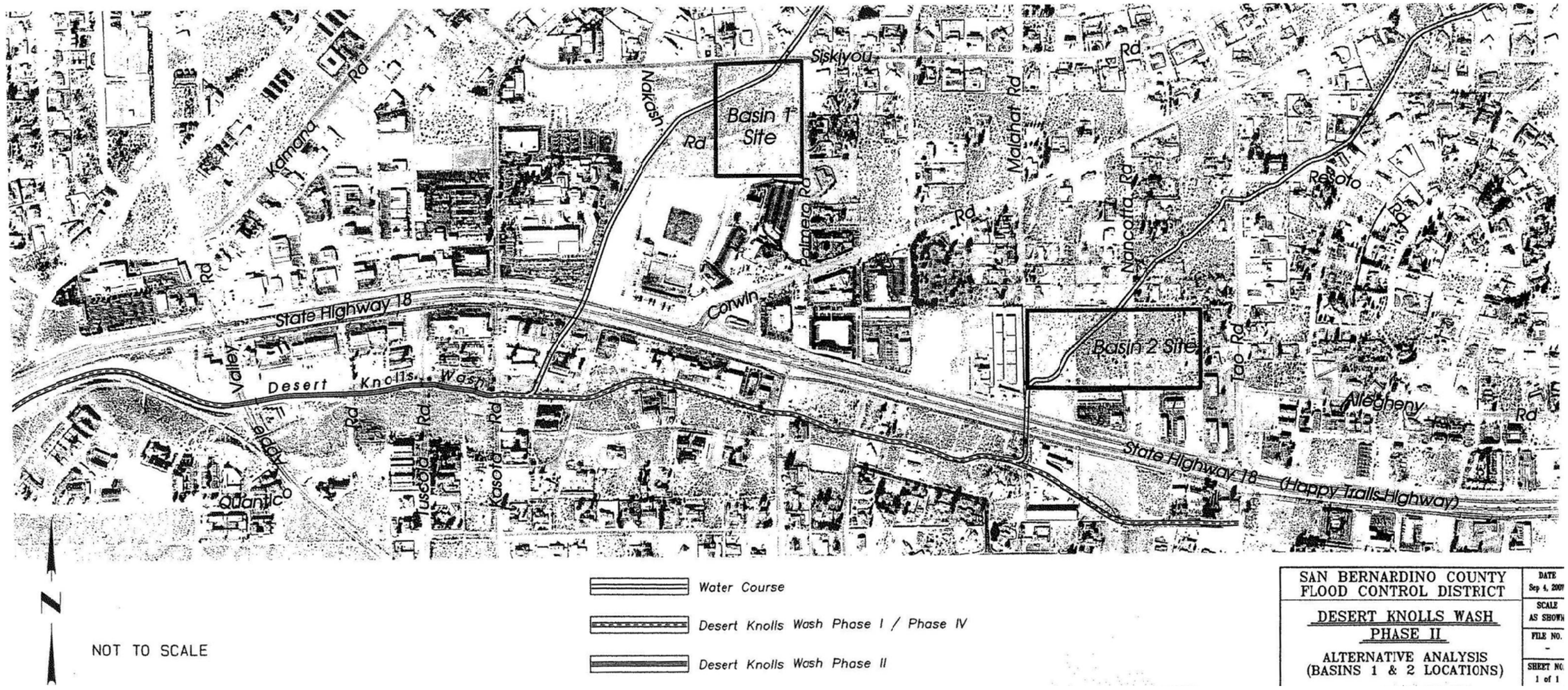
As part of obtaining Lahontan Board approval for the project, the District was requested to prepare a new design alternatives study that incorporates hydrologic and other environmental considerations to arrive at a preferred concept that meets water quality standards and does not result in significant adverse impacts to the hydrologic and ecological functions of the Wash and portions downstream. The revised designs and related analyses are further explained in Chapters below.

The conceptual designs are required to satisfy the following objectives:

- Meet water quality objectives of the Basin Plan and preserve the beneficial uses of the Mojave River and Desert Knolls Wash
- 100-year event flood risk reduction
- Minimize right-of-way (ROW) impacts

Figure 1-2

Basin Plan Alternatives



2.0 CONCEPTUAL ALTERNATIVES

Three conceptual design alternatives have been prepared for the Desert Knolls Wash Improvement project area and are further described below. Detailed information, including conceptual project plans, hydraulic data and cost estimates, are provided in the Appendices to this document as follows:

- Appendix A.: Concept 1 Plans
- Appendix B.1: Concept 2 Plans
- Appendix B.2: Allard Engineering Concept Plan
- Appendix C.: Concept 3 Plans
- Appendix D.: Hydraulic & Sediment Transport Data and Analyses
- Appendix E.: Cost Estimates & ROW Impacts

All concept designs provide recommendations for culverts at the following eight roadways which cross the wash:

1) Apple Valley Road
2) Quantico Road
3) Tuscola Road
4) Kasota Road
5) Olalee Road
6) Mondamon Road
7) Pohez Road
8) Private Crossing between Pohez Road and Tao Road

Designs described in this chapter are conceptual, and all identified channel and culvert dimensions and slopes will be revised as required upon selection and approval of the preferred alternative and during final project design. Final alignment of the channel may be adjusted to provide curved reaches instead of sharp angles including adjustment to culvert sizes and transition lengths. In addition, rectangular concrete channels will be used where severe right-of-way restrictions exist in Reaches 2 and 3.

2.1 Plan 1 – Low Flow Side Channel

Description

Concept 1 represents a proposed concrete channel with an adjacent parallel low flow channel. The proposed channel in Reach 1 of this plan includes approximately 2,624 linear feet of trapezoidal channel and extends from a location approximately 1,200 feet upstream of the confluence with Mojave River, up to the existing concrete channel. Reaches 2 and 3 consist of approximately 6,286 linear feet of a combination trapezoidal and rectangular channel.

The channel concept is designed to convey a 100-year storm event in addition to providing 3-feet of freeboard, as required by District standards. Where the freeboard is not achieved with the typical channel section, a vertical wall has been added to the concept to achieve the required freeboard. During final design, the channel configuration and vertical alignment may be altered to contain the flows in the channel with freeboard, without the use of vertical walls.

As further discussed in Chapter 3 of this document, the proposed concrete channel design will increase the velocity of the channel. In order to reduce the velocity at the channel outlet a hardened energy dissipater, or other technique as determined appropriate, will be identified in final design plans and used to reduce the terminal velocity anticipated.

Several pipes will convey the low flow runoff to the low flow channel located parallel with the concrete channel. The conceptual design for the low flow channel includes the use of a natural, permeable material at an anticipated width of 25-feet for the approximate 2-mile length of the channel.

A visual investigation of the site reveals massive exposed bedrock located approximately 500-feet downstream of the existing concrete channel. During the final design plans, a geotechnical investigation will be performed to determine the type of bedrock and the feasibility of construction which will dictate the limits of the channel.

In order to maintain local traffic circulation the channel flow will be conveyed via several pipes under the roadbed at all roadway crossings. For this concept, a total of eight culvert crossings at all the road crossings in Reaches 2 and 3 were conceptually configured and simulated in the hydraulic model.

As further discussed in Chapter 3 of this document, less sediment than existing conditions is anticipated as a result of this design concept. The low flow channel includes an element into the design that allows for percolation and vegetation to naturally occur, and does not result in significant adverse impacts to the hydrologic and ecological functions of the Wash and portions downstream, which will meet the Lahontan Board's beneficial uses and water quality objectives of the Mojave River. The low flow channel will be landscaped with appropriate native vegetation at an appropriate size in winter after completion. No irrigation is anticipated.

Concept 1 Plan advantages:

- Protect the adjacent properties from the 100-year storm events.
- Produces slightly less sediment than existing conditions, which would be beneficial to the riparian/wetland habitat at the confluence with the Mojave River, at the west end of the Project area
- Low flow channel provides for low flow infiltration of urban runoff flows allowing for pollutants to settle out before flow reaches wetlands
- Low flow channel concept plans propose use of natural, permeable material that may allow for native vegetation to naturally occur, or will allow for the planting of native vegetation which will benefit plant and wildlife species within the region

Concept 1 Plan disadvantages:

- Concrete proposed for significant portion of channel design
- Higher velocities anticipated with concrete lined channel
- Limited amount of natural material is proposed in design
- May affect special aquatic resources areas and special status species
- Construction activities within Reach 1 may result in the disturbance of an identified archaeological site

To construct this alternative, the following amount of land will need to be acquired for the necessary channel improvements:

Permanent land: 17.5 acres (763,805 square feet)

Temporary land: 6.2 acres (270,815 square feet)

Ownership of the necessary parcels to construct the project is held by both private and public entities. Details of project ROW impacts, including owner information and total area (permanent and temporary) required, are provided in Appendix E.

Cost Estimate

The total cost to construct Plan 1 is as follows:

ROW Acquisition:	$ 4,904,000.00
Construction:	$ 31,390,336.00
TOTAL	**$36,294,336.00**

Line item details are provided in Appendix E.

2.2 Plan 2 – Gabion Mat Drop Structure

Description

Concept 2 represents the natural channel with gabion mattress drop structures incorporated, which function as channel stabilizers.

The proposed channel design in Reach 1 of this plan includes approximately 2,434 linear feet of trapezoidal natural bottom channel with un-grouted rock side slopes and grouted rock drop structures. Reach 1 extends from a location approximately 1,400-feet upstream of the confluence with Mojave River up to existing concrete channel. The Reach 1 concept was developed by Allard Engineering for the adjacent Lewis Center expansion project (Allard Plan), and has been integrated into this conceptual design and related hydraulic model (See Appendix B.2).

The conceptual design for Reaches 2 and 3 combined consists of approximately 6,390 linear feet of a natural bottom trapezoidal channel with earthen side slopes and gabion drop structures. In this concept, the banks will be hydro-seeded with a native mix and no irrigation is anticipated. The natural material proposed does not result in significant adverse impacts to the

hydrologic and ecological functions of the Wash and portions downstream, which will meet the Lahontan Board's beneficial uses and water quality objectives of the Mojave River.

To reduce erosion within the channel, un-grouted rock revetment will be used where velocities exceed 8-feet per second (fps). As further discussed and detailed in Chapter 3 of this document, less sediment than existing conditions will be produced from implementation of this design concept.

For Reaches 2 and 3, hardened energy dissipaters or other techniques as found appropriate, will be included with final design plans and used to reduce the velocities anticipated with this design concept downstream of the gabion mattress drop structures. The channel concept is designed to convey a 100-year storm event in addition to providing 3-feet of freeboard. Where the freeboard is not achieved with the typical channel section, a vertical wall may be constructed to achieve the required freeboard. During final design, the channel configuration and vertical alignment may be altered to contain the flows in the channel with freeboard, without the use of vertical walls.

In order to maintain local traffic circulation, the channel flow will be conveyed via several culverts under the roadbed at all roadway crossings. For this alternative, a total of eight culvert crossings at all the road crossings in Reaches 2 and 3 were also conceptually configured and simulated, however the dimensions of these culverts are not the same as the other alternatives.

Concept 2 Plan advantages:

- Protect the adjacent properties from the 100-year storm events.
- Produces less sediment than existing conditions, which would be beneficial to the riparian/wetland habitat at the west end of the Project area
- Channel design provides for low flow infiltration of urban runoff flows allowing for pollutants to settle out before flow reaches wetlands
- Gabion structures allow for additional sediment management in larger flow events
- Channel concept plans propose use of natural material that may allow for native vegetation to naturally occur, or will allow for the planting of native vegetation which will benefit plant and wildlife species within the region

- Proposes use of natural materials in project design, which will benefit plant and wildlife species within the region
- Allows for greater percolation and groundwater recharge

Concept 2 Plan disadvantages:

- Limited water storage is available in this concept
- May affect special aquatic resources areas and special status species

To construct this alternative, the following amount of land will need to be acquired for the necessary channel improvements:

Permanent land: 27.1 acres (1,181,954 square feet)

Temporary land: 6.2 acres (270,699 square feet)

Ownership of the necessary parcels to construct the project is held by both private and public entities. Details of project ROW impacts, including owner information and total area (permanent and temporary) required, are provided in Appendix E.

Cost Estimate

The total cost to construct Plan 2 is as follows:

ROW Acquisition:	$ 5,171,717.00
Construction:	$ 21,486,738.00
TOTAL	**$26,658,455.00**

Line item details are provided in Appendix E.

2.3 Plan 3 – Boulder Stabilizer

Description

Concept 3 represents a proposed natural bottom channel with natural side slopes and boulder stabilizers. Hydro-seeding is anticipated on appropriate banks and plantings are to occur at the boulder stabilizers. No irrigation is anticipated. Some grouted rock drop structures are used.

Sills at approximately 8-feet in width, as well as access roads, will be provided on each side of the channel except in areas where topography and ROW constraints exist. To reduce erosion within the channel, un-grouted rock revetment will be used where velocities exceed eight-feet per second (fps). Vertical walls will be constructed where necessary to achieve the required freeboard. Maintenance will be performed utilizing temporary access through the sills as necessary. Similar to Concept 2, and as further discussed and detailed in Chapter 3 of this document, less sediment than existing conditions will be produced from implementation of this design concept.

In order to maintain local traffic circulation the channel flow will be conveyed via several culverts under the roadbed at all roadway crossings. For this alternative, a total eight culvert crossings at all the road crossings in Reaches 2 and 3 were conceptually configured and simulated.

Concept 3 Plan advantages:

- Protect the adjacent properties from the 100-year storm events.
- Proposes use of natural materials in project design, which will benefit plant and wildlife species within the region
- Allows for greater percolation and groundwater recharge
- Low flow channel provides for low flow infiltration of urban runoff flows allowing for pollutants to settle out before flow reaches wetlands

Concept 3 Plan disadvantages:

- May affect special aquatic resources areas and special status species

To construct this concept, the following amount of land will need to be acquired for the necessary channel improvements:

Permanent land: 26.1 acres (1,135,385 square feet)

Temporary land: 6.5 acres (282,473 square feet)

Ownership of the necessary parcels to construct the project is held by both private and public entities. Details of project ROW impacts, including owner information and total area (permanent and temporary) required, are provided in Appendix E.

Cost Estimate

The total cost to construct Plan 1 is as follows:

ROW Acquisition:	$ 5,584,042.00
Construction:	$ 24,029,238.00
TOTAL	**$29,613,280.00**

Line item details are provided in Appendix E.

2.4 No Project Alternative

Under the no project alternative, flow conditions would be maintained as currently existing in the Desert Knolls Wash. As a tributary to the Mojave River, there is exceptional surface runoff flow in the Desert Knolls Wash which occurs during seasons of unusually high rainfall. As a result of the shallow surface soils, fan-shaped collecting systems, and steep gradients, the Mojave River produces high runoff rates and rapidly concentrates flood waters. Two subsurface dikes exist where the historic State Route 18 crosses over the Mojave River between the Cities of Apple Valley and Victorville. Here, large bedrock outcrops, referred to as the Upper and Lower Narrows, have formed geomorphic constrictions that force groundwater to the surface. Sustained high levels of sediment load transport into the Mojave Narrows would continue under the no project alternative.

Consistent with what was previously identified in the May 2008 Alternatives Analysis, and as further substantiated in Chapter 3 of this document, a 100-year Flood event would present significant impacts to properties adjacent to the wash, particularly within Reach 2. According to the FEMA Flood Insurance Rate Map (FIRM) dated March 18, 1996, approximately 58 acres would be inundated by a 100-year flood upstream of Apple Valley Road and downstream of Tao Road. Within this overflow area, existing uses include 33 commercial, nine multi-family residential, and seven single-family properties which could be impacted during a 100-year Flood event. In addition, existing vacant parcels with zoning designations allowing commercial uses

(3 properties) and multi-family residential (37 properties) are located within the potential overflow area.

3.0 HYDRAULIC, SEDIMENT TRANSPORT AND SCOUR ANALYSIS

This chapter documents the hydraulic, sediment transport and scour analysis performed as part of the Desert Knolls Wash project. Information discussed includes existing conditions and anticipated conditions based on the proposed concept plans. Existing sewer lines and other utility relocations will be further addressed in final design plans for the selected alternative.

3.1 Existing Condition

The existing condition represents the natural (existing) channel. In addition, an area with massive exposed bedrock currently exists downstream from the existing concrete channel for approximately 500-feet and is impractical to excavate. The water-surface profiles are shown in Figure 3-1. The summary results are presented in Appendix D.

The openings for this modified existing condition scenario are not specifically culverts but used as an initial estimate of the magnitude of opening to be used as a starting point for the three alternatives. As can be seen in Table 3-1, the spans tend to be expansive because the rise of the openings is limited by the existing adjacent topography – i.e., very low-rise component. The sizing for the three alternatives, which will be discussed in the following sections, is more refined and applies proposed grading that allows for larger culvert rise dimensions.

Table 3-1. Proposed Road Opening Dimensions, Existing Condition

Road Crossing		Station	Span (ft)	Rise (ft)
1	Apple Valley Road	56+80	28.0	9.0
2	Quantico Road	63+29	68.0	4.0
3	Tuscola Road	67+86	80.0	4.0
4	Kasota Road	72+49	65.0	4.0
5	Olalee Road	77+50	70.0	4.0
6	Mondamon Road	90+20	95.0	4.5
7	Pohez Road	95+26	70.0	4.0

It should be noted that for the information and data of all three concept plans discussed in the following pages, it is assumed that a concrete channel would be continued downstream of the existing concrete channel at about the same slope as the existing concrete channel. This condition is not discussed in detail or reflected in the conceptual plans provided in the Appendices to this document, however relevant information is provided in the HEC-RAS results and floodplain maps provided in Appendix D of this document. Furthermore, for the selected alternative, the plan and profile will be altered during final design to accommodate the continuation of the concrete channel.

3.1.1 Data Review

Digital topographic data was obtained for almost the entire extents of the floodplains for Reaches 1, 2 and 3. There is a significant digital topographic data gap for a portion of Reach 1, which covers most of the concrete channel downstream of Apple Valley Road from stations 38+35 to 55+15. As-built plans were used for the improved channel to characterize the topography.

A formal data request to the Federal Emergency Management Agency (FEMA) via the National Flood Insurance Program (NFIP) Library was made and confirmation received that there is no hydrologic/hydraulic data available for this study reach of Desert Knolls Wash. Necessary hydrologic data used in the analyses were available from District databases and records.

3.1.2 Hydrology

Peak discharges from District data are summarized below in Table 3-2. These peak discharges correspond to the maximum flows from the San Bernardino County unit hydrographic analysis of the Desert Knolls Master Plan of Drainage (MPD).

Table 3-2. Peak Discharges (ft3/s)

Hydrologic Node	Hydraulic Station	Drainage Area (mi2)	SBCFCD1				Flood Insurance Study (FIS)2		
			100-yr	10-yr	5-yr	2-yr	100-yr	50-yr	10-yr
—	—	0.3	—	—	—	—	700	500	100
5285	120+28	3.6	1,730	810	550	340	—	—	—
5286	113+14	4.1	1,960	920	620	390	—	—	—
5451	106+14	5.7	2,590	1,220	820	500	—	—	—
5722	95+15	5.8	2,620	1,230	830	510	—	—	—
—	—	6.3	—	—	—	—	2,700	1,500	200
5725	77+39	6.9	2,970	1,400	930	570	—	—	—
5871	72+31	7.3	3,150	1,480	990	610	—	—	—
6078	39+70	8.17	3,380	1,600	1,070	650	—	—	—
6104	19+87	8.24	3,480	1,650	1,120	680	—	—	—

For the sediment transport modeling, which is a dynamic simulation, the corresponding District hydrographs were applied along the study reach. The detailed hydrographic inflows are exhibited in the appendix. Figure 3-1 represents boundary condition at the upstream study limit at Tao Road. Lateral inflow hydrographs, which account for the additional contribution from tributaries, were added as the simulation moved progressively downstream. These lateral inflow hydrographs are exhibited in Appendix D.

[1] Flood *Routing Analysis Using County Hydrology Manual of San Bernardino (1986), AES*, results from hydrologic executions performed by SBCFCD, February – March 2010.

[2] *Flood Insurance Study and Flood Insurance Rate Maps*, Federal Emergency Management Agency, August 28, 2008.

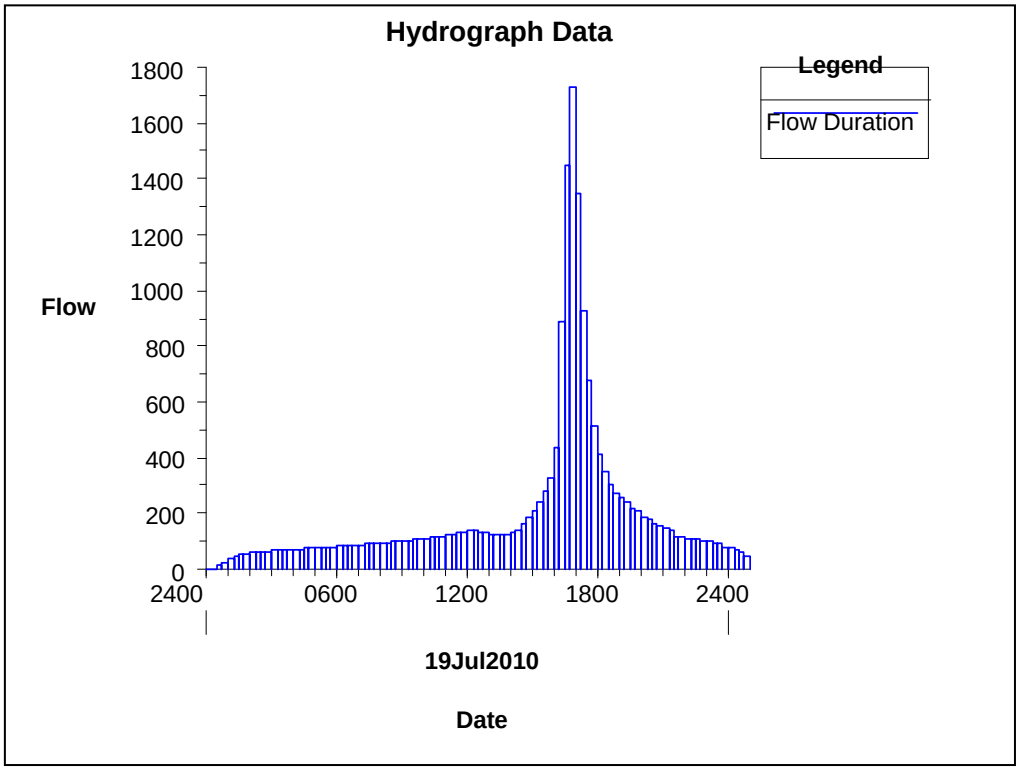
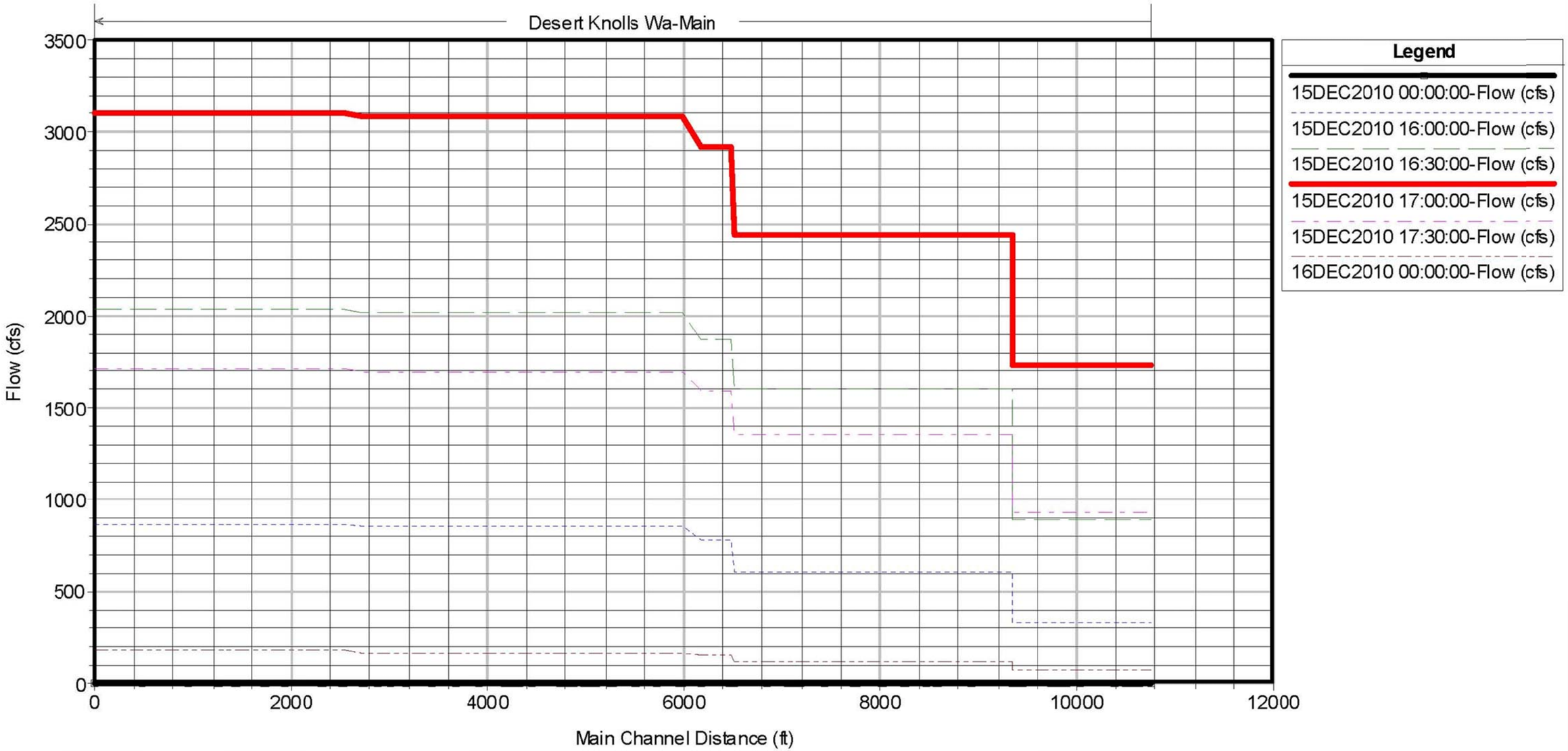


Figure 3-1. Desert Knolls Wash, 100-year Hydrograph at Tao Road (Upstream B.C.)

Figure 3-2 illustrates the peak discharges along Desert Knolls Wash for different time intervals of the 24 hour sediment transport simulation. From this flow profile, the incremental lateral flow additions can be seen as the simulations progresses downstream. Station 0 is the downstream study limit of the reach.

Figure 3-2

100-Year Peak Discharge Profile



3.1.3 Hydraulics

An existing (effective) hydraulic model was developed using HEC-RAS to simulate the baseline condition from which the proposed concept scenarios will be developed.

Since this analysis is a conceptual, general design criteria were applied. Specifically, the culverts pass the 50-year flow and are not overtopped by the 100-year flows plus the allowable freeboard of 3 feet. Freeboard within the typical conceptual cross-section varies at different road crossings but this is a criterion, which would best be addressed in the design stage.

The floodplain limits for Reaches 1, 2 and 3 in alternatives 1, 2 and 3 are all contained in the channel. The floodplain limits for all the alternatives are proposed scenarios based on proposed elevations. However, it should be noted that only the existing contours are exhibited on the plans and not the proposed contours. In the design stage, detailed grading plans would have to be prepared to establish the contours, at which point, the refined floodplain limits would be delineated.

Reach 1

The hydraulic analysis begins at the downstream boundary (station 9+57), which is the distance upstream from the confluence with the Mojave River to the existing concrete channel that extends upstream to Apple Valley Road, station 56+10 (downstream face). The source topographic maps have elevations established using vertical datum NGVD29.

Reach 2

Reach 2 extends from Apple Valley Road to Tuscola Road, corresponding to stations 56+80 (upstream face) and 67+70, respectively. The source topographic maps have elevations established using vertical datum NGVD29. As the attached floodplain exhibit indicates:

The existing double 14-foot by 7-foot reinforced concrete culverts at Apple Valley Road appears to have the capacity for the FIS but not the SBCFCD 100-year discharges.

There appear to be several properties and insurable structures that may be inundated by a 100-year flood for the existing condition. All three alternatives remove the insurable structures from the 100-year flood floodplain to comply with the project objectives.

Reach 3

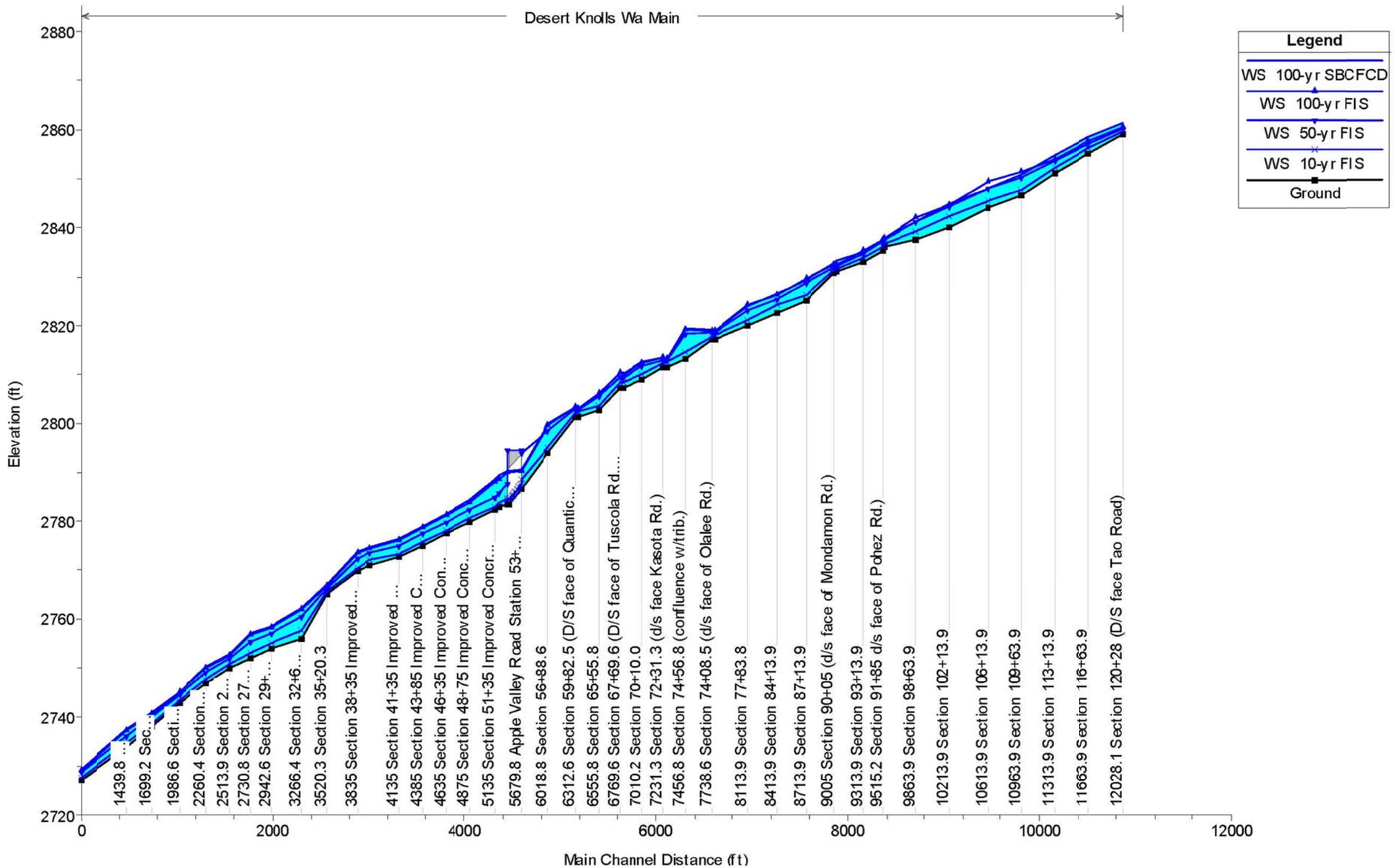
Reach 3 extends from Tuscola Road to the upstream study limit at Tao Road, corresponding to stations 68+02 and 120+28, respectively. The source topographic maps have elevations established using vertical datum NGVD29. There appear to be properties and insurable structures that may be inundated by a 100-year flood for the existing condition. All three alternatives remove the insurable structures from the 100-year flood floodplain to comply with the project objectives.

HEC-RAS Assumptions

For all of the scenarios, including the existing condition and all three alternatives, the roughness coefficients are typically categorized as concrete, riprap-lined or natural (sand) channel surfaces. We applied the standard Manning's n coefficient for concrete and riprap, which are 0.013 and 0.035, respectively. The coefficient range for sand is 0.020 – 0.033. For sandy the natural channel, we applied a value of 0.030, which is on the higher end of the range, to account for potential debris, gravel and cobbles. Figure 3-2 illustrates the existing condition water surface profile for the 100-year storm events.

Figure 3-3

Flood Water Surface Profiles – Existing Condition



3.2 Post Project Conditions - Hydraulic

3.2.1 Concept 1 – Low Flow Side Channel

Concept 1 represents the concrete channel with an adjacent parallel low flow channel. A hardened energy dissipater, or other means as identified in final design plans, will be used to reduce the terminal velocity anticipated with this design concept. The water-surface profiles are shown in Figure 3-4. The summary results are presented in the Appendix.

The bypass flows from the concrete flood channel to the low flow channel were modeled as a lateral flow function. This approach yields peak flows that are diverted from the flood channel to the low flow channel. There are several locations in which a 24-inch low flow pipe diverts flow from the main channel. At stations 116+45, 105+15, 88+75, 71+15, 37+30, 32+10, 27+60, 23+10, and 17+10, the diverted peak flows are ranging from 20.2 – 32.9 ft3/s for the 100-year event. These flows serve as an estimate of the magnitude of flow in the low flow channel for an extreme flood event. However, a more detailed and sophisticated hydrodynamic model – including hydrograph routing – would have to developed at the design stage to achieve a more refined estimate of the diverted flow and resulting backwater.

For this alternative, a total of eight culvert crossings at all the road crossings in Reaches 2 and 3 were conceptually configured and simulated. All the proposed culvert barrels in the main channel are reinforced concrete boxes (RCB) and 24-inch reinforced concrete pipes (RCP) in the low flow channel. The universal design criteria, as stipulated by the SBCFCD, are to pass the 50-year peak flow and maintain a minimum of 2.5-foot freeboard in the channel for the 100-year event. The details of the hydraulic dimensions are specified in the HEC-RAS output in the appendix. The delineation and configuration of the channel is depicted in the conceptual plans.[3]

[3] *Alternative Concept Plan #1, Low Flow Side Channel, Desert Knolls Wash*, prepared by URS Corporation, March 2011.

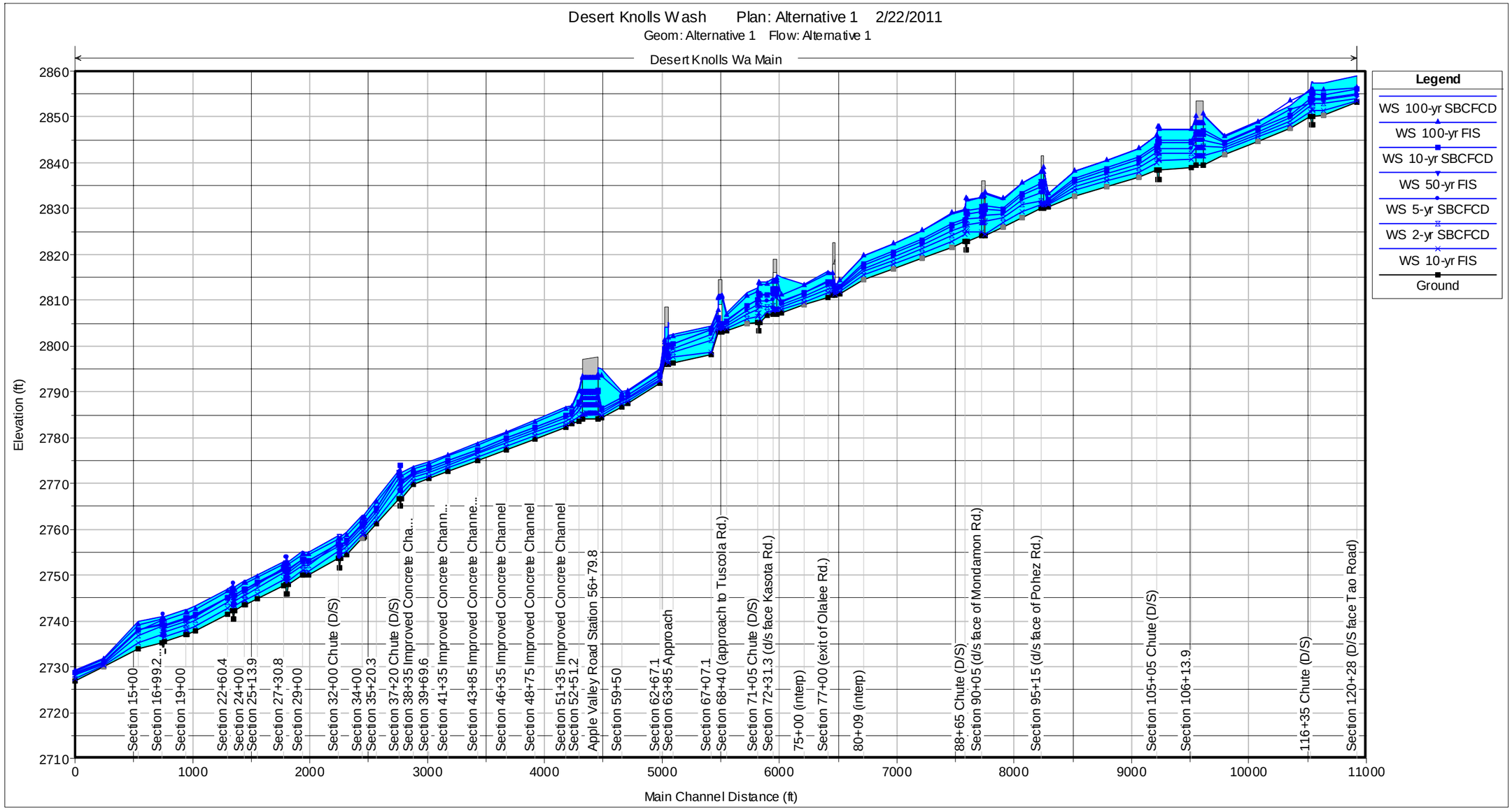
Table 3-3. Proposed Culvert Dimensions, Alternative 1

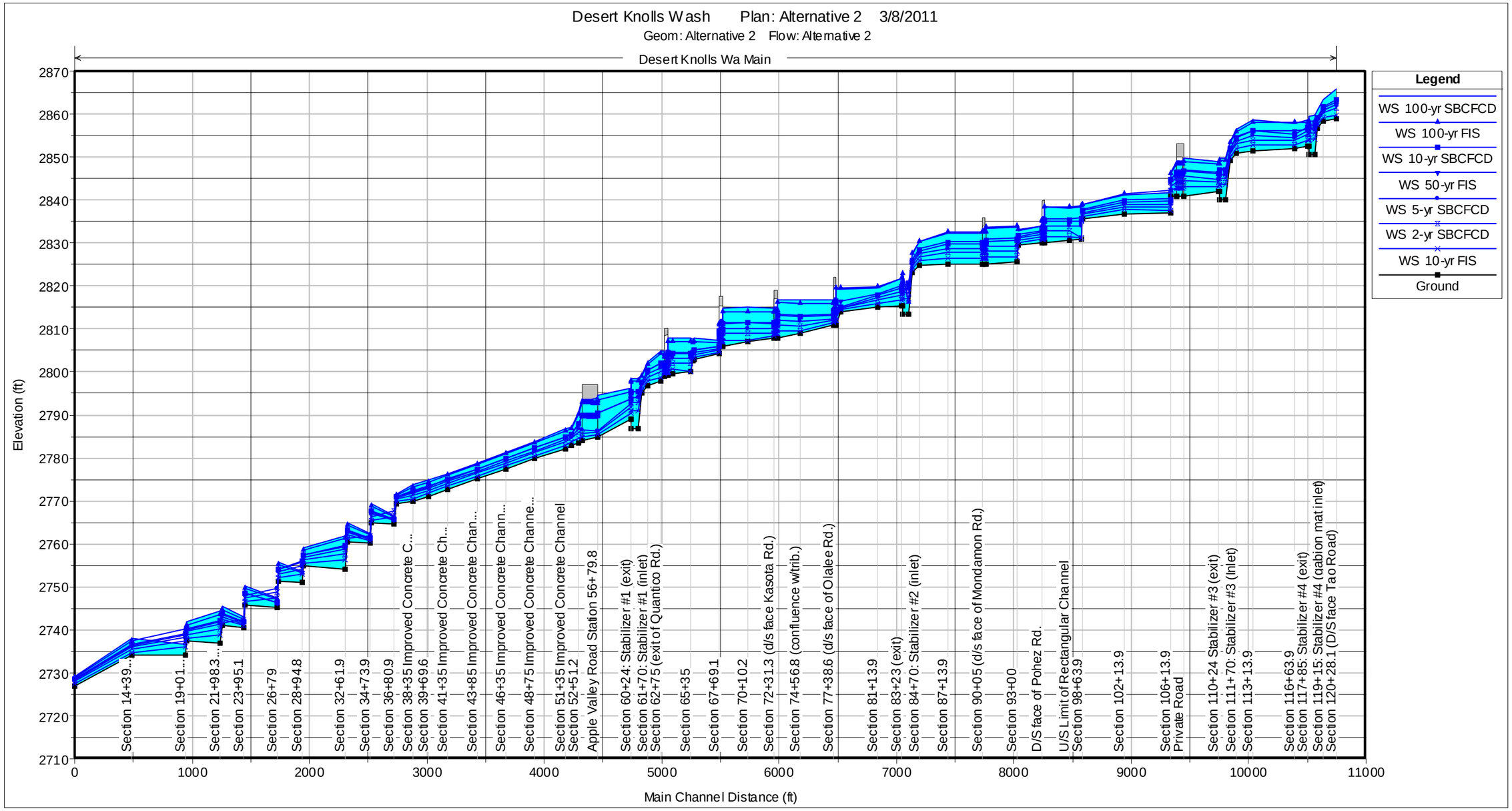
Road Crossing		Station	# Barrels	Span (ft)	Rise (ft)
1	Apple Valley Road*	56+80	2	14.0	9.0
			2	7.0	9.0
2	Quantico Road	63+29	3	14.0	8.0
3	Tuscola Road	67+86	3	14.0	7.5
4	Kasota Road	72+49	3	14.0	9.0
5	Olalee Road	77+50	3	14.0	7.0
6	Mondamon Road	90+20	3	12.0	9.0
7	Pohez Road	95+26	3	12.0	9.0
8	Private Road	106+94	3	12.0	9.0

* Note: the only existing culvert systems are through Apple Valley Road and the Private Road, which are both proposed to be retrofitted.

Figure 3-4

Flood Water Surface Profiles – Alternative 1




Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
Desert Knolls Wa Main
Elevation (ft)
Main Channel Distance (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Section 14+39...
Section 19+01...
Section 21+98.3...
Section 23+95.1
Section 26+79
Section 28+94.8
Section 32+61.9
Section 34+73.9
Section 36+80.9
Section 38+35 Improved Concrete C...
Section 39+69.6
Section 41+35 Improved Concrete Ch...
Section 43+85 Improved Concrete Chan...
Section 46+35 Improved Concrete Chann...
Section 48+75 Improved Concrete Channe...
Section 51+35 Improved Concrete Channel
Section 52+51.2
Apple Valley Road Station 56+79.8
Section 60+24: Stabilizer #1 (exit)
Section 61+70: Stabilizer #1 (inlet)
Section 62+75 (exit of Quantico Rd.)
Section 65+35
Section 67+69.1
Section 70+10.2
Section 72+31.3 (d/s face Kasota Rd.)
Section 74+56.8 (confluence w/trib.)
Section 77+38.6 (d/s face of Olalee Rd.)
Section 81+13.9
Section 83+23 (exit)
Section 84+70: Stabilizer #2 (inlet)
Section 87+13.9
Section 90+05 (d/s face of Mondamon Rd.)
Section 93+00
D/S face of Pohez Rd.
U/S Limit of Rectangular Channel
Section 98+63.9
Section 102+13.9
Section 106+13.9
Private Road
Section 110+24 Stabilizer #3 (exit)
Section 111+70: Stabilizer #3 (Inlet)
Section 113+13.9
Section 116+63.9
Section 117+85: Stabilizer #4 (exit)
Section 119+15: Stabilizer #4 (gabion mat inlet)
Section 120+28.1 (D/S face Tao Road)

3.2.2 Concept 2 – Gabion Mat Drop Structures

Concept 2 represents the natural channel with gabion mattress drop structures which function as stabilizers. For Reach 1, the concept developed by Allard Engineering for the Lewis Center (Allard Plan) was integrated into this hydraulic model (See Appendix B.2). Ungrouted rock revetment will be used where velocities exceed 8 feet per second (fps), as found acceptable by the Lahontan Board. For Reaches 2 and 3 a hardened energy dissipater, or other means as identified in final design plans, will be used to reduce the terminal velocity anticipated with this design concept.

For Reach 1, the concept developed by Allard Engineering for the Lewis Center (Allard Plan) was integrated into this hydraulic model. The Allard Plan proposed rip-rap for the channel bottom, 2:1 side slopes of both natural rock and rip rap material, would follow the existing channel alignment, and would vary in width to permit lower velocities and greater groundwater infiltration. In addition, the Allard Plan proposed natural rock edges for the channel banks, drop structures along the bottom of the channel to slow flood flow velocities and assist infiltration, and a detention basin at the bottom of the wash. Concept 2 does not include the in-line sediment basin proposed in the Allard Plan as it does not significantly affect sediment discharges and is impractical to construct and maintain.

The water-surface profiles are shown in Figure 3-5. The summary results are presented in the Appendix. Refer to the conceptual plans (Appendix B) for more detailed information on the configuration and location.

For this alternative, a total of eight culvert crossings at all the road crossings in Reaches 2 and 3 were conceptually configured and simulated. The details of the hydraulic dimensions are specified in the HEC-RAS output in Appendix D. The dimensions of these culverts are not the same as the other alternatives.

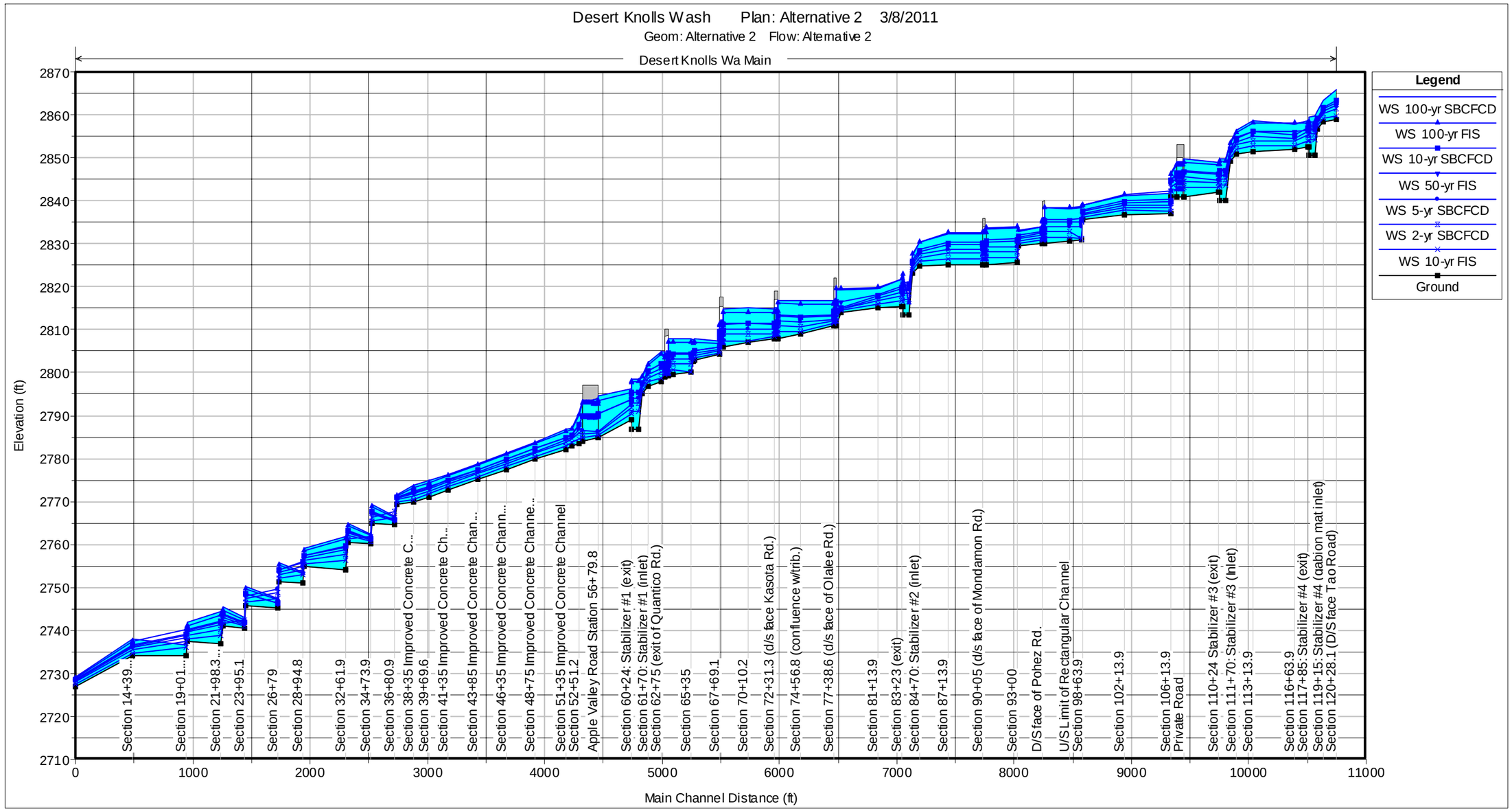
Table 3-4. Proposed Culvert Dimensions, Alternative 2

Road Crossing		Station	# Barrels	Span (ft)	Rise (ft)
1	Apple Valley Road*	56+80	2	14.0	9.0
			2	7.0	9.0
2	Quantico Road	63+29	3	14.5	9.5
3	Tuscola Road	67+86	3	14.0	9.5
4	Kasota Road	72+49	3	14.0	9.0
5	Olalee Road	77+50	3	14.0	9.0
6	Mondamon Road	90+20	3	14.0	9.0
7	Pohez Road	95+26	3	14.0	8.0
8	Private Road	106+94	3	12.0	9.0

* Note: the only existing culvert system is through Apple Valley Road. The rest are proposed.

Figure 3-5

Flood Water Surface Profiles – Alternative 2



3.2.3 Concept 3 – Boulder Stabilizers

Concept 3 represents the natural channel with boulder stabilizers. The water-surface profiles are shown in Figure 3-6. The summary results are presented in Appendix D and the configuration and location of the stabilizers are defined on the conceptual plans.

For this alternative, a total of eight culvert crossings at all the road crossings in Reaches 2 and 3 were conceptually configured and simulated. The details of the hydraulic dimensions are specified in the HEC-RAS output in Appendix D. The dimensions of these culverts (Table 3-5) are not necessarily the same as the other alternative.

Table 3-5. Proposed Culvert Dimensions, Alternative 3

Road Crossing		Station	# Barrels	Span (ft)	Rise (ft)
1	Apple Valley Road	56+80	2	14.0	9.0
			2	7.0	9.0
2	Quantico Road	63+29	3	14.0	9.0
3	Tuscola Road	67+86	3	14.0	9.0
4	Kasota Road	72+49	3	14.0	8.0
5	Olalee Road	77+50	3	14.0	7.0
6	Mondamon Road	90+20	3	11.0	9.0
7	Pohez Road	95+26	3	11.0	9.0
8	Private Road	106+94	2	9.0	9.0

Figure 3-6

Flood Water Surface Profiles – Alternative 3

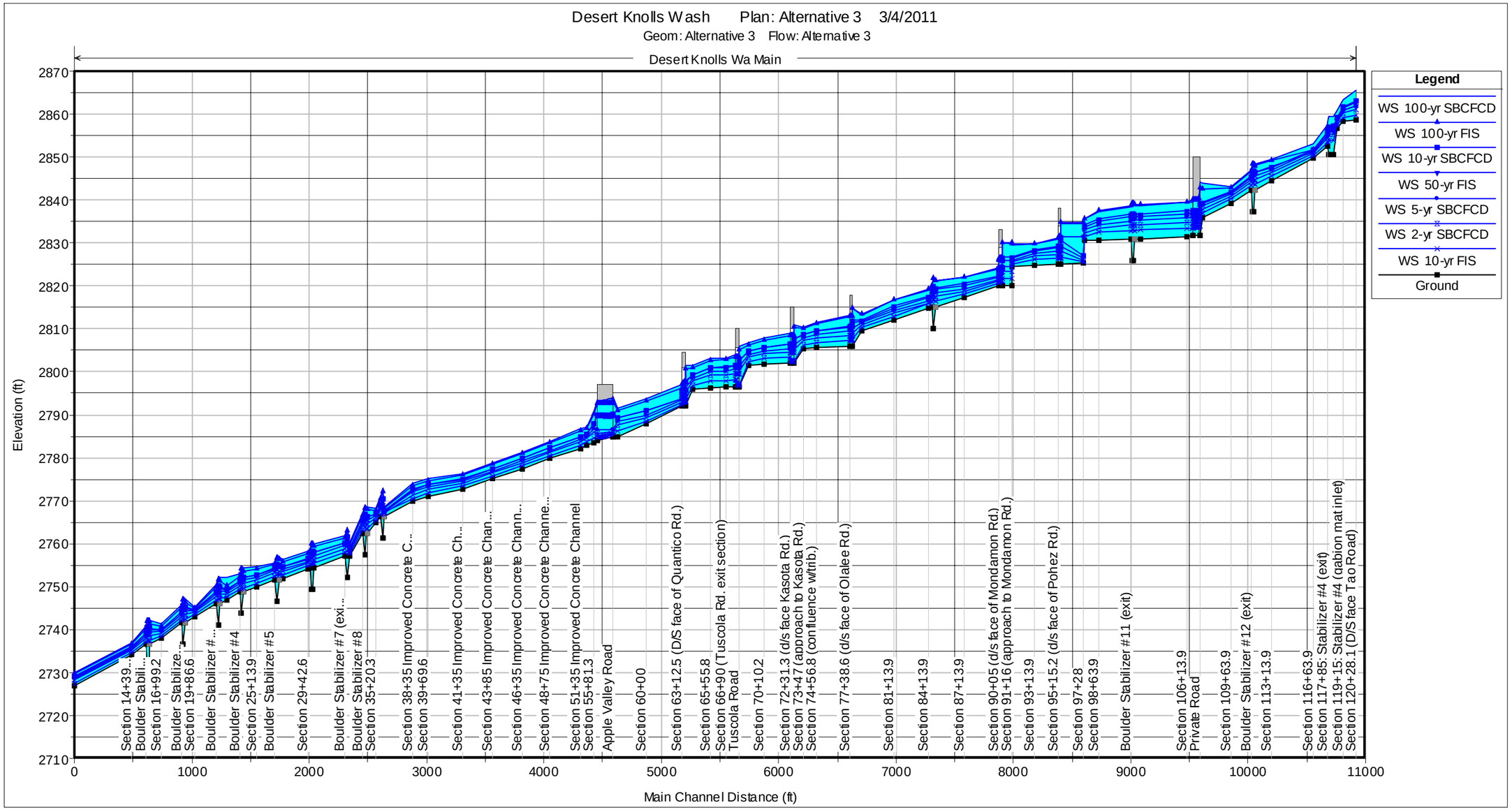


Table 3-6 and Figures 3-7 through 3-10 give a brief summary of the hydraulic characteristics that directly relate to erosion potential: average velocity and shear stress. As can be seen, the velocities and shear stresses for the three alternatives are generally reduced in comparison to the existing condition, although, there are a few caveats. The concrete channel will produce higher velocities, which will be reduced by energy dissipaters before being reintroduced into the natural. The gabions do yield slightly higher shear stresses, however, a one-dimensional hydraulic program such as HEC-RAS does not have the capability to simulate the complex unsteady and rapidly-varied flow that is conveyed through a gabion drop structure. From past experience, the gabion design equations tend to produce different results than a one-dimensional model.

Table 3-6. 100-year Hydraulic Characteristics (Average)

Alternative/Scenario		Average Channel Velocity (ft/s)	Average Shear Stress (lb/ft2)
—	Existing condition	13.5	2.0
1	Concrete and low flow channel	19.2	1.5
2	Gabion mat drop structure	10.3	2.6
3	Boulder stabilizer	9.0	1.6

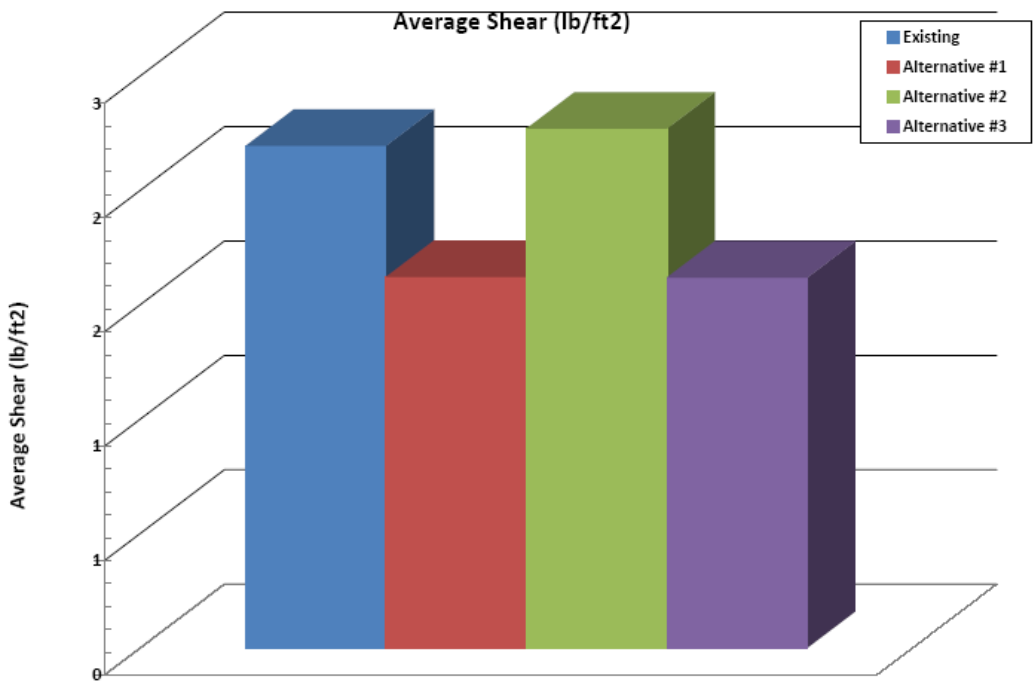


Figure 3-7 - Average Shear Comparison

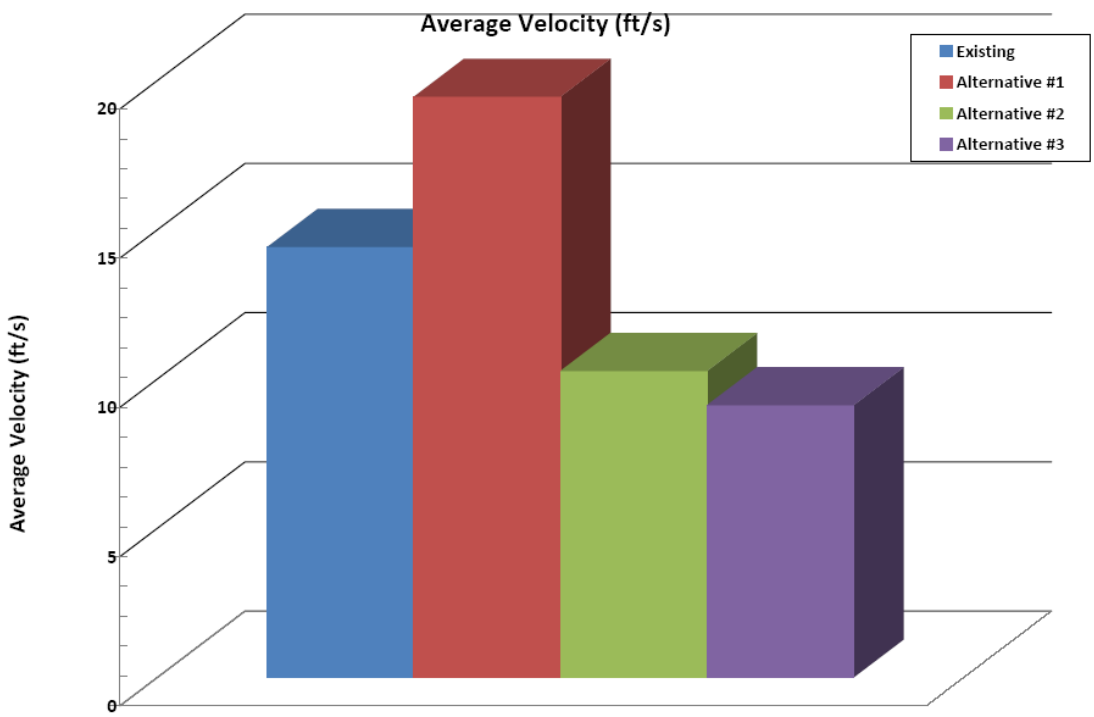


Figure 3-8 - Average Velocity Comparison

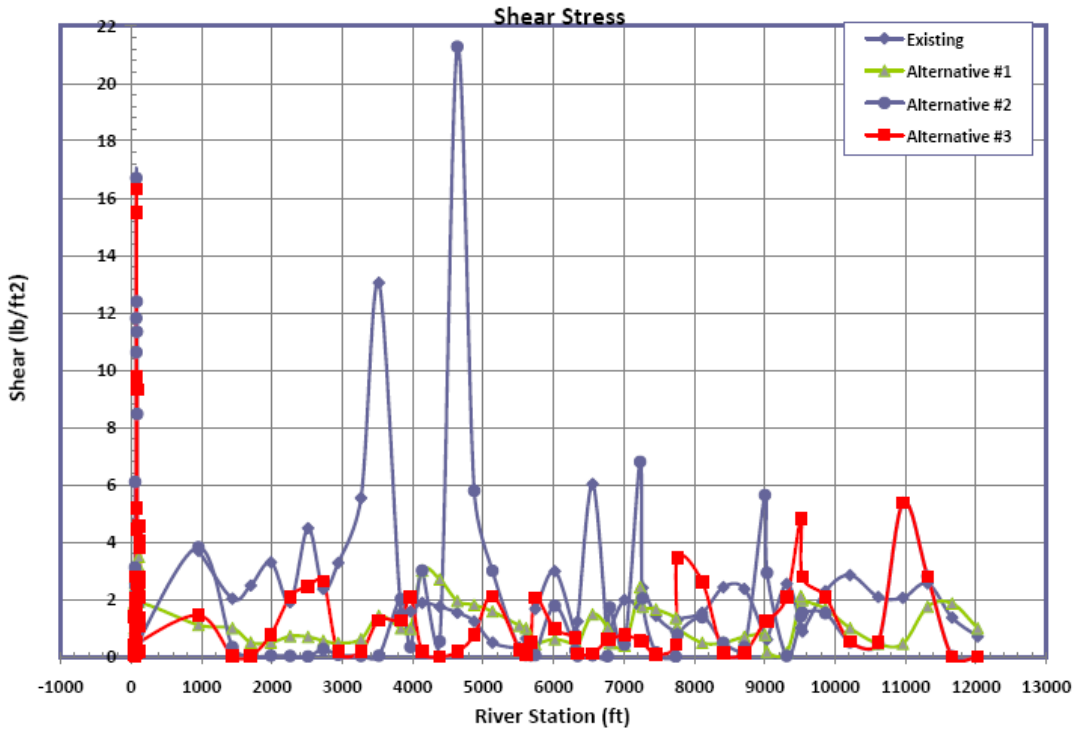


Figure 3-9 - Shear Stress Comparison

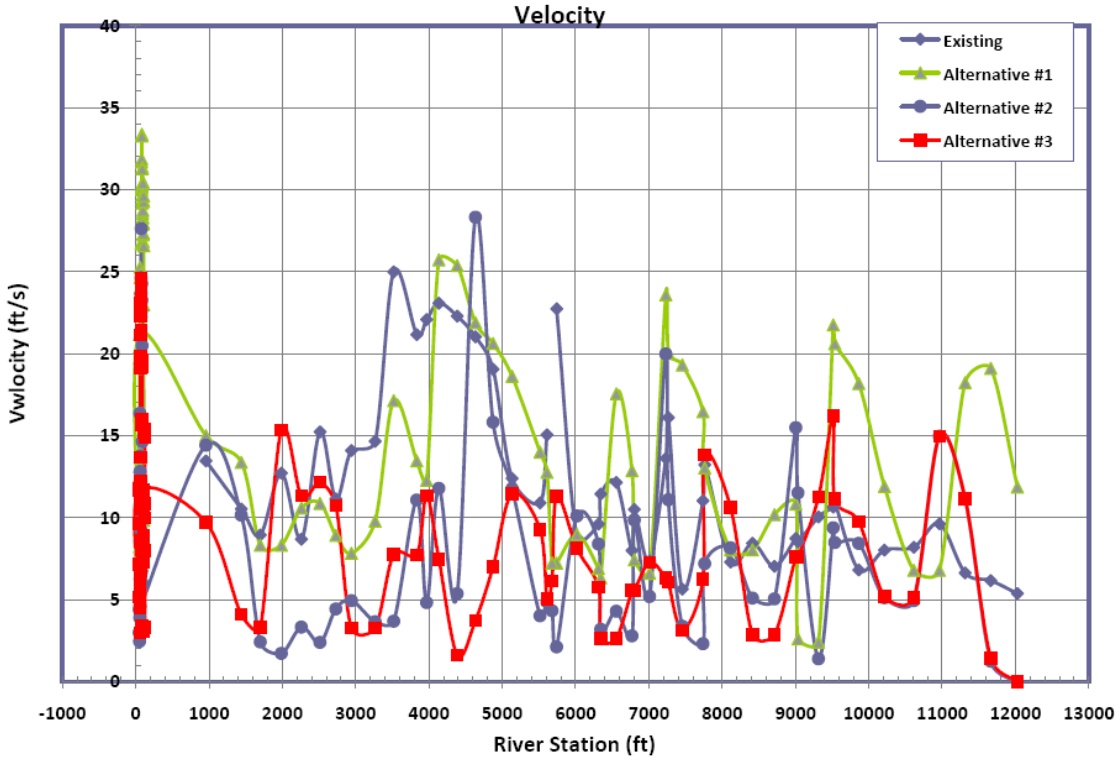


Figure 3-10 - Velocity Comparison

3.3 Post Project Conditions - Sediment Transport and Scour

For selection of the appropriate sediment transport model, criteria were used to ensure that the model most closely represented the prototype. The following are the most appropriate sediment transport models used in the HEC-RAS computer program to simulate the study reach:

- Acker and White
- Meyer-Peter Muller
- Yang

Multiple methodologies were evaluated because sediment transport models can yield significantly different results. Sensitivity analyses were performed by simulating all three aforementioned methodologies. Based on comparisons and an understanding of the prevailing behavior of the sedimentation process in the reach, the Meyer-Peter Muller model is recommended, which the following results reflect. The 100-year event was simulated for a simulation time of 24 hours for the existing and three alternative scenarios. The upstream boundary condition for the sediment load was simulated as an equilibrium state.

The fall velocities and sorting were determined using the Toffaleti and Exner methods, respectively. Figure 3-11 shows the particle size distribution curve of a representative soil sample from the site, which was used in the sediment transport model. The particles are distributed as 75% sand and 25% gravel. Figure 3-12 provides a profile of change in existing channel bed elevations.

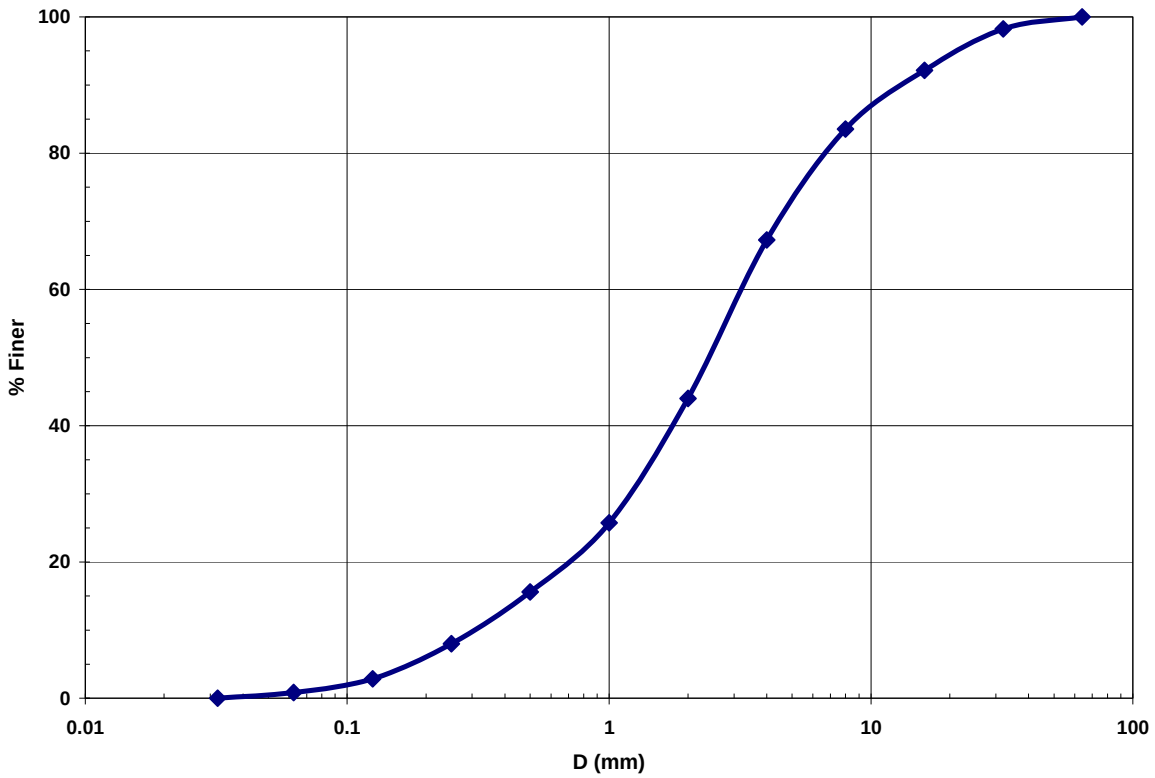
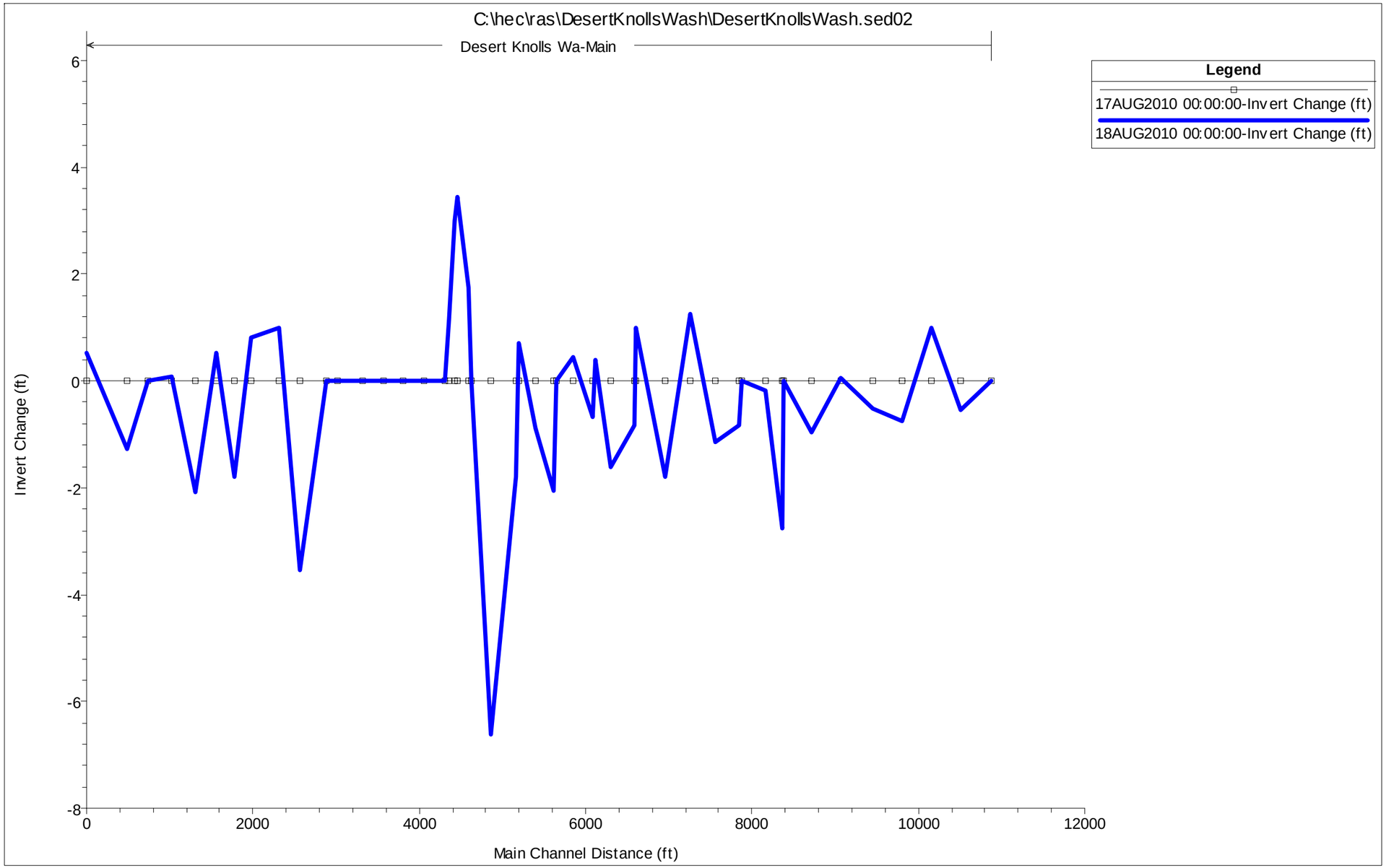


Figure 3-11. Particle Size Distribution (Gradation) Curve

Figure 3-12

Profile of Change in Channel Bed Elevations – Existing Condition



Through sensitivity analyses, it was determined that the upper limit of degradation depth could reasonably be set to 10 feet. The degradation depth limit was confirmed to be more than the maximum degradation depth of any of all the simulations. For rigid surfaces (e.g., concrete), the maximum depth was set to 0 feet so that the sediment transport analysis would not simulate aggradation of a rigid boundary.

A sediment transport model was developed for Concept 1 but because the entire length of the proposed flood channel is lined with concrete and the upstream boundary is assumed to be in equilibrium, there is no aggradation or degradation with the study reach. However, the downstream boundary is characterized by high velocity, high shear stress, clear-water flow, which would be highly erosive once it reaches the natural channel. In the design stage, energy dissipaters would be have to be applied to reduce the velocities and shear stresses back to natural conditions or, ideally, in a state of stable condition or equilibrium.

Figures 3-13 and 3-14 exhibit the changes in channel invert elevations. The orientation the graphs are left-to-right is downstream to upstream.

Figure 3-13

Profile of Change in Channel Invert Elevations – Alternative 2

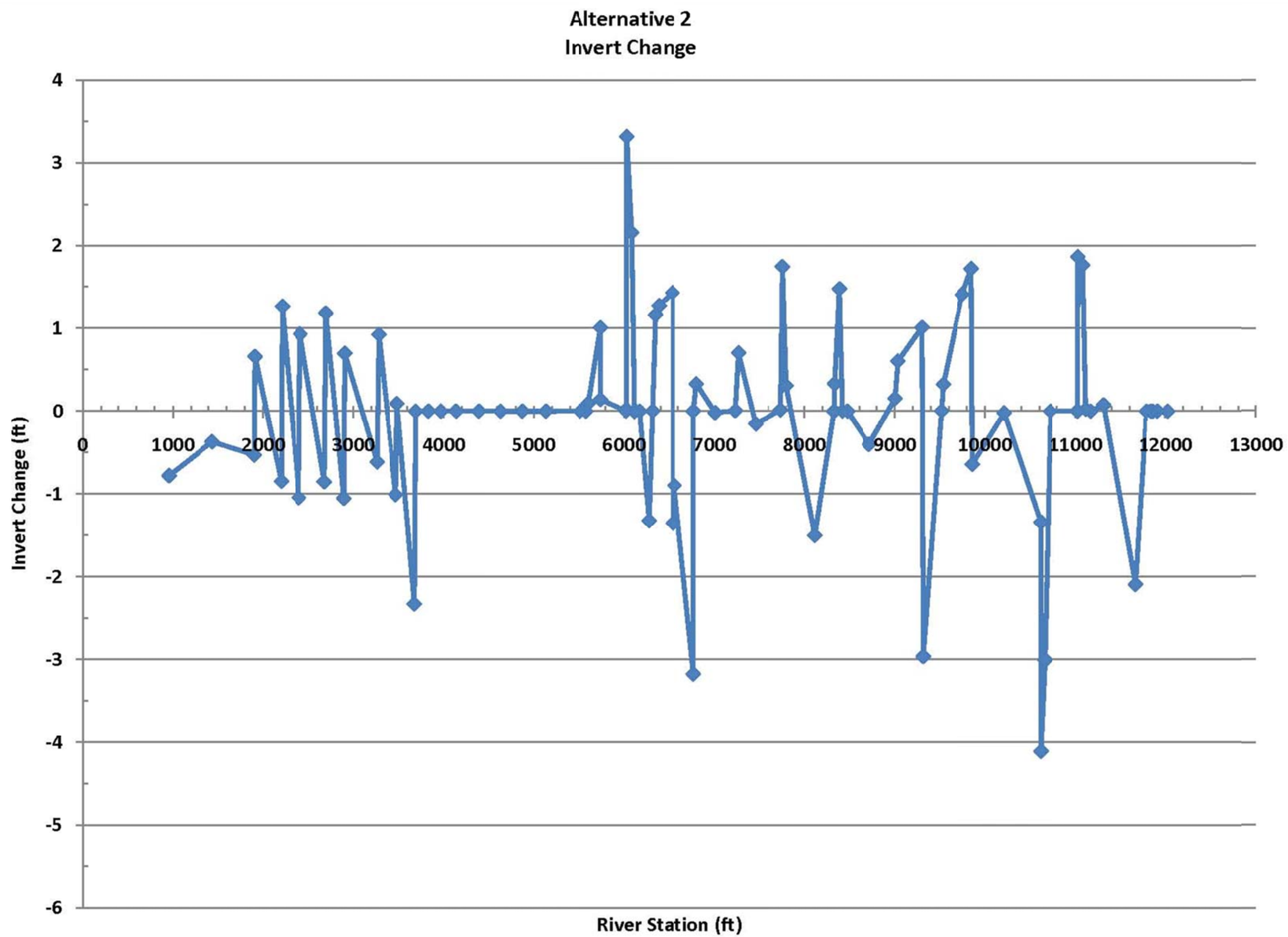
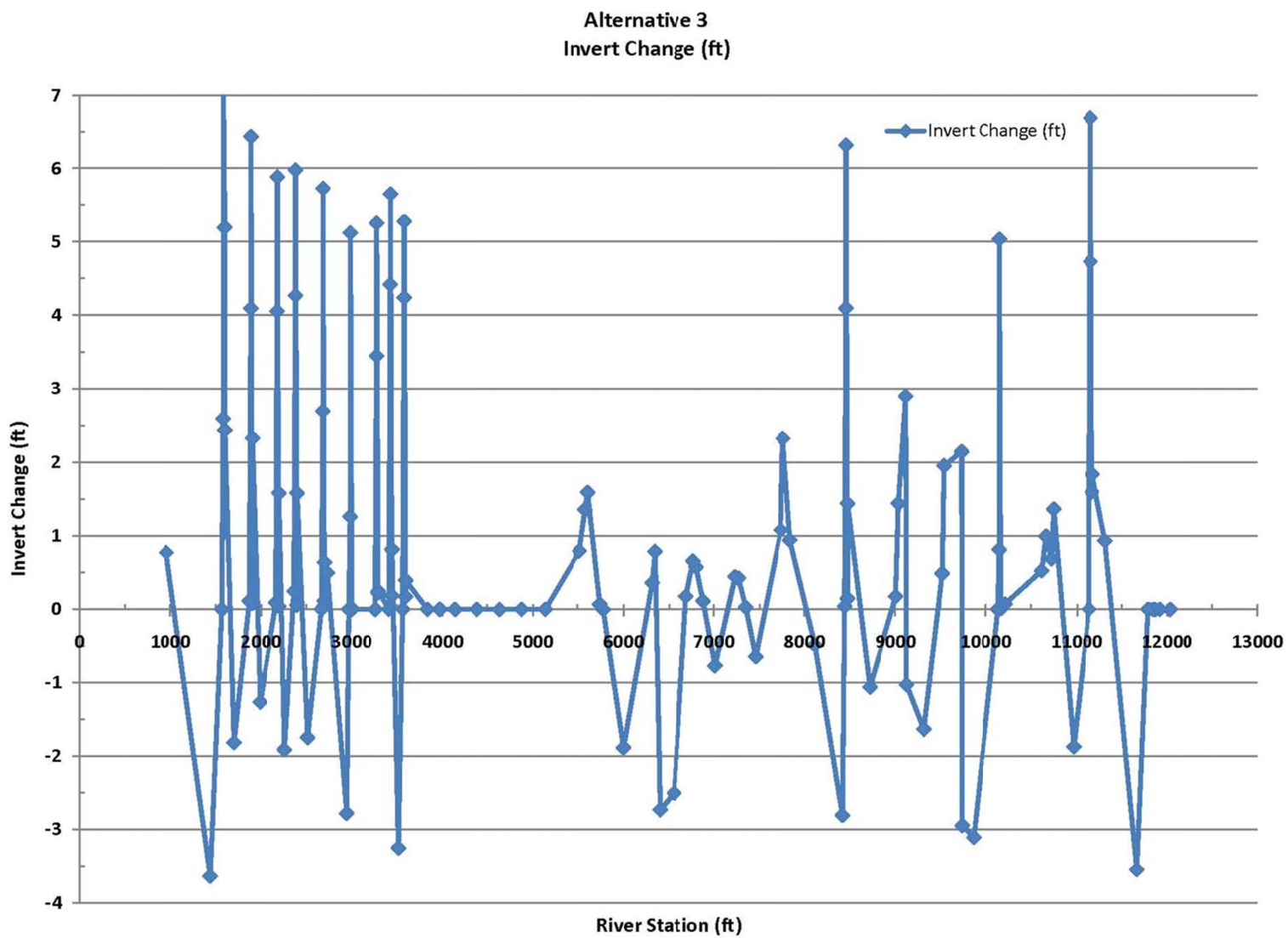


Figure 3-14

Profile of Change in Channel Invert Elevations – Alternative 3



A comparison of Alternatives 2 and 3 (Table 3-7) reveal that the absolute change in the channel inverts are 0.8 and 1.6, respectively. It appears that Alternative 3 is a more sediment balance than Alternatives 1 and 2. The invert change is between the beginning and end of the 24 hour simulation for the 100-year flood event.

Table 3-7. Relative Channel Invert Elevation Change, 100-year Event

Alternative/Scenario		Invert Elevation Change (ft)		
		Abs(Mean)	Minimum	Maximum
—	Existing condition	1.0	-6.6 (60+19)	3.4 (56+10)
1	Concrete and low flow channel	0	0	0
2	Gabion mat drop structure	0.7	-4.1 (106+14)	3.3 (60+31)
3	Boulder stabilizer	1.6	-3.6 (14+40)	7.1 (15+83)

Notes: Alternative 1 is a concrete channel, so there is no aggradation/degradation for rigid surfaces. Parenthetical values represent corresponding river station.

Table 3-8. Sediment Mass (Cumulative), 100-year Event

Alternative/Scenario		Sediment Mass)
		Cumulative Mass Out (ton)
—	Existing condition	4,250
1	Concrete and low flow channel	equilibrium
2	Gabion mat drop structure	3,297
3	Boulder stabilizer	3,513

Note: The cumulative sediment mass is estimated at the exit of the study reach (station 9+57).

Cumulative sediment results at the confluence of the Desert Knolls Wash and Mojave River, modeled at 2, 5, 10 and 100-year flood events for Concepts 2 and 3, are identified in Tables 3-9 and 3-10 below. Concept 1 is a rigid, non-erodible channel and there is no sediment transport with this design concept. The results identify Concept 2 will produce more sediment than

Concept 3 in the 2, 5 and 10 year events by 126, 218 and 274 tons respectively. However Concept 2 will produce less sediment than Concept 3 in a 100-year event by 216 tons.

Table 3-9. Sediment Mass (Cumulative) at Confluence – Concept 2

	Flood Event			
	2-Year	**5-Year**	**10-Year**	**100-Year**
Cumulative Sediment Mass Out (tons)	718	1160	1726	3297

Table 3-10. Sediment Mass (Cumulative) at Confluence – Concept 3

	Flood Event			
	2-Year	**5-Year**	**10-Year**	**100-Year**
Cumulative Sediment Mass Out (tons)	592	942	1452	3513

3.4 Conclusion

A review of the three alternatives in comparison to the existing reveals a few changes to the hydraulic and sediment transport characteristics of the channel. All of the processes produce less sediment than the existing condition. Accordingly, there is less variation in the change of the channel inverts. The gabion and concrete channel alternatives best represent this observation.

Figures 3-12 through 3-14 depict sharp variations in inverts at certain locations in the study reach. These occurrences are at boundaries between the countermeasure and the natural channel. A solution to minimize the degradation of the natural channel sections immediately downstream of the countermeasures would be to install energy dissipaters, which are designated in the concept plans. However, a one-dimensional hydraulic analysis cannot simulate the full extent of the energy dissipation of the turbulent state of flow. In the design, we recommend that a detailed design of energy dissipaters be performed to ensure that velocities and shear forces are reduced to a less erosive potential.

4.0 ENVIRONMENTAL ANALYSIS

Environmental documents prepared for the Desert Knolls Wash Improvement project, including recent reports and previous reports prepared for earlier design concepts, are the primary documents utilized for the current environmental analysis discussed in this chapter. Previous documents include the California Rapid Assessment Method (CRAM) report (Appendix F-1) prepared by the County Flood Control District, biological resources reports prepared by District staff and other consultants (Appendix F-2), cultural resources documents and maps, and other information assembled by District staff for the project. New documents prepared and reviewed for analysis of the current design concepts include the San Francisco Regional Water Quality Control Board Rapid Permit Checklist (Appendix G), updated Biological Technical Report (Appendix H) and an Ecological Management Plan (EMP) for each conceptual design alternative, which is the essential element anticipated by the District to evaluate and select a preferred design alternative.

Further discussion of preliminary environmental review and analysis, including the discussion of existing resources, beneficial uses, functions, values, and objectives of the proposed alternatives, are further explained below.

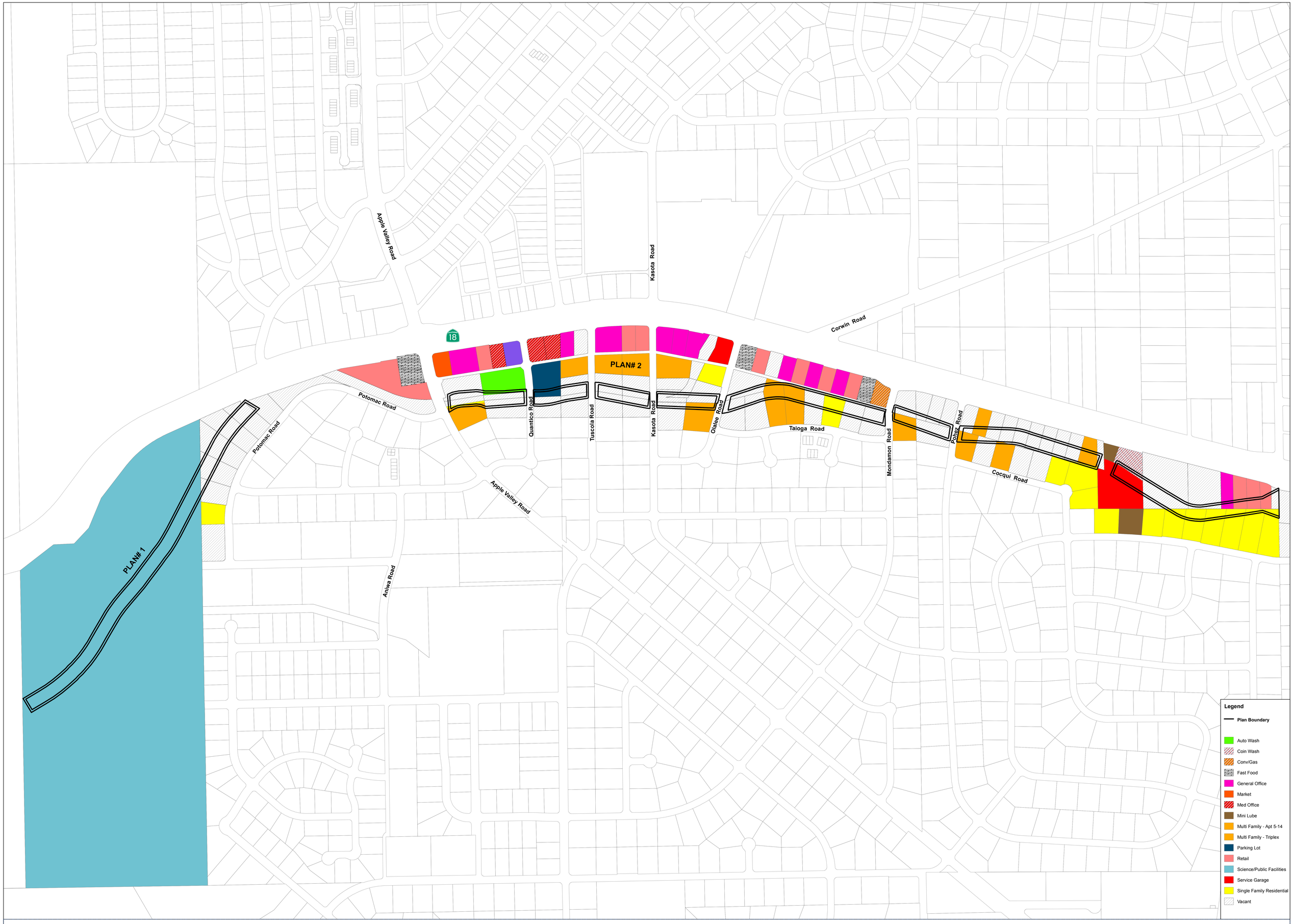
4.1 Analysis of Project Area Resources

4.1.1 Existing Land Uses

San Bernardino County experienced rapid growth and development activity in the past few decades which significantly impacted the water quality of the area and the Mojave River. A major factor impacting water quality and beneficial uses of the Mojave River is urban runoff from development growth in this area of San Bernardino County, including significant development activity in the Town of Apple Valley surrounding the Desert Knolls Wash Plan project area.

Existing land uses in the immediate project area include a mix of vacant parcels, single and multiple-family residential, and a variety of commercial uses including retail, fast food, auto service establishments and professional offices (Figure 4-1). State Highway 18, a major arterial road, is also located north of, and running parallel with, the project area. These uses and associated activities result in the introduction of various visible and non-visible pollutants into

the project area such as general trash and contaminated urban runoff containing waste oil, pesticides and other such pollutants.



Desert Knolls - Apple Valley Existing Plan Land Use Map

Date: 7/29/2010

4.1.2 Biological Resources

In addition to reviewing materials provided by the District, URS prepared a Biological Technical Report for the Project (Appendix H), which included results of biological field surveys and a review of additional available information from resource management plans and other relevant documents to determine locations and types of biological resources that have the potential to exist within and adjacent to the Project (USFWS 2010a and 2010b, County of San Bernardino Department of Public Works [CSBDPW] Biological Resources Report, September 2008, and EREMICO, June 2008). The California Department of Fish and Game's (CDFG) Natural Diversity Database (CDFG 2010) and California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS 2010) file data were also queried for records of occurrence of special-status species and habitats within the Victorville USGS 7.5-minute Quadrangle Map.

URS biologists conducted field surveys in July 2010 to assess general and dominant vegetation community types, plant and wildlife species present within communities, locations of special aquatic resources, and to assess any suitable habitat that may support special-status plant and wildlife species. For the purposes of this survey, the "study area" included the Project's proposed ground disturbance footprint (Project footprint) and a 500-ft buffer. Survey methods and results are summarized below and are detailed in the Biological Technical Report, provided in Appendix H.

Vegetation Communities

Field surveys determined that four vegetation community/land cover types are present within the study area: Mojave riparian forest (at the west end of the Project area), desert saltbush scrub (primarily on the uplands of the west basin area and scattered on portions of the east upland area), Mojave wash scrub (at the basin sites and much of the eastern and middle channel areas), and developed (on the uplands of the east end of the study area). As such, the Project would not have a significant impact on these habitats. However, the Mojave riparian forest may be impacted by the Project. Each community/habitat type is described in the Biological Technical Report in Appendix H.

Common Plant and Wildlife Species

Plant and wildlife species were identified during biological field surveys conducted in 2010. Plant and wildlife species detected were characteristic of the existing site conditions of west Mojave Desert vegetation communities.

A total of 52 plant species were observed within the study area. Common species observed included four-wing saltbush (*Atriplex canescens*), allscale (*Atriplex polycarpa*), cheesebush (*Hymenoclea salsola*), and rubber rabbitbrush (*Chrysothamnus nauseosus*). Other species observed included creosote (*Larrea tridentata*), Joshua tree (*Yucca brevifolia*), burrobush (*Ambrosia dumosa*), Fremont's cottonwood (*Populus fremontii*), and several species of willow (*Salix* spp.). A number of non-native and early successional species were present within the study area as well, as would be expected by both the natural and man-made disturbances, including common sow thistle (*Sonchus oleraceus*), cocklebur (*Xanthium strumarium*), red-stemmed filaree (*Erodium cicutarium*), ripgut grass (*Bromus diandrus*), and foxtail chess (*Bromus madritensis rubens*). A complete list of plant species observed is provided in the Biological Technical Report in Appendix H.

A total of 34 wildlife species or their signs (i.e. scat, tracks, nests, burrows) were observed within the study area. Common species observed included western fence lizard (*Sceloporus occidentalis*), western whiptail (*Aspidoscelis tigris*), mourning dove (*Zenaida macroura*), California quail (*Callipepla californica*), lark sparrow (*Chondestes grammacus*), black phoebe (*Sayornis nigricans*), cactus wren (*Campylorhynchus brunneicapillus*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), and California ground squirrel (*Otospermophilus beecheyi*). A complete list of wildlife species observed is provided in the Biological Technical Report in Appendix H.

Special-Status Plant Species

Special-status plant species and their habitat requirements, regulatory status, and potential for occurrence within the study area are summarized within Table 3 of the Biological Technical Report, provided in Appendix H. Six special-status plant species are reported to occur within the USGS Victorville Quadrangle Map that includes the Project area (CDFG 2010 & CNPS 2010). Two of the six special-status plant species were determined to have a low potential for

occurrence designation applied to them, and no further survey/study is obligatory to determine likely presence or absence of these species. The remaining four special-status plants were determined to have a moderate potential for occurrence designation applied to them; these species included Booth's evening-primrose (*Camissonia boothii* ssp. *boothii*), white pygmy poppy (*Canbya candida*), desert cymopterus (*Cymopterus deserticola*), and Mojave monkey flower (*Mimulus mohavensis*).

No special-status plant species have been observed within the study area (URS 2010); as such, no impacts to sensitive plant species are expected. However, suitable habitat to support special-status species does occur within the study area and no focused botanical surveys have been conducted. Therefore, further evaluation may be necessary to assess project-related effects to these species and subsequent agency coordination and investigations may be needed to determine the project's likely impacts on special-status plants.

Special-Status Wildlife Species

Special-status wildlife species and their habitat requirements, regulatory status, and potential for occurrence within the study area are summarized within Table 4 of the Biological Technical Report, provided in Appendix H. Eighteen special-status wildlife species are reported to occur within the USGS Victorville Quadrangle Map that includes the Project area (CDFG 2010). Five of the 16 special-status wildlife species had a low potential for occurrence designation applied to them and therefore no further survey/study is obligatory to determine likely presence or absence of these species. The remaining 13 special-status wildlife were determined to have a moderate or high potential for occurrence; these species included San Emigdio blue butterfly (*Plebulina emigdionis*), Victorville shoulderband (*Helminthoglypta mohaveana*), coast horned lizard (*Phrynosoma blainvillii*), Cooper's hawk (*Accipiter cooperii*), burrowing owl (*Athene cunicularia*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), southwestern willow flycatcher (*Empidonax traillii extimus*), yellow-breasted chat (*Icteria virens*), summer tanager (*Piranga rubra*), San Joaquin Le Conte's thrasher (*Toxostoma lecontei macmillanorum*), least Bell's vireo (*Vireo bellii pusillus*), Mojave river vole (*Microtus californicus mohavensis*), and Mohave ground squirrel (*Xerospermophilus mohavensis*).

Focused surveys have been conducted for several special-status wildlife species and are described below. In addition, observations were made for all special-status wildlife species during general biological field surveys.

A USFWS protocol-level survey for least Bell's vireo and southwestern willow flycatcher was conducted within suitable or potentially suitable riparian habitat along the Mojave River, including the Project area, between May and July in 2002 and 2008 (CSBDPW 2008). One nesting pair of least Bell's vireo was observed within the riparian habitat adjacent to the Project area; no southwestern willow flycatchers were observed. In 2008, no detections of either species were made within the Project area or the surrounding vicinity. Although recent surveys have not detected least Bell's vireo or southwestern willow flycatcher within the study area, the riparian habitat located within the Mojave River and Desert Knolls confluence is highly suitable for these species; as such impacts to least Bell's vireo and/or southwestern willow flycatcher is possible as a result of the Project.

USFWS protocol-level surveys were conducted for desert tortoise within the study area in April and May of 2008. No tortoise sign (i.e. scats, burrows, pallets, tracks, egg shells, or live tortoise) were observed during focused desert tortoise surveys (CSBDPW 2008). Based on the lack of detections for desert tortoise within the Project area, no impacts to this species are anticipated as a result of the Project. Furthermore, due to the geographical barriers including a highly urbanized and fragmented environment, the desert tortoise was determined to have a low potential for occurrence designation and is not expected to exist within the project area.

A burrowing owl survey following the guidelines established by the California Burrowing Owl Consortium was conducted in April and May 2008. No burrowing owls or their sign (i.e. burrows, pellets, white wash, feathers) were observed, although California ground squirrel were present and are common burrowers that provide nest sites for this species (CSBDPW 2008). Based on the lack of detections for burrowing owl within the study area, no impacts to this species are anticipated as a result of the Project.

A site assessment for Mohave ground squirrel was performed in May 2008. It was determined that the only potential habitat to support this species occurs at the Upper Narrows Basin and along a 500 foot stretch of the Wash immediately upstream from this basin. Due to habitat destruction, degradation, and fragmentation, it was determined that it would be unlikely that Mohave ground squirrel inhabits the Project area (EREMICO 2008); as such no impacts to this species are expected as a result of the Project.

A relocation study for Mojave river vole was conducted in October 2002. As part of the study, small mammal trapping was performed at the confluence of the Mojave River and Desert Knolls.

A relatively high density of voles was present within wetland habitat immediately adjacent to the Project (CSBDPW 2008). Based on the presence of Mojave river voles within the immediate vicinity of the Project area, it is possible that construction and ground disturbing activities associated with the Project could have an impact on this species.

Several special-status wildlife species have been observed within and in the vicinity of the Project area, including Mojave river vole and least Bell's vireo, and the Project area includes suitable habitat that has the potential to support additional sensitive wildlife species. In addition, it is expected that the Project could impact riparian bird species, including summer tanager and yellow-breasted chat, depending on the time of year and extent of the actual impact to the Mojave riparian forest habitat located within the Project area. As such, further evaluation would be necessary to assess Project-related effects to these species and subsequent agency coordination and investigations may be needed to determine the Project's likely impacts on special-status wildlife.

Wildlife Corridors

The channel of the Wash likely functions as a wildlife corridor, but due to the large barren areas with limited natural vegetation and development to the north, east, and south of the study area, the function of the Wash as a corridor has most likely been disturbed on a regional level and is no longer a regional corridor, although it may still function as a local corridor for wildlife.

Special Aquatic Resource Areas

Potential special aquatic resource areas were identified within the Project during biological field surveys conducted in 2010; however, only the United States Army Corp of Engineers, CDFG, and Regional Water Quality Control Board (RWQCB) can make a final determination of the boundaries of their jurisdictions. The Desert Knolls Wash Flood Channel and the Mojave River would likely qualify as jurisdictional features under Section 404 of the Clean Water Act and CDFG jurisdiction and are the largest drainage features within the Project area. In addition, many smaller ephemeral washes and drainages serve as tributaries to the aforementioned aquatic features. Consequently, the completion of a jurisdictional determination on those lands likely subject to the Clean Water Act, RWQCB, and CDFG jurisdiction, is warranted to determine Project implementation level affects to these features.

4.1.3 Cultural Resources

Limited data and materials were available for the assessment of potential project related impacts to cultural resources. Additional research was conducted and further materials were identified to assess if cultural resources were located within the project area.

Analysis

A review of available documents indicates there is a complex archaeological site (a prehistoric village) located near the confluence of the Mojave River and Desert Knolls Wash. This site/resource has been determined to appear to qualify as eligible to the National Register of Historic Places. The resources onsite have educational value in that the area can be studied and artifacts displayed to educate others on the rich history of the area. The archaeological site/source was identified and mapped during a Phase I Cultural Resource survey of Desert Knolls Wash. All three conceptual designs are located within the Area of Potential Effect (APE). The area contains evidence of prehistoric occupations and the potential exists for prehistoric resources to be found during ground disturbing activities associated with project construction related to all three conceptual project designs. Phase II testing identifying the vertical and horizontal limits of the site is required.

Conclusion

As part of the environmental review and documentation process for the final selected project, the resource will undergo Phase II Testing to determine the vertical and horizontal limits of the site, and a Phase III Mitigation plan will be developed and implemented as necessary. Both testing and mitigation plan will be prepared by others as part of final project review and approval. Recommended mitigation measures consistent with Federal, State and local guidelines for cultural resources will be included in final environmental documents associated with the preferred design concept. Given the potential significance of the prehistoric occupation sites near the Lewis Center and confluence at the Mojave River, a flood plain concept may have a greater impact to cultural resources than the alternatives proposed.

4.1.4 California Rapid Assessment Method (CRAM)

Analysis

In recent years, rapid wetland assessment methods have been gaining popularity for use in management applications. Increases in the need for water quality protection program accountability have resulted in expansion of ambient monitoring programs, more rigorous performance monitoring for mitigation and restoration projects, and an increased focus on landscape scale and cumulative impact assessment. In recognition that an intensive assessment is not always practical or desirable, the U.S. Environmental Protection Agency has proposed a three-tiered approach to monitoring and assessment, termed Level 1-2-3. Under this approach, Level 1 consists of habitat inventories and landscape-scale assessment, Level 2 consists of rapid assessment, and Level 3 is the most intensive level of assessment, in that it addresses detailed questions about stressors and condition on a site-specific scale. Because it is less time consuming and relatively inexpensive, Level 2, or rapid assessment, was prepared to provide supplemental information during the evaluation of wetland condition to aid in regulatory review under Section 401 and 404 of the Clean Water Act and Section 1600 of the Fish and Game code (Stein et. al, 2009). The Level 2, or CRAM analysis, was performed at the Mojave River and Desert Knolls Wash confluence by District staff in January 2009 (Appendix F-1).

Conclusion

The CRAM resulted in a score of 81, which indicates a fairly healthy ecosystem exists in the Mojave River/Desert Knolls Wash assessment area. While the CRAM can be a useful tool, it may not be a thorough environmental test indicator because while it provides a snapshot of existing conditions, monitoring for larger wetland areas that exhibit more complex physical and biological functions will typically require more information than CRAM will be able to provide.

The District intends to use the CRAM analysis for the purposes of developing a baseline and threshold of significance to help determine the preferred project design alternative, however, a more comprehensive long term analysis, or Level 3 assessment, will be performed as necessary to gage impacts over time following implementation of the selected concept plan. As part of the Level 3 assessment, a baseline will be generated using an appropriate methodology for vegetation sampling in the Spring, just prior to the project commencement, followed by long-

term monitoring once the project is complete to determine whether ecological restoration objectives and set performance measurements are being met over time.

4.2 Ecological Impacts Analysis

In addition to review of the proposed concept plans and their respective hydraulic, sediment transport and scour analyses, two documents were prepared to assess the impacts of the conceptual plans and identify possible mitigation measures to meet the ecological objectives of the project:

- San Francisco Regional Water Quality Control Board Rapid Permit Checklist
- Ecological Management Plan

4.2.1 San Francisco Regional Water Quality Control Board Rapid Permit Checklist

District staff contacted Ann Riley – River Engineer with the San Francisco Regional Water Quality Control Board and informal advisor to the Lahontan Water Board for this project – to discuss available resources to assist with expediting the permit review and approval process for this project. Ms. Riley recommended completing the Rapid Permit Checklist – utilized by the San Francisco Regional Water Board – to assist in the evaluation of the project. The Rapid Permit Checklist was developed as a tool to make it easier and faster to submit a clear and complete permit application under Clean Water Act sections 401-404, and is provided in spreadsheet form where questions can be answered and calculations can be done. The questions on the checklist can also serve as a guide to prepare necessary CEQA or project documents and reports needed for projects such as the Desert Knolls Wash Improvement Plan.

As suggested, this document has been prepared for each of the three conceptual designs and is included Appendix G. The checklist provides basic information and an overview of existing channel conditions and proposed project conditions upon implementation of the project. The checklist does not, however, allow for the multiple variations included in the conceptual plans related to proposed slopes, depths and widths of the channel at various locations to accommodate existing development and other existing conditions within and surrounding the channel that are difficult to remove. Also of note is that the checklist has been created for hydrologic, biotic, and other evaluation regimes that are significantly different than the high

desert regimes of the Apple Valley area. Therefore, many sections of the checklist are inapplicable to the Desert Knolls Wash Improvement project.

4.2.2 Ecological Management Plan (EMP)

The review and analysis of environmental information, including information compiled from the hydraulic, sediment and scour modeling results, and conceptual alternatives design data, was utilized to prepare an EMP for each concept plan (see Appendices I-K). The EMP includes discussions of beneficial uses, functions, values, and objectives of the Desert Knolls Wash Improvement Project and covers the project area and the receiving Mojave River area. The EMP describes the project area's beneficial uses, functions and values, ecological management objectives, existing conditions, post-project conditions for each alternative, avoidance measures to minimize impacts, and recommended mitigation.

The beneficial uses, functions, values, and objectives for each concept plan were identified for various categories as provided in Table 4-1 below.

Table 4-1. Beneficial Uses/Functions

BENEFICIAL USES / FUNCTIONS
MUN (Municipal and Domestic Supply) and GWR (Groundwater)
AGR (Agricultural Supply) Objectives
FRSH (Freshwater replenishment)
WARM and COLD (Warm and Cold Freshwater Habitat)
WILD (Wildlife Habitat)
RARE (Rare, Threatened, or Endangered Species)
REC - 1 (Contact Water Recreation) Objectives
REC-2 (Non-Contact Water Recreation) Objectives
COMM (Commercial and Sports Fishing)
WQE (Water Quality Enhancement) Beneficial
FLD (Flood Peak Attenuation/Flood Water Storage)
Cultural Resource

4.2.3 Summary of Ecological Impacts and Proposed Mitigation Measures

A summary of potential ecological impacts and mitigation measures, by concept plan, is provided in Tables 4-2 through 4-4 on the following pages.

Table 4-2. Summary of Potential Impacts and Mitigation Measures – Concept Plan #1

Concept Plan #1 – Low Flow Side Channel		
Beneficial Use Function(s)	**Potential Ecological Impacts with Implementation of Project**	**Recommended Avoidance, Minimization & Mitigation Measures**
MUN and GWR	The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel. The design diverts low flows for percolation while accommodating for high flows during storm events. Sediment loading at confluence will be greater due to concentrated flows. Irrigation is not available.	• It is recognized that groundwater recharge occurs naturally and appropriate Best Management Practices (BMPs) shall be in place to maintain and if possible improve existing conditions. • The FCD staff will ensure that final design plans, should this concept design alternative be selected, allow for groundwater recharge. • The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel. This approach yields peak flows that are diverted from the flood channel to the low flow channel, which will increase the amount of runoff infiltration in this location.
FRSH	The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel. The design will also produce less sediment than existing conditions and further benefit fresh water replenishment in the low flow condition.	• The low flow channel provides the opportunity for infiltration within the project. Additional design features, including the use of baffle blocks and other such mechanisms, will be identified during final design of the concept to reduce sediment and maximize fresh water replenishment.
WARM and COLD	There are no consistent flows anticipated in this design concept; the low flow channel will maintain warm water flows. The main channel accommodates storm surge.	• As this is an intermittent stream, COLD flows are not manageable nor are they currently maintained. The FCD will evaluate warm freshwater habitat and will allow for habitat enhancement within the low flow channel where appropriate through natural revegetation, removal of nonnative vegetation (e.g. tamarisk, arrundo, Siberian elm) and monitoring. • The low flow natural channel will be allowed to re-vegetate with native vegetation as feasible to ensure the continued functions and values for wildlife. Subsequent agency coordination and investigations will be done during the final design phase to determine the specific features which will provide the most benefit and reduce impacts within the natural

Concept Plan #1 – Low Flow Side Channel		
Beneficial Use Function(s)	**Potential Ecological Impacts with Implementation of Project**	**Recommended Avoidance, Minimization & Mitigation Measures**
		channel.
WILD	The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel. The low flow channel may provide an area for which wildlife can continue to occupy and function. It is not anticipated that the low flow channel has sufficient water to maintain sufficient habitat.	• The FCD will evaluate the area for wildlife habitat and conduct habitat enhancement through natural revegetation, removal of nonnative species and monitoring. • Additional design features, including the planting of native vegetation for wildlife, will be assessed and identified for the low flow natural channel during the final design phase. Subsequent agency coordination and investigations will be done during the final design phase to determine the specific features which will provide the most benefit and reduce impacts within the natural channel.
RARE	The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel. It is not anticipated that the low flow channel has sufficient water to maintain future habitat.	• The FCD will evaluate the Mojave River vole population and conduct habitat enhancement through natural revegetation, removal of nonnative species and monitoring. • The FCD will maintain, improve and increase suitable habitat for least Bell's vireo and southwestern willow flycatcher through habitat monitoring, re-vegetation, removal of nonnative vegetation, and annual bird surveys. In addition, the FCD will continue to remove brown-headed cowbirds (*Molothrus ater*), which brood parasite a number of nesting birds, including the least Bell's vireo and southwestern willow flycatcher from the Mojave River from the Mojave Narrows Regional Park to the VVWRA . • The Lewis Education Center (LCER) will continue its nonnative vegetation eradication efforts.
REC-1	The proposed concept will be consistent with existing conditions and contact water recreation will continue to be unavailable within the limits of the drainage area.	• Avoidance and minimization measures related to impacts on contact water recreation are not required for this concept as this is not currently used or planned as a beneficial use for the Desert Knolls Wash concept.
REC-2	Opportunities for non-contact recreation, consistent with existing opportunities, will still be available under the	• The FCD will, to the maximum extent practicable, provide design modifications during the final design stage of the concept to allow access

Concept Plan #1 – Low Flow Side Channel		
Beneficial Use Function(s)	**Potential Ecological Impacts with Implementation of Project**	**Recommended Avoidance, Minimization & Mitigation Measures**
	proposed concept design and will be further addressed during the final design stage of the concept.	for hiking and cross-country running. The FCD will also coordinate with enforcement personnel to further minimize illegal off-road vehicle use.
COM	The proposed concept will be consistent with existing conditions and no opportunities for commercial or sports fishing will be available within the limits of the drainage area.	• Avoidance and minimization measures related to impacts on commercial sports fishing activities are not required for this concept as this is not currently or planned as a beneficial use for the Desert Knolls Wash concept.
WQE	The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel. This design is anticipated to divert low flows that will allow for greater percolation and groundwater recharge. The design will also produce less sediment than existing conditions and further benefit water quality in the region. Urban run-off low flows may have the higher concentrations of urban pollutants. The low flow channels assist in water quality enhancement by providing opportunity for infiltration before migration downstream.	• The LCER will collaborate with FCD staff in fluvial sediment monitoring, (observation and photos taken over time). • To ensure protection of riparian and wetland habitat that occurs downstream of the concept, the FCD will reduce scour and sediment transport upstream that is adversely affecting the riparian wetland. Protection options will be assessed and identified during review and approval of project final design plans. • To the maximum extent practicable, the FCD will incorporate into final plans natural enhancements for improvement of water quality through such devises as erosion control, bank stabilizers, siltation control, and maintenance to ensure channel integrity, and filtration and purification of urban runoff pollutants. These additional elements will vary as the flows change and the low flow channel matures.
FLD	The concept design allows for bypass flows from a concrete channel to an adjacent low flow natural channel. The low flow channel will provide opportunity for infiltration and allow for diversion of peak event flows. Main channel is designed to meet 100 year event flows.	• The low flow channel provides the opportunity for infiltration within the project.
Cultural Resource	Construction activities associated with the concept within Reach 1 may result in the disturbance of the identified archaeological site.	• FCD will coordinate with the Lewis Center to house found artifacts at LCER for educational purposes. • Native American consultation will be implemented throughout the

Concept Plan #1 – Low Flow Side Channel		
Beneficial Use Function(s)	**Potential Ecological Impacts with Implementation of Project**	**Recommended Avoidance, Minimization & Mitigation Measures**
		concept. Monitors will be onsite during excavation and construction activities to minimize impacts to the archaeological resources present.

Table 4-3. Summary of Anticipated Conditions and Mitigation Measures – Concept Plan #2

Concept Plan #2 – Gabion Mat Drop Structures		
Beneficial Use Function(s)	**Potential Ecological Impacts with Implementation of Project**	**Recommended Avoidance, Minimization & Mitigation Measures**
MUN and GWR	The concept design allows for a natural channel with gabion mattress drop structures which function as stabilizers throughout the wash plan. A natural rock slope will be utilized as allowed and identified in final concept design plans. This design is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge. The design will also produce less sediment than existing conditions and further benefit municipal and domestic water supplies for the region. Irrigation is not available.	• It is recognized that groundwater recharge occurs naturally and appropriate Best Management Practices (BMPs) shall be in place to maintain and, if possible, improve existing conditions. • The FCD staff will ensure that final design plans, should this concept design alternative be selected, allow for groundwater recharge. • The gabion mat drop structure design allows for significant percolation and groundwater recharge which will increase the amount of runoff infiltration in this location. This design approach increases water volume storage capacity within the gabion structure, which then infiltrates locally.
FRSH	The concept design allows for a natural channel with gabion mattress drop structures which function as stabilizers throughout the wash plan. A natural rock slope will be utilized as allowed and identified in final concept design plans.	• Design features, including the gabion mattress, natural rock slope, gravel filters, and other such natural design features, will be identified during final design of the concept to reduce sediment and maximize fresh water replenishment.
WARM and COLD	The concept alternative has been designed to include a natural channel with gabion mattress drop structures	• As this is an intermittent stream, COLD flows are not manageable nor

Concept Plan #2 – Gabion Mat Drop Structures		
Beneficial Use Function(s)	**Potential Ecological Impacts with Implementation of Project**	**Recommended Avoidance, Minimization & Mitigation Measures**
	which function as stabilizers. The natural channel concept will allow existing plant communities to be maintained and supported.	are they currently maintained. The FCD will evaluate warm freshwater habitat and will allow for habitat enhancement where appropriate through natural revegetation, removal of invasive species, and monitoring. • The project area will be allowed to re-vegetate with native vegetation where appropriate to ensure continued functions and values for wildlife. Additional design features will be identified for this concept alternative during the final design phase. Subsequent agency coordination and investigations will be done during the final design phase to determine the specific features which will provide the most benefit and reduce impacts within the natural channel.
WILD	The concept alternative has been designed to include a natural channel with gabion mattress drop structures which function as stabilizers. The natural channel concept will provide an area for which wildlife habitat can continue to occupy and function. Habitat will be allowed to be established along the banks and away from the main channel.	• The FCD will evaluate area wildlife habitat and conduct habitat enhancement through natural revegetation, removal of nonnative species (e.g. tamarisk, arrundo, Siberian elm) and monitoring. • Natural revegetation will be allowed where appropriate to promote its use by area wildlife. Subsequent agency coordination and investigations will be done during the final design phase to determine the specific features which will provide the most benefit and reduce impacts within the natural channel.
RARE	The concept alternative has been designed to include a natural channel with gabion mattress drop structures which function as stabilizers. The natural channel concept will provide an area for identified rare, threatened or endangered species in the area can continue to occupy and function.	• The FCD will evaluate the Mojave River vole population and conduct habitat enhancement through natural revegetation, removal of nonnative species, and monitoring. • The FCD is to maintain, improve and increase suitable habitat for least Bell's vireo and southwestern willow flycatcher through habitat monitoring, revegetation, removal of nonnative species, and annual bird surveys. In addition, the FCD will continue to remove brown-headed cowbirds (*Molothrus ater*), which brood parasite a number of nesting birds, including the least Bell's vireo and southwestern willow flycatcher from the Mojave River from the Mojave Narrows Regional Park to the VVWRA . • The Lewis Education Center (LCER) will continue its nonnative vegetation eradication efforts.

Concept Plan #2 – Gabion Mat Drop Structures		
Beneficial Use Function(s)	**Potential Ecological Impacts with Implementation of Project**	**Recommended Avoidance, Minimization & Mitigation Measures**
REC-1	The proposed concept will be consistent with existing conditions and contact water recreation will continue to be unavailable within the limits of the drainage area.	• Avoidance and minimization measures related to impacts on contact water recreation are not required for this concept as this is not currently or planned as a beneficial use for the Desert Knolls Wash concept.
REC-2	Opportunities for non-contact recreation, consistent with existing opportunities, will still be available under the proposed concept design and will be further addressed during the final design stage of the concept. Non-contact recreation except near the LCER in Reach 1 is anticipated to be limited. A pedestrian trail may be established in final design plans depending on available right-of-way and hydraulic features.	• The FCD will, to the maximum extent practicable, provide design modifications during the final design stage of the concept, to allow access for hiking and cross-country running. The FCD will also coordinate with enforcement personnel to further minimize illegal off-road vehicle use.
COM	The proposed concept will be consistent with existing conditions and no opportunities for commercial or sports fishing will be available within the limits of the drainage area.	• Avoidance and minimization measures related to impacts on commercial sports fishing activities are not required for this concept as this is not currently or planned as a beneficial use for the Desert Knolls Wash concept.
WQE	The concept alternative has been designed to include a natural channel with gabion mattress drop structures which function as stabilizers. This design is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge. The design will also produce less sediment than existing conditions and further benefit water quality in the region. Opportunities may also be available to manage the stream bottom to maximize the lower flows percolation.	• The LCER will collaborate with FCD staff to undertake fluvial sediment monitoring (observation and photos taken over time).. • To ensure protection of riparian and wetland habitat that occurs downstream of the concept, the FCD will reduce scour and sediment transport upstream that is adversely affecting the riparian wetland. Protection options will be identified in the final design alternative analysis. • To the maximum extent practicable, the FCD will incorporate into final plans natural enhancements for improvement of water quality through such devices as erosion control, bank stabilizers, siltation control, and maintenance to ensure channel integrity, and filtration and purification of naturally occurring water pollutants. These additional elements will vary as the flows change and the low flow channel matures.
FLD	The concept alternative has been designed to include a natural channel with gabion mattress drop structures	• To avoid and/or minimize the excess flow runoff, the gabion structure is

Concept Plan #2 – Gabion Mat Drop Structures		
Beneficial Use Function(s)	**Potential Ecological Impacts with Implementation of Project**	**Recommended Avoidance, Minimization & Mitigation Measures**
Cultural Resource	which function as stabilizers. Limited water storage is available in this concept except for managed low flows. Construction activities associated with the concept within Reach 1 may result in the disturbance of the identified archaeological site.	anticipated to provide a means to manage the low flow volume and to allow infiltration. • FCD will coordinate with the LCER to house found artifacts at LCER for educational purposes. • Native American consultation will be implemented throughout the concept. Monitors will be onsite during excavation and construction activities to minimize impacts to the archaeological resources present.

Table 4-4. Summary of Anticipated Conditions and Mitigation Measures – Concept Plan #3

Concept Plan #3 – Boulder Stabilizer		
Beneficial Use Function(s)	**Potential Ecological Impacts with Implementation of Project**	**Recommended Avoidance, Minimization & Mitigation Measures**
MUN and GWR	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area may be constructed adjacent to the natural channel and identified in final concept design plans. This design is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge. The design will also produce less sediment than existing conditions and further benefit municipal and domestic water supplies for the region. Irrigation is not available.	• It is recognized that groundwater recharge occurs naturally and appropriate Best Management Practices (BMPs) shall be in place to maintain and, if possible, improve existing conditions. • The FCD staff will ensure that our preferred design allows for groundwater recharge. • The boulder stabilizer design allows for significant percolation and groundwater recharge which will increase the amount of runoff infiltration in this location. This design approach increases water volume storage capacity within the boulder voids which then infiltrates locally.
FRSH	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area may naturally occur adjacent to the natural channel.	• Design features, including the boulder stabilizers, natural vegetated areas, and other such natural design features, will be identified during final design of the concept to reduce sediment and maximize fresh water replenishment.
WARM and COLD	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area can be constructed adjacent to the natural channel and identified with further details in final design plans. The natural channel concept and adjacent naturally vegetated area will allow existing plant communities to be maintained and supported.	• As this is an intermittent stream, COLD flows are not manageable nor are they currently maintained. The FCD will evaluate warm freshwater habitat and will allow for habitat enhancement where appropriate through natural revegetation, removal of invasive species, and monitoring. • The project area will be allowed to re-vegetate with native vegetation where appropriate to ensure continued functions and values for wildlife. Additional design features will be identified for this concept alternative during the final design phase. Subsequent agency coordination and investigations will be done during the final design phase to determine the specific features which will provide the most benefit and reduce impacts within the natural channel.

Concept Plan #3 – Boulder Stabilizer		
Beneficial Use Function(s)	**Potential Ecological Impacts with Implementation of Project**	**Recommended Avoidance, Minimization & Mitigation Measures**
WILD	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area will be constructed adjacent to the natural channel and identified in final concept design plans. The natural channel concept will provide an area for which wildlife habitat may continue to occupy and function.	• The FCD will evaluate area wildlife habitat and conduct habitat enhancement through natural revegetation, removal of nonnative species (e.g. tamarisk, arrundo, Siberian elm) and monitoring. • Natural revegetation will be allowed where appropriate to promote its use by area wildlife. Subsequent agency coordination and investigations will be done during the final design phase to determine the specific features which will provide the most benefit and reduce impacts within the natural channel.
RARE	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area will be constructed adjacent to the natural channel and identified in final design plans. The natural channel concept will provide an area for which identified rare, threatened or endangered species in the area can continue to occupy and function.	• The FCD will evaluate the Mojave River vole population and conduct habitat enhancement through natural revegetation, removal of nonnative species, and monitoring. • The FCD is to maintain, improve and increase suitable habitat for least Bell's vireo and southwestern willow flycatcher through habitat monitoring, revegetation, removal of nonnative species, and annual bird surveys. In addition, the FCD will continue to remove brown-headed cowbirds (*Molothrus ater*), which brood parasite a number of nesting birds, including the least Bell's vireo and southwestern willow flycatcher from the Mojave River from the Mojave Narrows Regional Park to the VVWRA . • The Lewis Education Center (LCER) will continue its nonnative vegetation eradication efforts.
REC-1	The proposed concept will be consistent with existing conditions and contact water recreation will continue to be unavailable within the limits of the drainage area.	• Avoidance and minimization measures related to impacts on contact water recreation are not required for this concept as this is not currently or planned as a beneficial use for the Desert Knolls Wash concept.
REC-2	Opportunities for non-contact recreation, consistent with existing opportunities, will still have limited availability under the proposed concept design. A pedestrian trail may be established in final design plans depending on available right-of-way and hydraulic features.	• The FCD will to the maximum extent practicable provide design modifications to allow access for hiking and cross-country running. The FCD will also coordinate with enforcement personnel to further minimize illegal off-road vehicle use.

Concept Plan #3 – Boulder Stabilizer		
Beneficial Use Function(s)	**Potential Ecological Impacts with Implementation of Project**	**Recommended Avoidance, Minimization & Mitigation Measures**
COM	The proposed concept will be consistent with existing conditions and no opportunities for commercial or sports fishing will be available within the limits of the drainage area.	• Avoidance and minimization measures related to impacts on commercial sports fishing activities are not required for this concept as this is not currently or planned as a beneficial use for the Desert Knolls Wash concept.
WQE	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area will be constructed adjacent to the natural channel and identified in final concept design plans. This design is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge. The design will also produce less sediment than existing conditions and further benefit water quality in the region.	• The LCER will collaborate with FCD staff to undertake fluvial sediment monitoring, (observationand photos taken over time). • To ensure protection of riparian and wetland habitat that occurs downstream of the concept, the FCD will reduce scour and sediment transport upstream that is adversely affecting the riparian wetland. Protection options will be identified in the final design alternative analysis. • To the maximum extent practicable, the FCD will incorporate natural enhancements for improvement of water quality through such devices as erosion control, bank stabilizers, siltation control, and maintenance to ensure channel integrity, and filtration and purification of naturally occurring water pollutants. These additional elements will vary as the flows change and the low flow channel matures.
FLD	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area will be constructed adjacent to the natural channel and identified in final concept design plans. This design is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge.	• To avoid and/or minimize the excess flow runoff, FCD is proposing the boulder stabilizer method as a means to manage the low flow volume and to allow infiltration.

Concept Plan #3 – Boulder Stabilizer		
Beneficial Use Function(s)	**Potential Ecological Impacts with Implementation of Project**	**Recommended Avoidance, Minimization & Mitigation Measures**
Cultural Resource	Construction activities associated with the concept within Reach 1 will result in the disturbance of the identified archaeological site.	• FCD will coordinate with the LCER to house found artifacts at LCER for educational purposes. • Native American consultation will be implemented throughout the concept. Monitors will be onsite during excavation and construction activities to minimize impacts to the archaeological resources present.

5.0 EVALUATION OF CONCEPTUAL ALTERNATIVES

As previously discussed in Chapter 1, the District's objective for the review and selection of a preferred concept plan for the Desert Knolls Wash project is to identify a plan that meets water quality standards and does not result in significant adverse impacts to the hydrologic and ecological functions of the Wash and portions downstream. The following objectives were considered when assessing each concept:

- Meet water quality objectives of the Basin Plan and preserve the beneficial uses of the Mojave River and Desert Knolls Wash
- 100-year event flood risk reduction
- Minimize right-of-way (ROW) impacts

A review of the three concepts in comparison to existing conditions reveals few differences to the hydraulic and sediment transport characteristics of the channel. All of the concepts result in less sediment than the existing condition (Appendix D).

Concept 1 reduces sediment the most while maintaining a smooth hydraulic profile. There is less variation in the change of the channel inverts for Concept 1. Concept 2 and Concept 3 have a more variable invert. While Concepts 1 and 2 provide the most benefits to address flood risk issues, Concepts 2 and 3 are the most effective in reducing velocities downstream and in minimizing impacts to wildlife functions and values. Concepts 2 and 3 offer the use of more natural materials incorporated into project designs. Concept 2 appears to allow for a greater probability of success in establishing and maintaining habitat within the channel while maintaining flood protection and beneficial uses at the receiving waters (Mojave River Narrows). However concepts 2 and 3 are very similar. Therefore, at this conceptual stage, the District has identified that the Least Environmentally Damaging Practical Alternative (LEDPA) is Concept 2, Concept 3, or a hybrid of both.

A comparison of all three concepts related to the above identified objectives is provided below in Table 5-1 to assist the District in selection of a preferred plan.

Table 5-1. Evaluation of Concept Plans by Objectives

EVALUATION OF CONCEPT PLANS BY OBJECTIVES			
Objective	*Concept 1*	*Concept 2*	*Concept 3*
Water Quality Objectives & Beneficial Uses	• The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel during low flows , for percolation purposes, while accommodating for high flows during peak flows. The low flow channel will have insufficient water to maintain a rich and diverse habitat. In some areas, there is insufficient right-of-way to support a low-flow channel adjacent to the concrete channel. Areas of passive revegetation, and areas to be revegetated downstream coupled with the removal of nonnative species will be identified in final concept design plans. • This design is anticipated to have higher velocity flows and less percolation than the other 2 concepts during peak flows due to the concrete-lined channel that conveys large flows. The low flow channel allows for groundwater percolation.	• The concept design allows for a natural channel with gabion mattress drop structures which function as stabilizers throughout the wash plan. An ungrouted natural rock slope will be utilized as allowed. The natural channel concept will provide an area for which wildlife can continue to occupy and function. Habitat will be allowed to be established in areas where it is feasible (most of slopes and channel are current devoid of vegetation due to erosive forces). Areas of passive revegetation, and areas to be revegetated downstream coupled with the removal of nonnative species will be identified in final concept design plans. • This design is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge.	• The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. The natural channel concept will provide an area for which wildlife can continue to occupy and function. Habitat will be allowed to be established in areas where it is feasible (most of slopes and channel are current devoid of vegetation due to erosive forces). Areas of passive revegetation, and areas to be revegetated downstream coupled with the removal of nonnative species will be identified in final concept design plans. • This design is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge.

EVALUATION OF CONCEPT PLANS BY OBJECTIVES			
Objective	*Concept 1*	*Concept 2*	*Concept 3*
	• The low flow channel will allow for percolation and infiltration of urban runoff flows. The concrete channel will not allow for infiltration of urban runoff during peak flows.	• Channel design provides for low flow infiltration of urban runoff flows allowing for pollutants to settle out before flow reaches wetlands.	• Channel design provides for low flow infiltration of urban runoff flows allowing for pollutants to settle out before flow reaches wetlands.
	• The design will produce less sediment than existing conditions and further benefit municipal and domestic water supplies for the region.	• Gabion structures allow for additional sediment management in larger flow events, will produce less sediment than existing conditions and further benefit municipal and domestic water supplies for the region.	• The design will produce less sediment than existing conditions and further benefit municipal and domestic water supplies for the region.
	• Opportunities for non-contact recreation, consistent with existing opportunities, will have limited availability if any under the proposed concept design and will be further addressed during the final design stage of the concept. Non-contact recreation except near the Lewis Center in Reach 1 is anticipated to be limited.	• Opportunities for non-contact recreation, consistent with existing opportunities, will still be available under the proposed concept design and will be further addressed during the final design stage of the concept. Non-contact recreation except near the Lewis Center in Reach 1 is anticipated to be limited.	• Opportunities for non-contact recreation, consistent with existing opportunities, will still have limited availability under the proposed concept design and will be further addressed during the final design stage of the concept. Non-contact recreation except near the Lewis Center in Reach 1 is anticipated to be limited.

EVALUATION OF CONCEPT PLANS BY OBJECTIVES			
Objective	*Concept 1*	*Concept 2*	*Concept 3*
100-Year Flood Event Risk Reduction	• provides for 2.5-feet of freeboard • Low flow conditions will aid percolations and allow for some diversion of peak event flows. • Main channel is designed to meet 100 year event flows and protect the adjacent properties from 100-year storm events.	• provides for 3-feet of freeboard • This design is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge. • Design allows opportunities to manage the stream bottom to maximize the lower flows percolation. • Design meets 100 year event flows and protects the adjacent properties from 100-year storm events.	• provides for 3-feet of freeboard • The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan which is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge. • Design meets 100 year event flows and protects the adjacent properties from 100-year storm events.
ROW Impacts	• Temporary: 6.4 acres • Permanent: 17 acres	• Temporary: 6 acres • Permanent: 19 acres	• Temporary: 6 acres • Permanent: 20 acres
Cost	$36.3 million	$26.6 million	$29.6 million

6.0 APPENDICES

A. Concept #1 Plans – Low Flow Side Channel

B.

1. Concept #2 Plans – Gabion Mat Drop Structure
2. Allard Engineering Concept Plan

C. Concept #3 Plans – Boulder Stabilizer

D. Hydraulic & Sediment Transport Data and Analyses

E. Cost Estimates & ROW Impacts

F.

1. June 2009 California Rapid Assessment Method (CRAM) Report
2. County EMD Biological Report, September 2008

G. San Francisco Regional Water Quality Control Board Rapid Permit Checklist

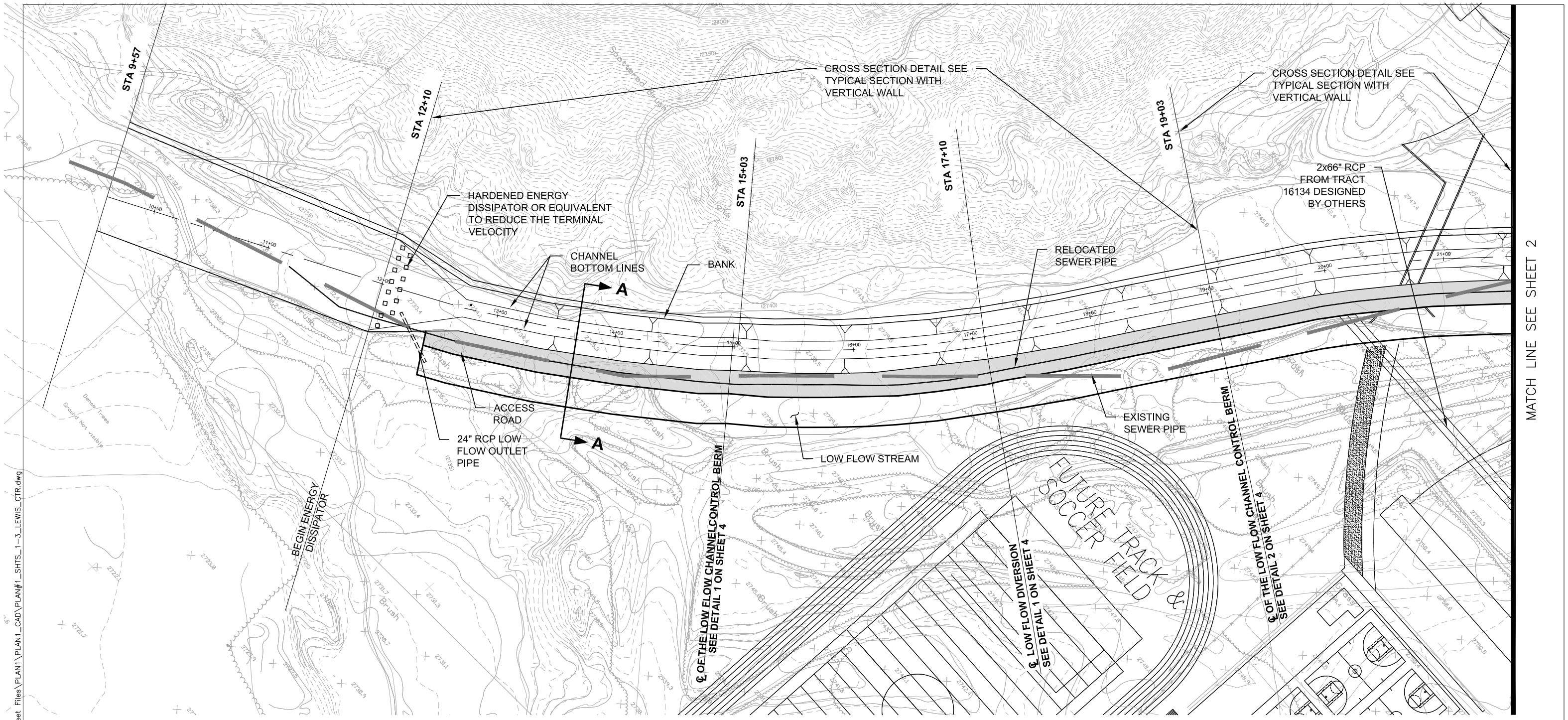
H. Biological Technical Report

I. Ecological Management Plan – Concept #1

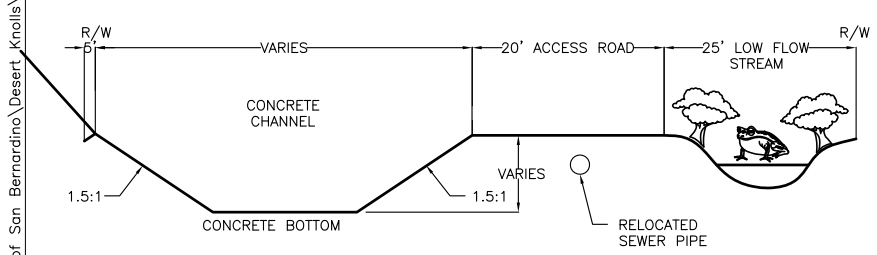
J. Ecological Management Plan – Concept #2

K. Ecological Management Plan – Concept #3

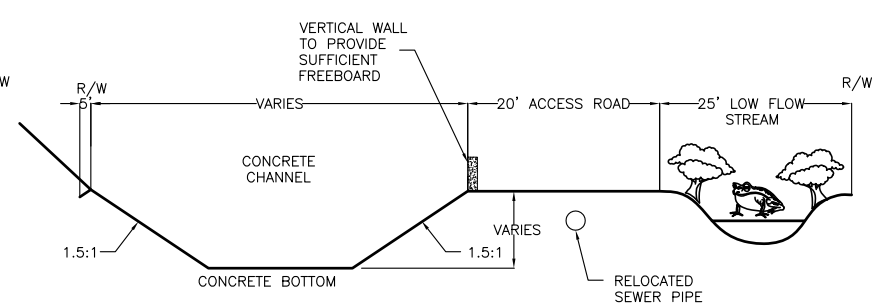
A. Concept #1 Plans – Low Flow Side Channel



PLAN #1, DOWNSTREAM/REACH 1



TYPICAL SECTION, SECTION A–A & B–B



TYPICAL SECTION WITH VERTICAL WALL

0 10' 20'

NOTES:
1. AFTER GEOTECHNICAL ANALYSIS IS CONDUCTED, THE CONCRETE CHANNEL MAYBE EXTENDED TO THE END OF EXISTING MASSIVE EXPOSED BEDROCK.
2. FOR CROSS-SECTION DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.

0 40' 80' 160' 240'

URS Corporation

ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
LEWIS CENTER CHANNEL/REACH 1

Proj. No.: 38001579.30002		Date: 6-16-2011	
Project: DESERT KNOLLS WASH		Sheet No.: 1 OF 14	Rev.: 2
		Scale: SEE SCALE BAR	

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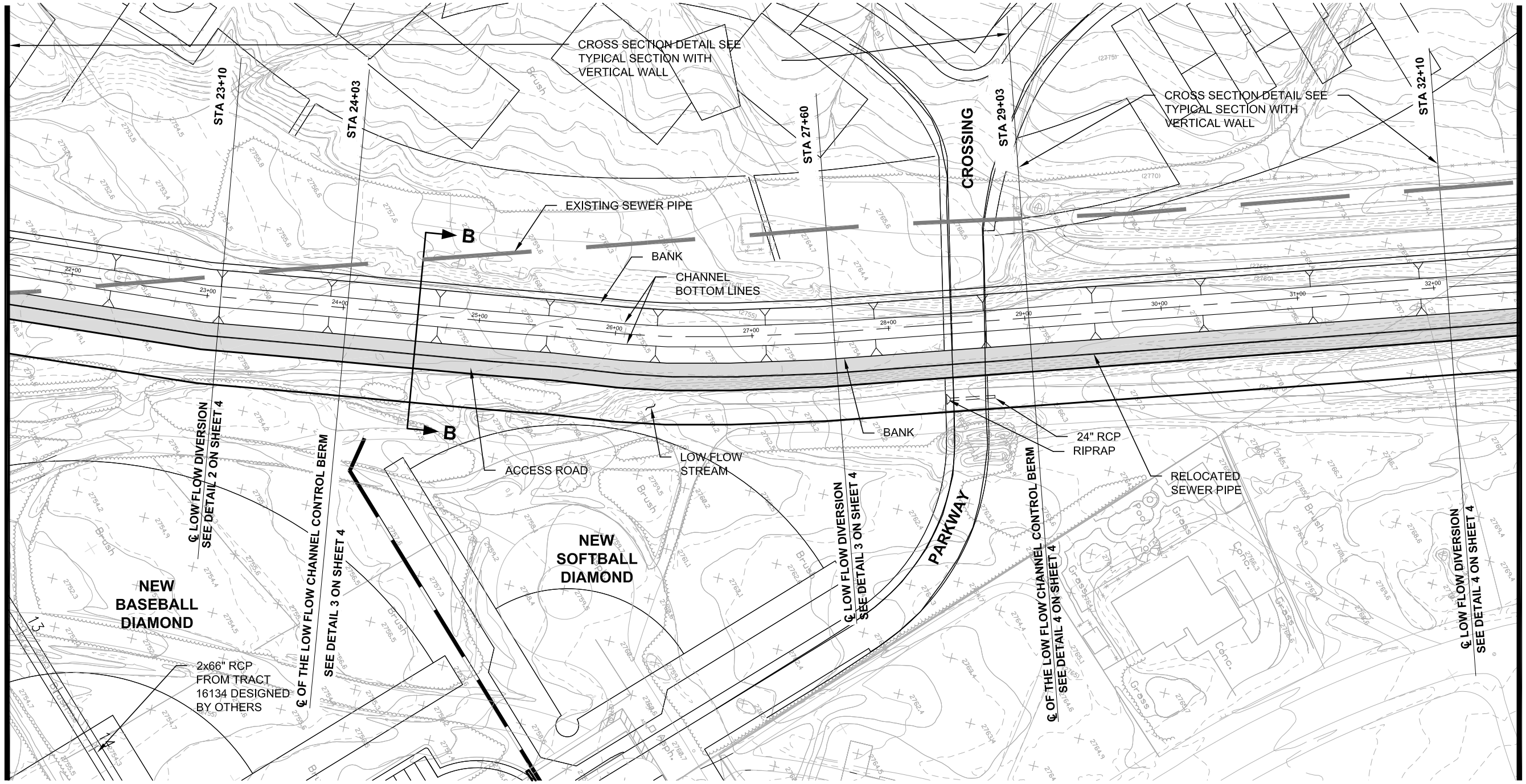
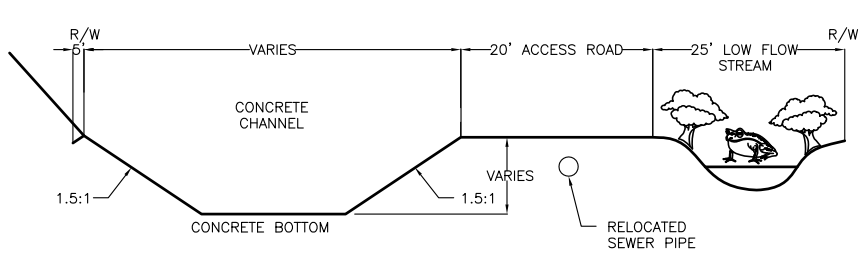
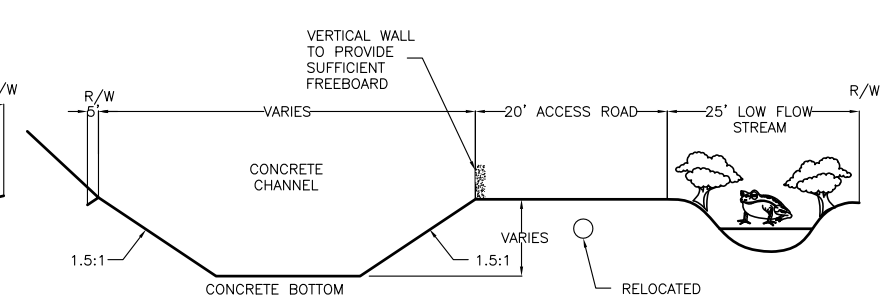


PLAN #1, DOWNSTREAM/REACH 1



TYPICAL SECTION, SECTION A–A & B–B



TYPICAL SECTION WITH VERTICAL WALL

NOTES:
1. AFTER GEOTECHNICAL ANALYSIS IS CONDUCTED, THE CONCRETE CHANNEL MAY BE EXTENDED TO THE END OF EXISTING MASSIVE EXPOSED BEDROCK.
2. FOR CROSS-SECTION DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.

0 10' 20'

0 40' 80' 160' 240'

URS Corporation

ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
LEWIS CENTER CHANNEL/REACH 1

Proj. No.: 38001579.30002		Date: 6-16-2011	
Project: DESERT KNOLLS WASH		Sheet No.: 2 OF 14	Rev.: 2
		Scale: SEE SCALE BAR	

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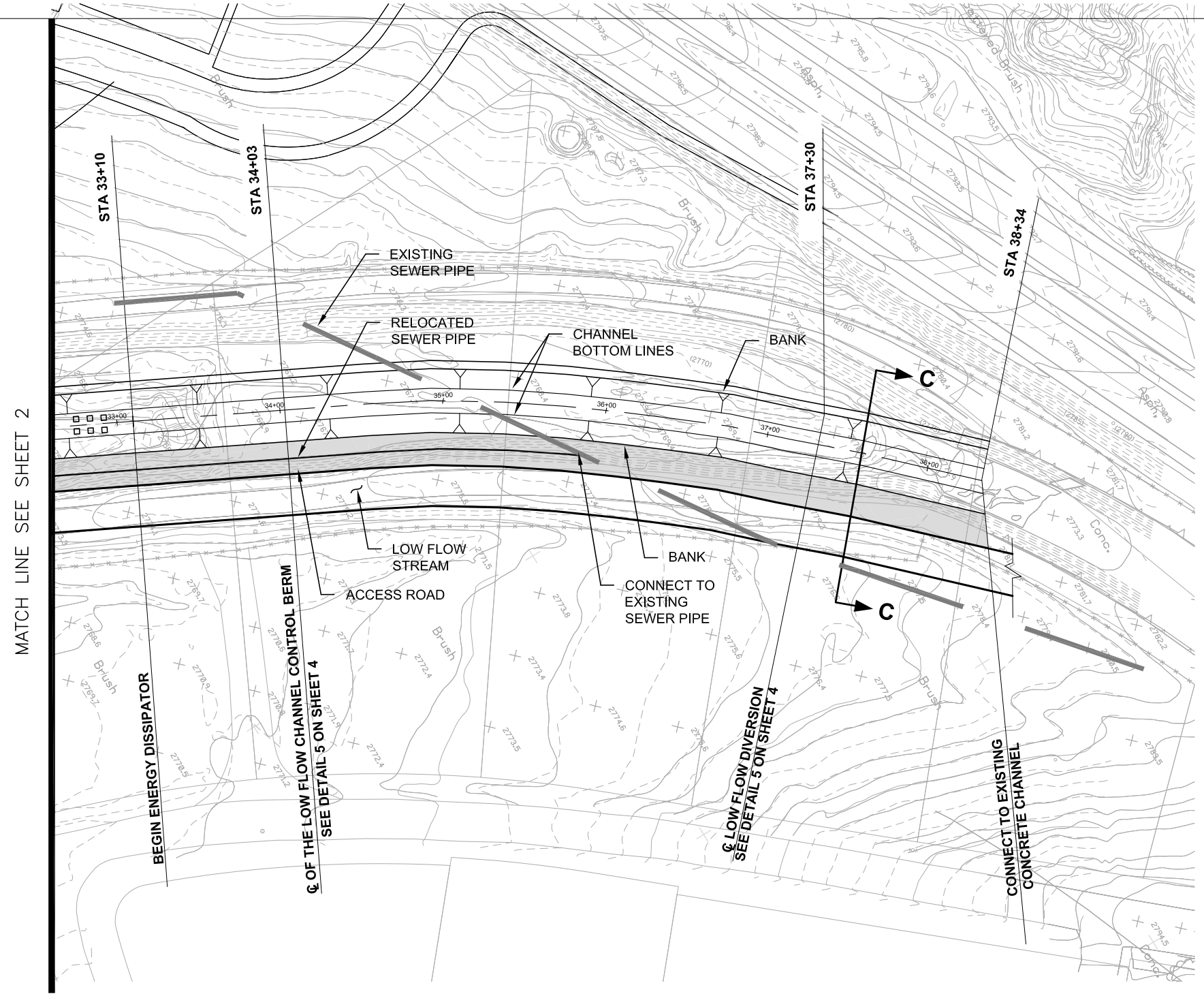

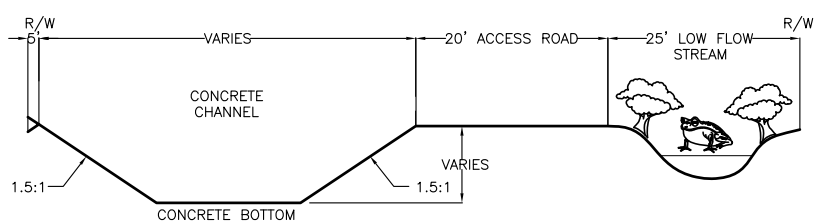

NOTE: FOR CROSS-SECTION DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.

TYPICAL SECTION, SECTION C–C

0 10' 20'

PLAN #1, DOWNSTREAM/REACH 1

NOTES:
1. AFTER GEOTECHNICAL ANALYSIS IS CONDUCTED, THE CONCRETE CHANNEL MAY BE EXTENDED TO THE END OF EXISTING MASSIVE EXPOSED BEDROCK.
2. FOR CROSS-SECTION DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.

N

0 40' 80' 160' 240'

URS Corporation

ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
LEWIS CENTER CHANNEL/REACH 1

Proj. No.: 38001579.30002	Date: 6-16-2011		
Project: DESERT KNOLLS WASH	Sheet No.: 3 OF 14	Rev.: 2	
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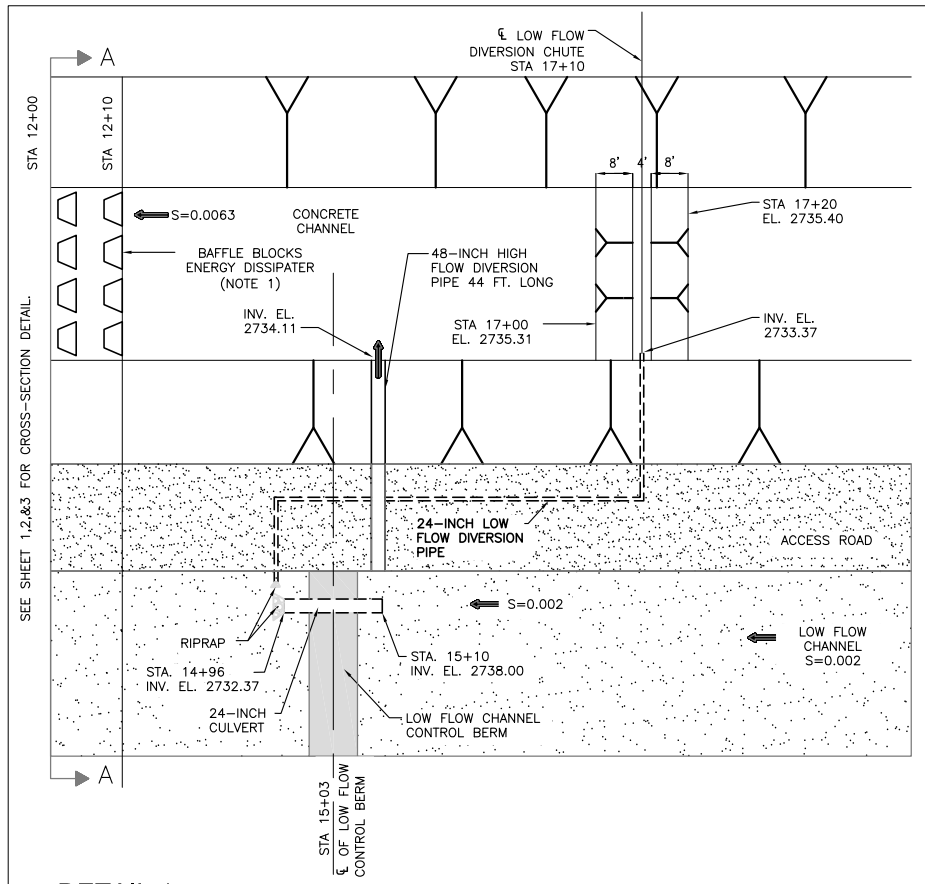

DETAIL 1

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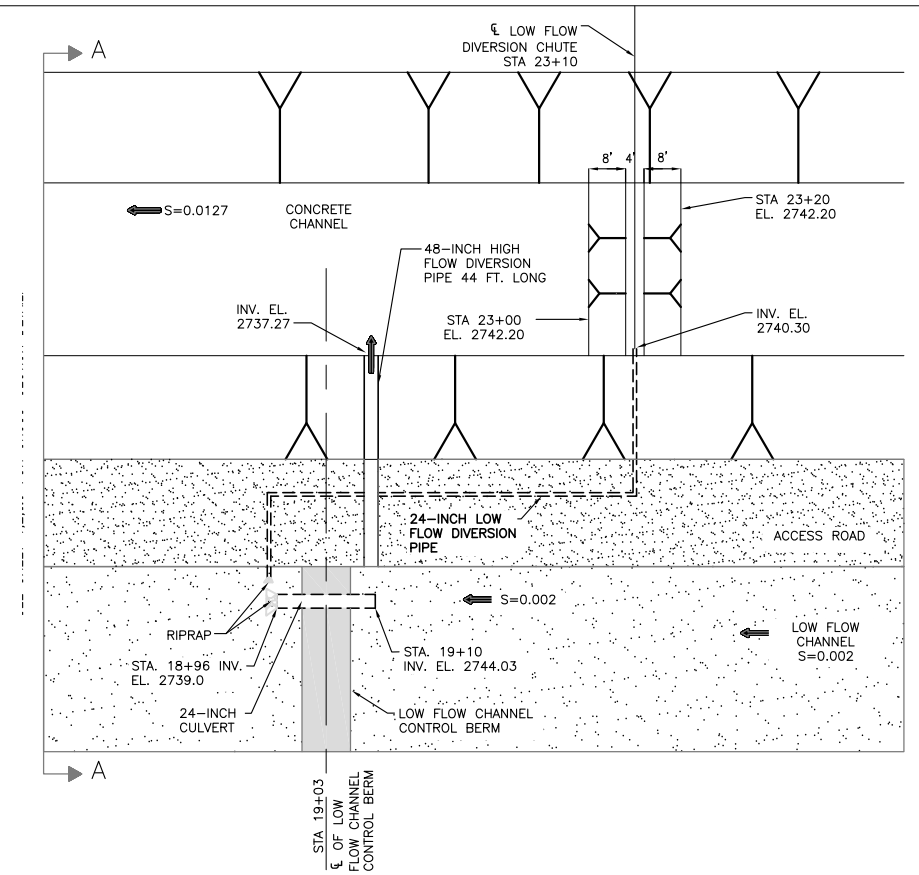

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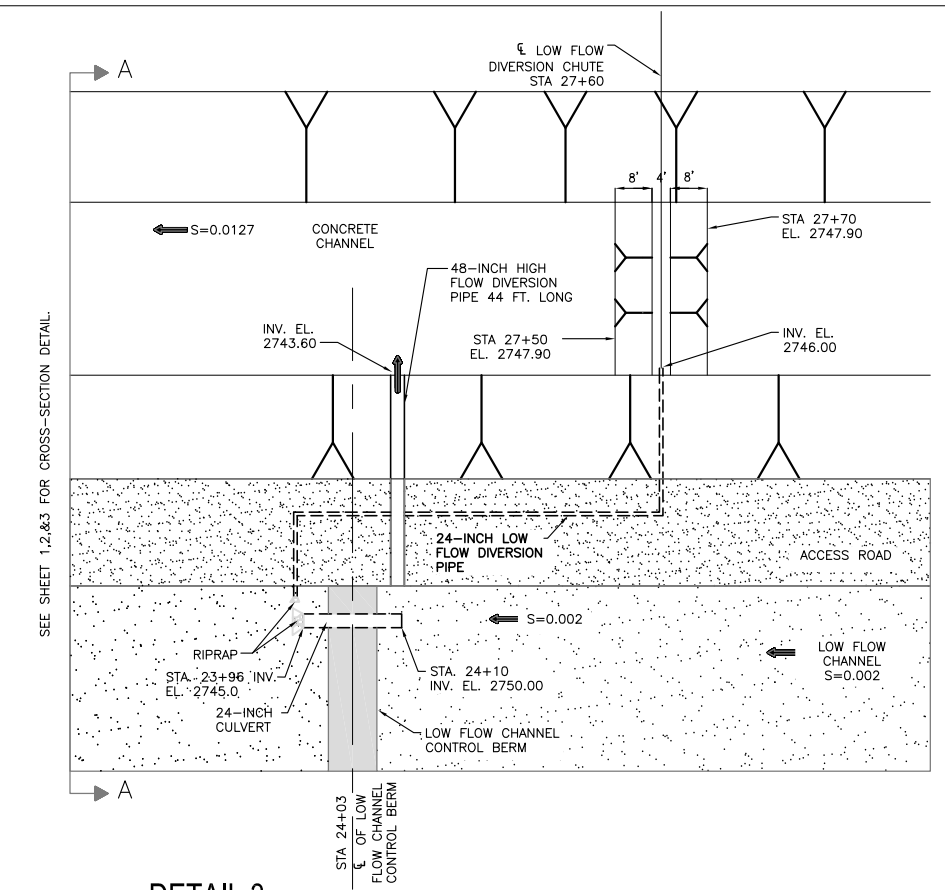

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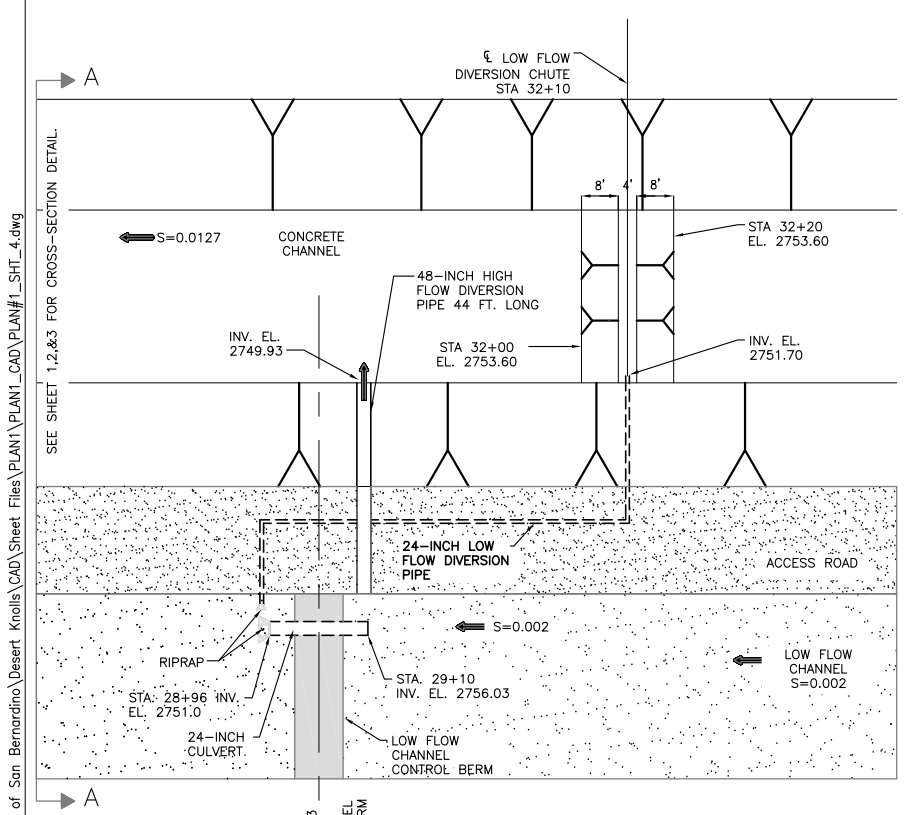

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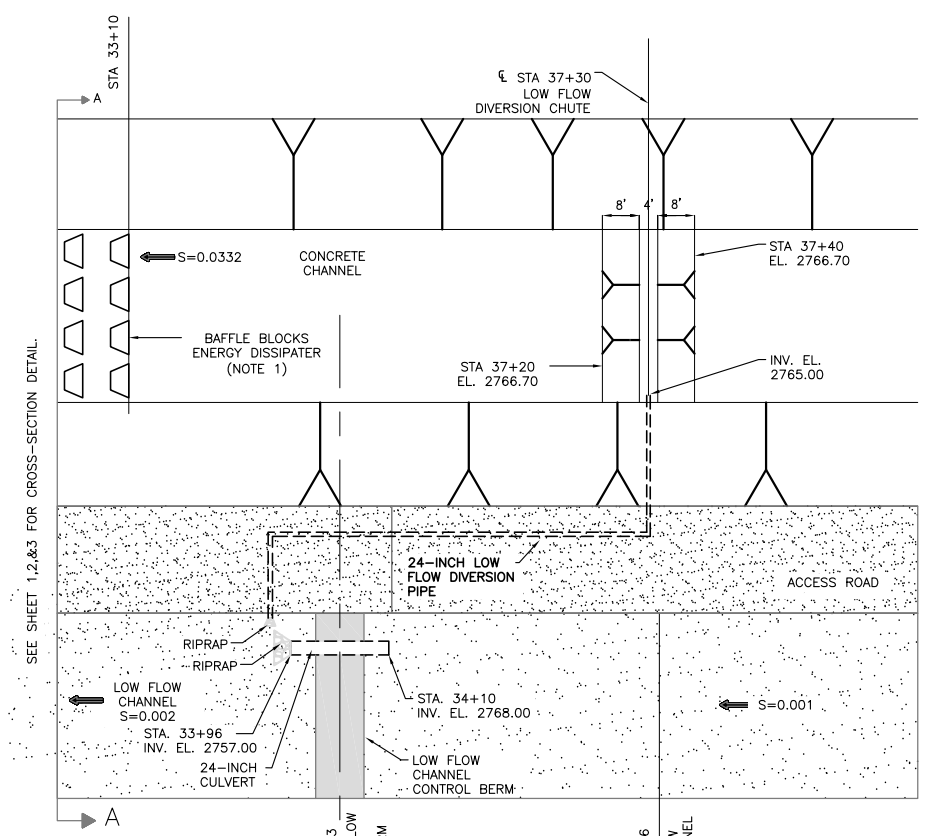

DETAIL 5

SCALE: N.T.S.

NOTE 1: ENERGY DISSIPATER TO BE ANALYZED DURING DESIGN STAGE.

NOTE 2: FOR DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.

URS Corporation

DETAILS
ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
LEWIS CENTER CHANNEL/REACH 1

Proj. No.: 38001579.30002	Date: 6-16-2011		
Project: DESERT KNOLLS WASH	Sheet No.: 4 OF 14	Rev.: 2	
	Scale: N.T.S		

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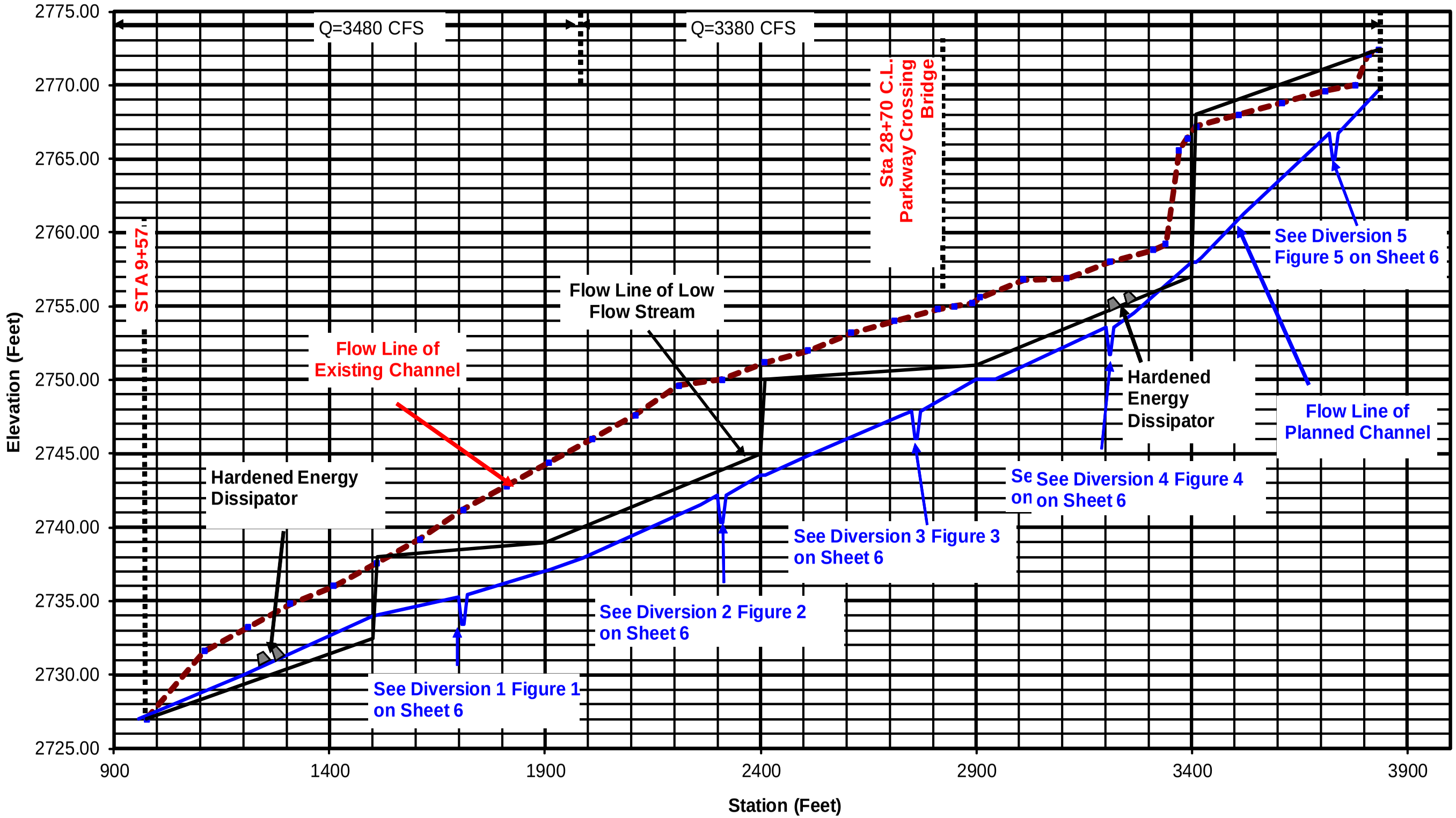

CONCEPTUAL ALTERNATIVE PLAN NO.1
TRAPEZOIDAL CONCRETE CHANNEL WITH LOW FLOW STREAM DOWNSTREAM OF THE EXISTING CONCRETE CHANNEL
(Lewis Center Channel)

DOWNSTREAM PROFILE
SCALE: N.T.S.

URS Corporation

DOWNSTREAM PROFILE
ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
LEWIS CENTER CHANNEL/REACH 1

Proj. No.: 38001579.30002	Date: 6-16-2011		
Project: DESERT KNOLLS WASH	Sheet No.: 5 OF 14	Rev.: 2	
	Scale: N.T.S.		

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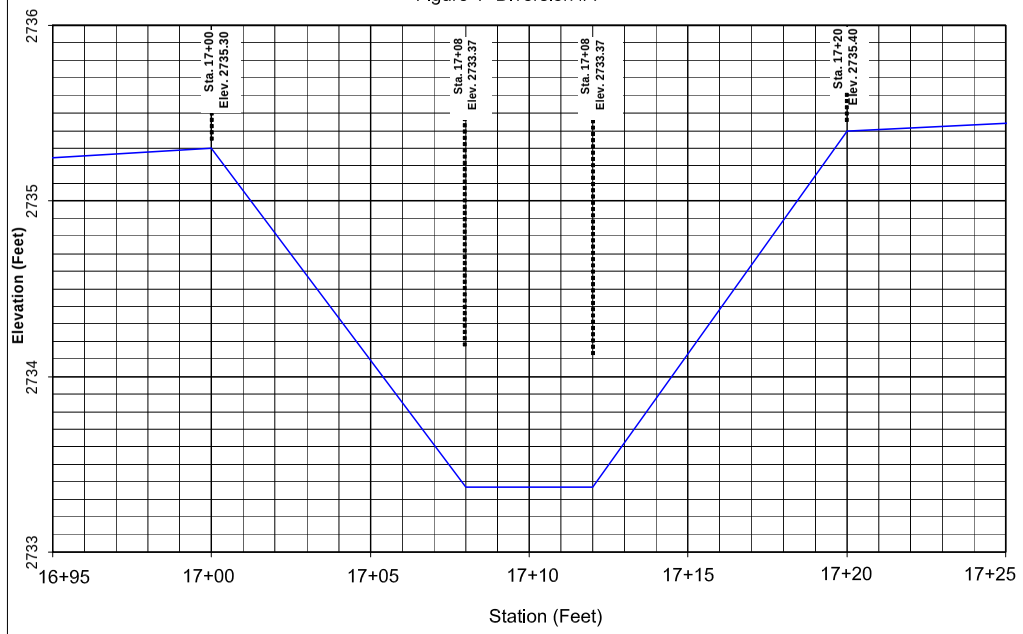
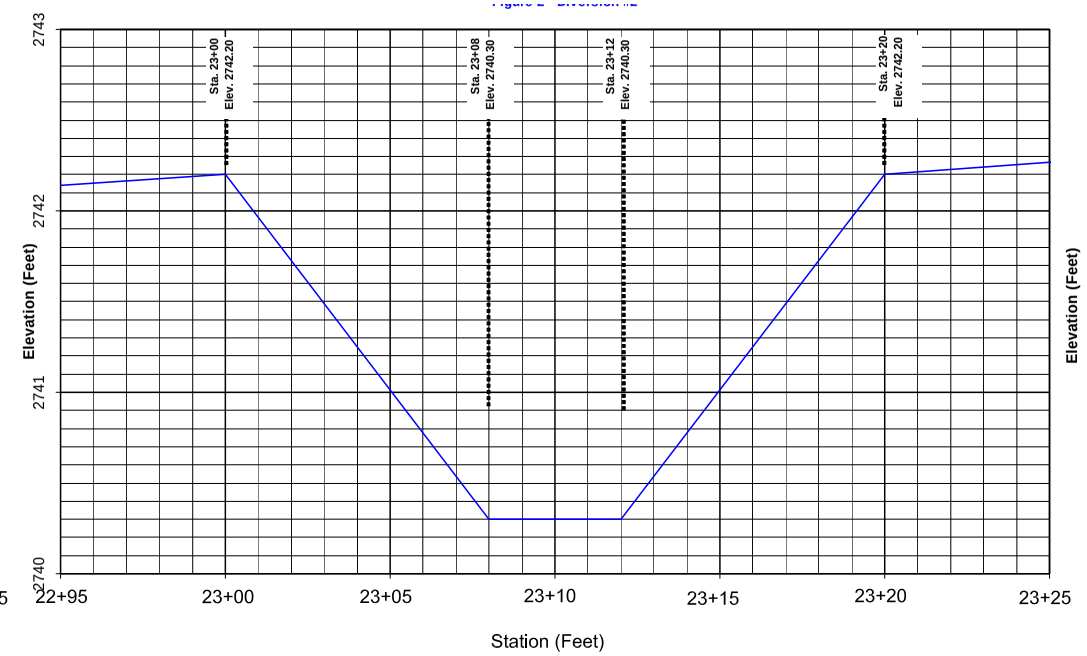
Figure 1- Diversion #1



DIVERSION #1

SCALE: N.T.S.

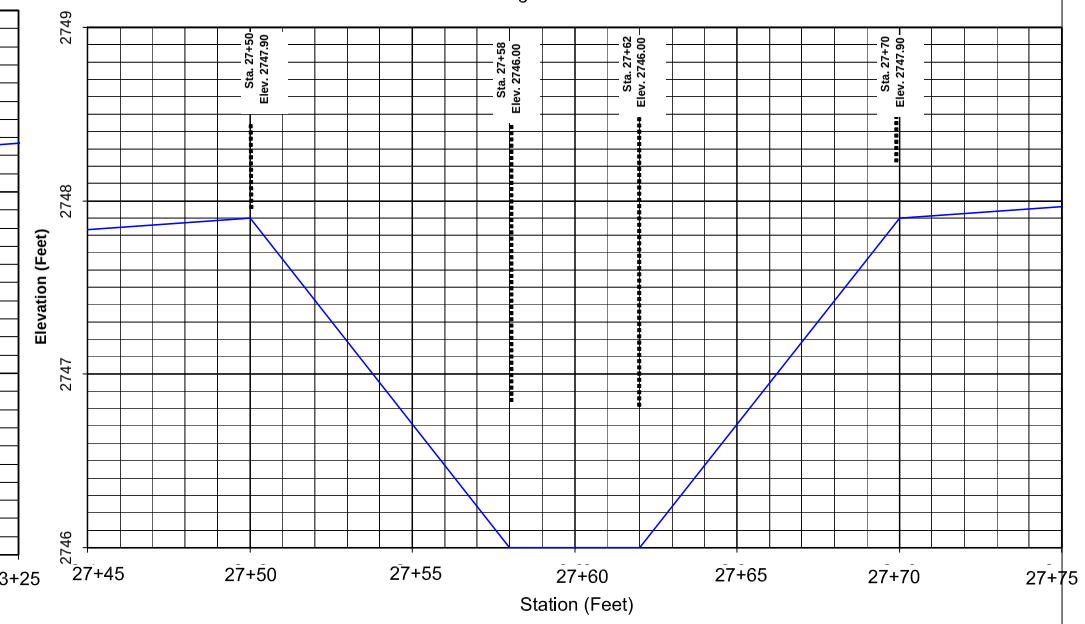
Figure 2- Diversion #2



DIVERSION #2

SCALE: N.T.S.

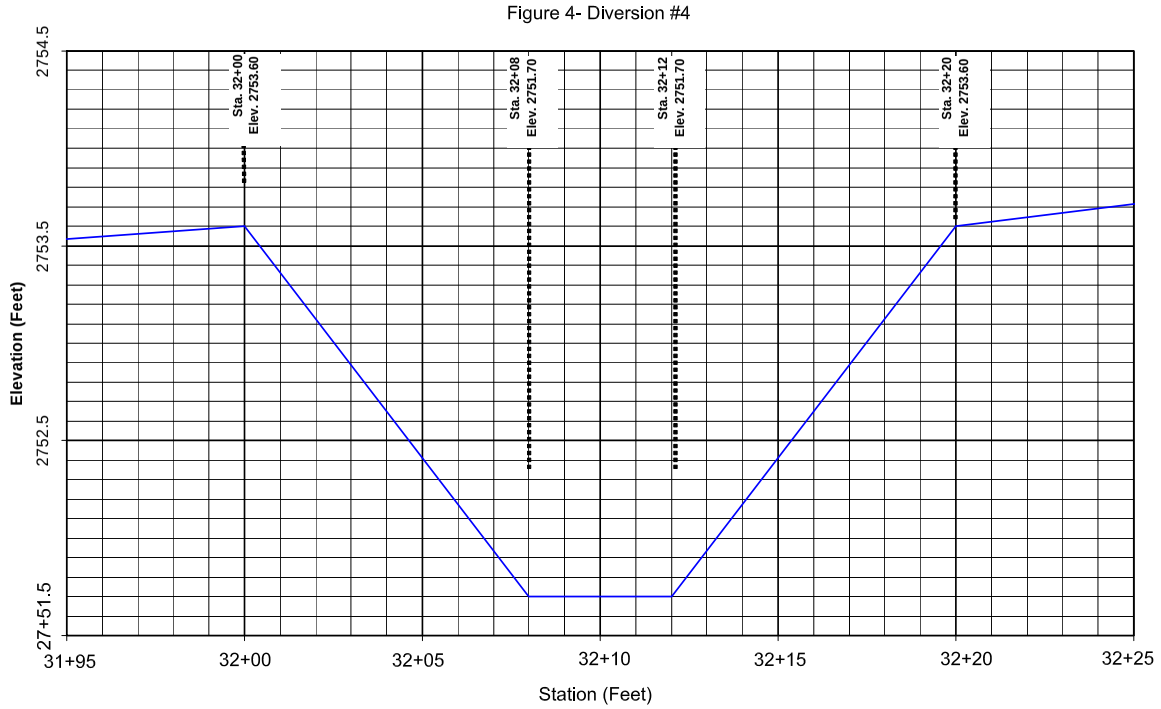
Figure 3- Diversion #3



DIVERSION #3

SCALE: N.T.S.

Figure 4- Diversion #4



DIVERSION #4

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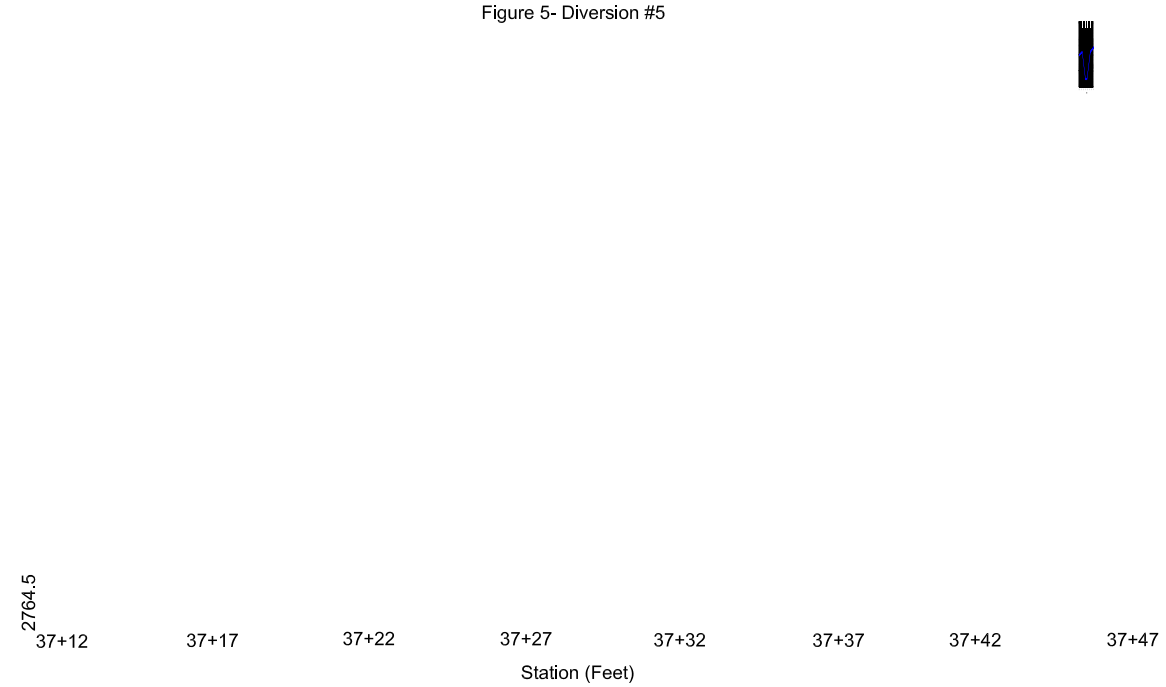
Figure 5- Diversion #5



DIVERSION #5

SCALE: N.T.S.

URS Corporation

DIVERSION DETAILS
ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
LEWIS CENTER CHANNEL/REACH 1

Proj. No.: 38001579.30002	Date: 6-16-2011		
	Sheet No.: 6 OF 14	Rev.: 2	
Project: DESERT KNOLLS WASH	Scale: N.T.S.		

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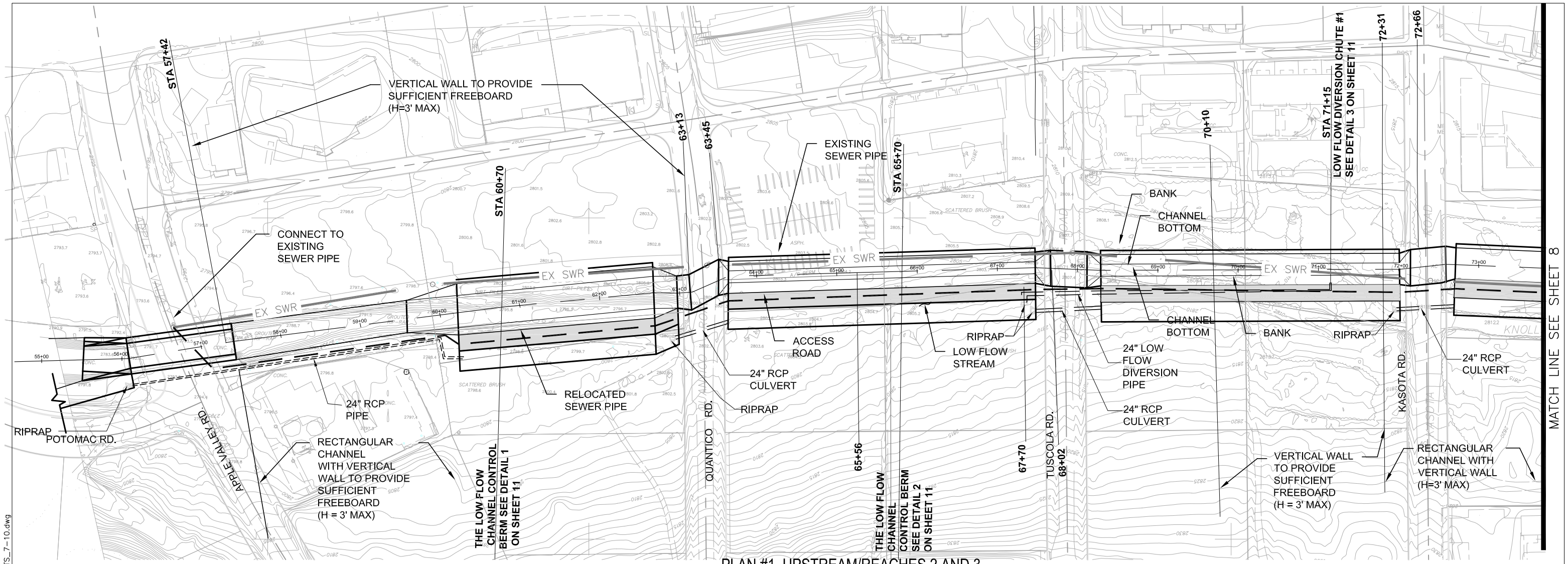
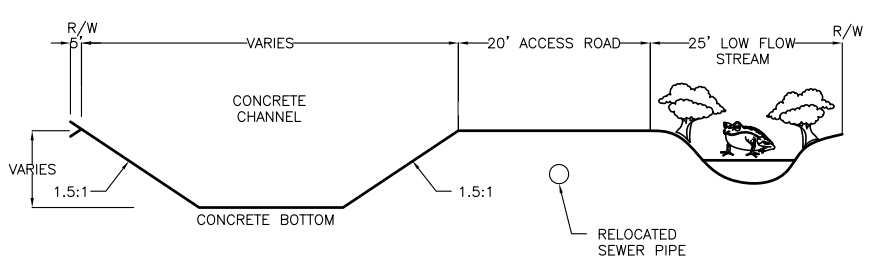
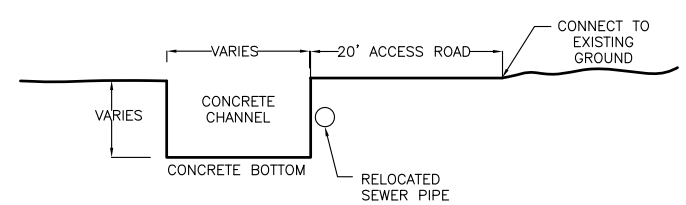


PLAN #1, UPSTREAM/REACHES 2 AND 3

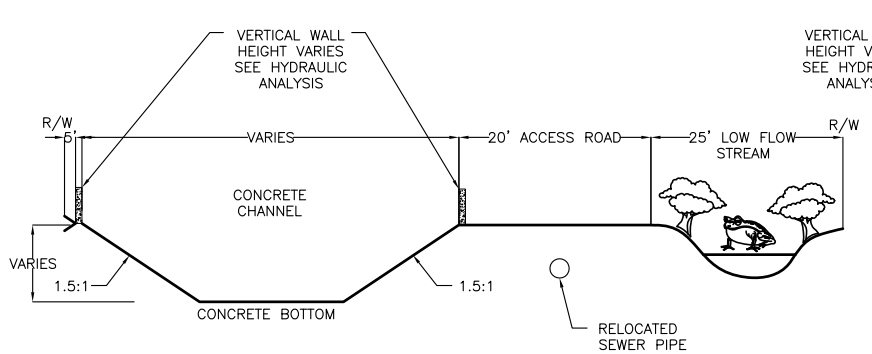


TYPICAL SECTION
N.T.S

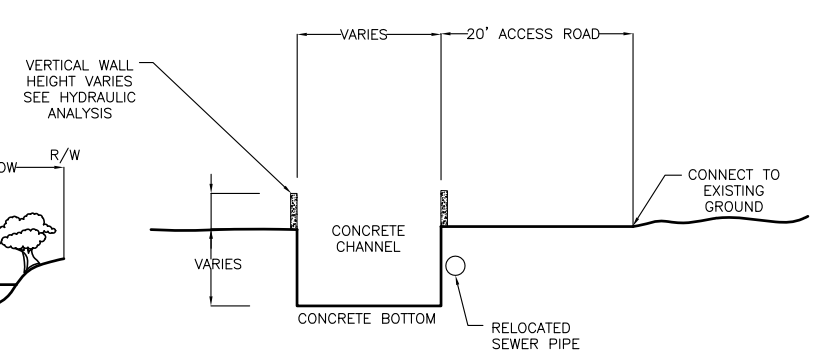


TYPICAL RECTANGULAR CHANNEL SECTION
N.T.S

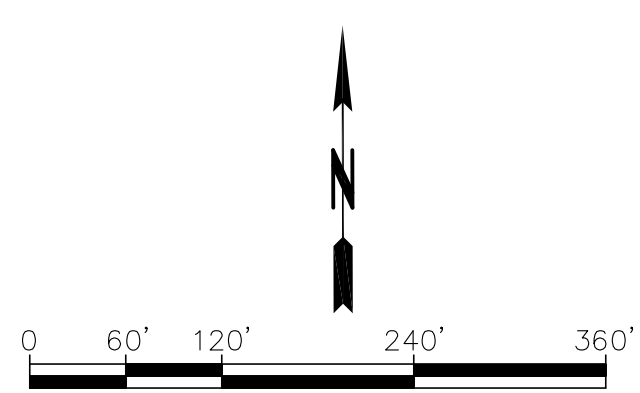
NOTES:
1. FOR CROSS-SECTION DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.



TYPICAL SECTION WITH VERTICAL WALLS
N.T.S



RECTANGULAR CHANNEL SECTION WITH VERTICAL WALLS
N.T.S



URS Corporation

ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
UPSTREAM/REACHES 2 AND 3

Proj. No.:	38001579.30002	Date:	6-16-2011
Project:	DESERT KNOLLS WASH	Sheet No.: 7 OF 14	Rev.: 2
		Scale: SEE SCALE BAR	

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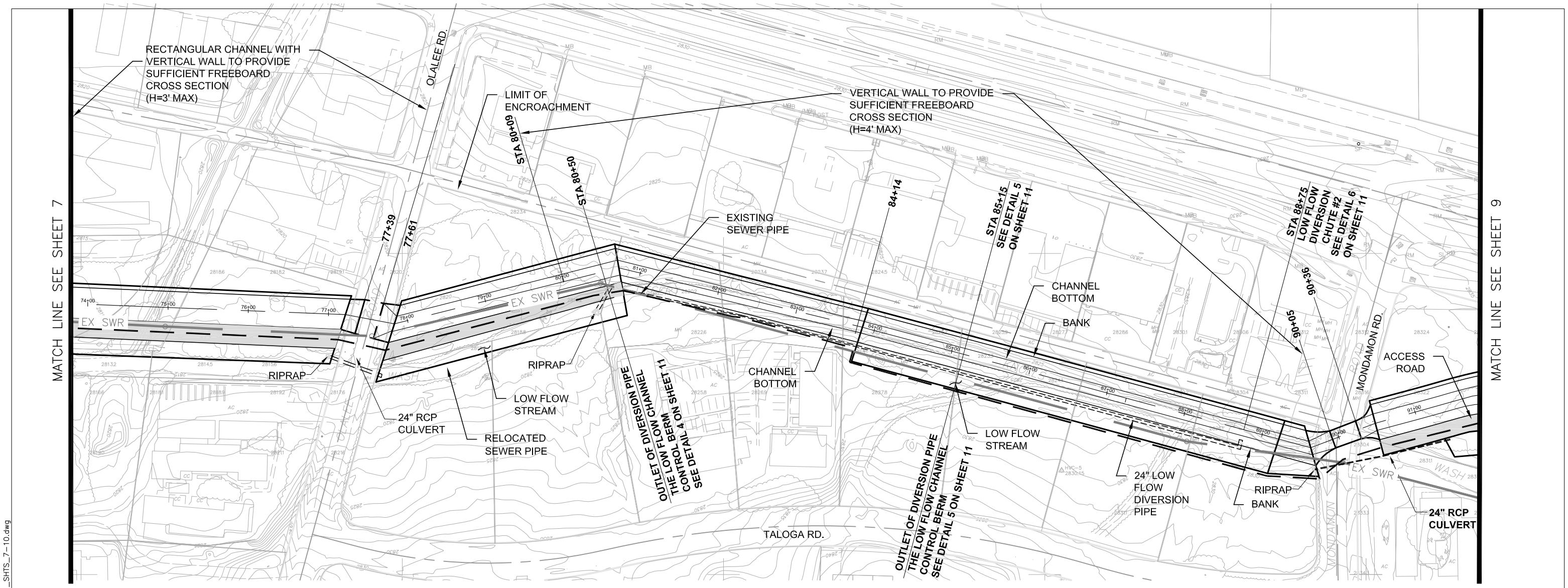
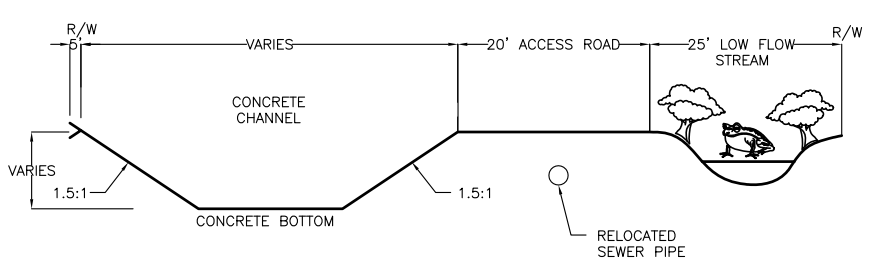
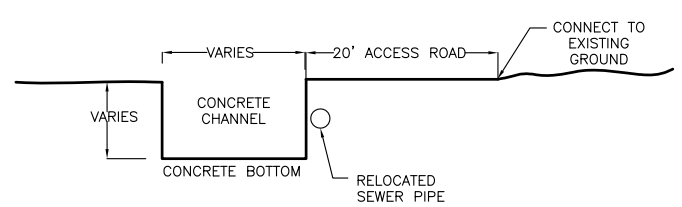


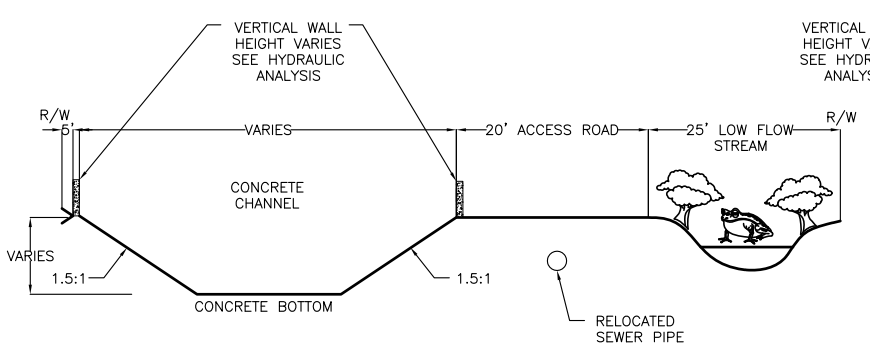
PLAN #1, UPSTREAM/REACH 3



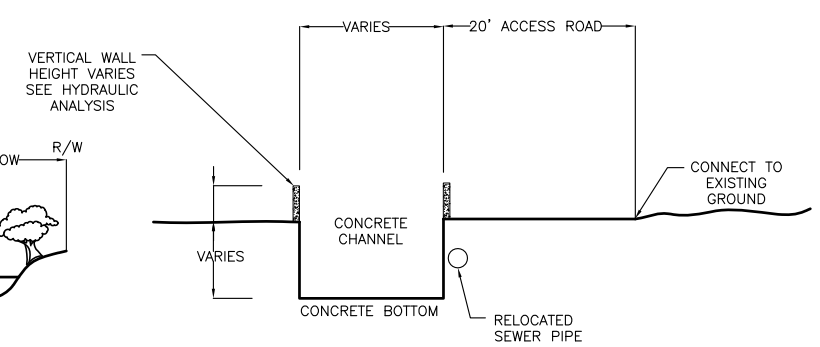
TYPICAL SECTION
N.T.S



TYPICAL RECTANGULAR CHANNEL SECTION
N.T.S

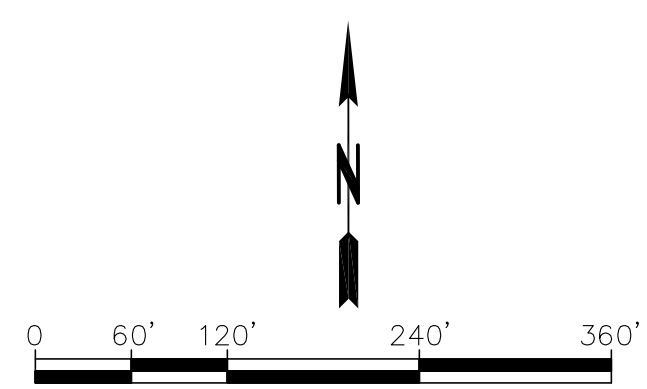


TYPICAL SECTION WITH VERTICAL WALLS
N.T.S



RECTANGULAR CHANNEL SECTION WITH VERTICAL WALLS
N.T.S

NOTES:
1. FOR CROSS-SECTION DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.



URS Corporation

ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
UPSTREAM/REACH 3

Proj. No.: 38001579.30002	Date: 6-16-2011		
Project: DESERT KNOLLS WASH	Sheet No.: 8 OF 14	Rev.: 2	
	Scale: SEE SCALE BAR		

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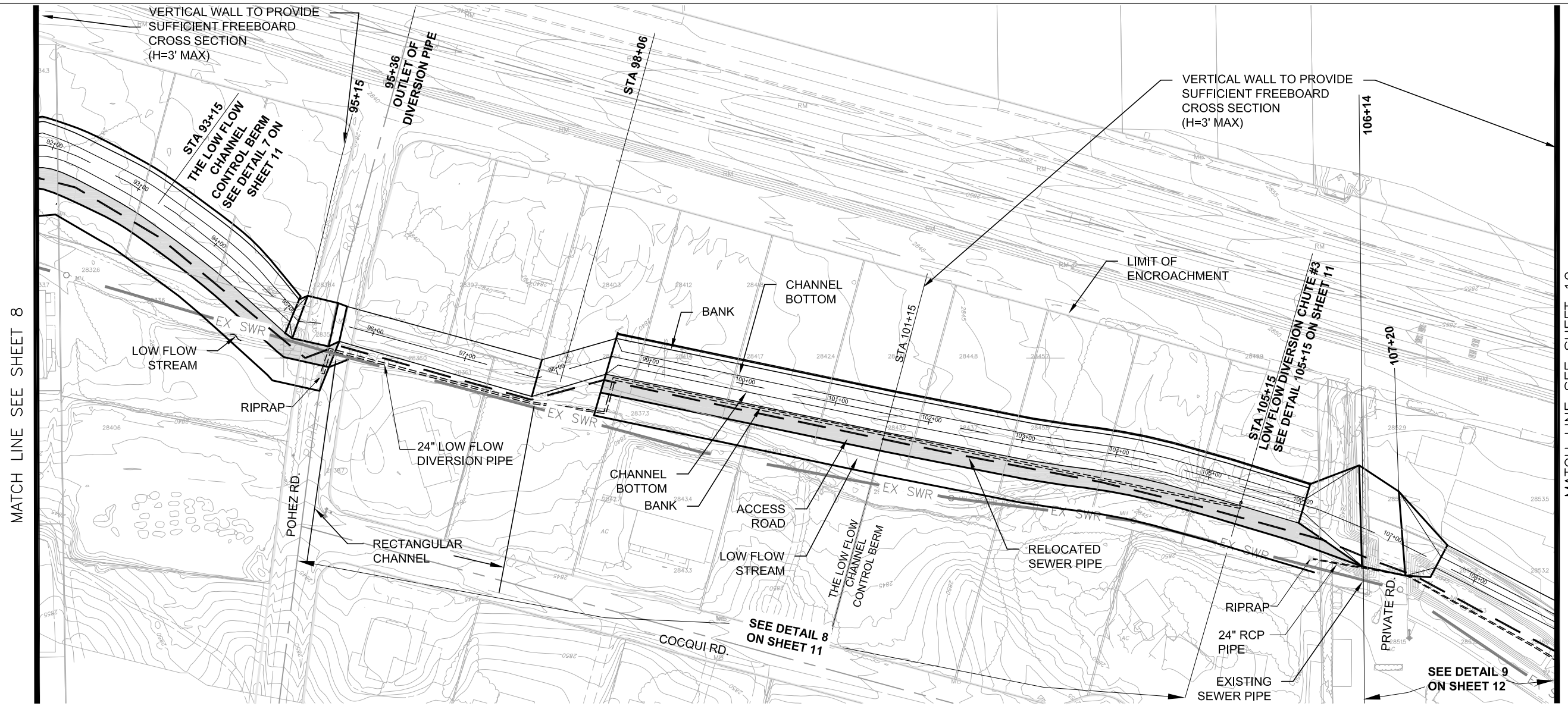
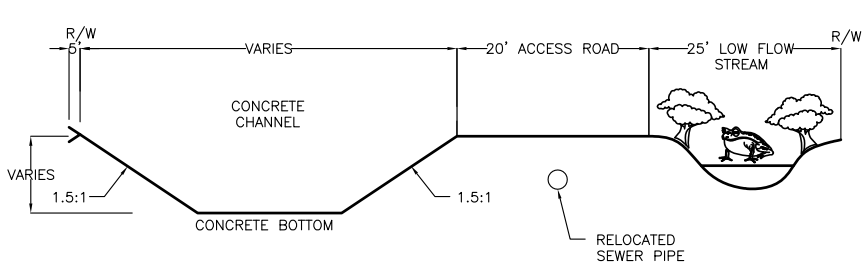


PLAN #1, UPSTREAM/REACH 3



TYPICAL SECTION
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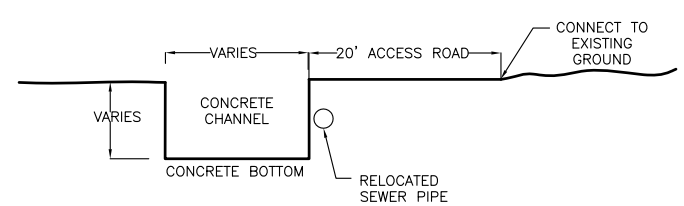
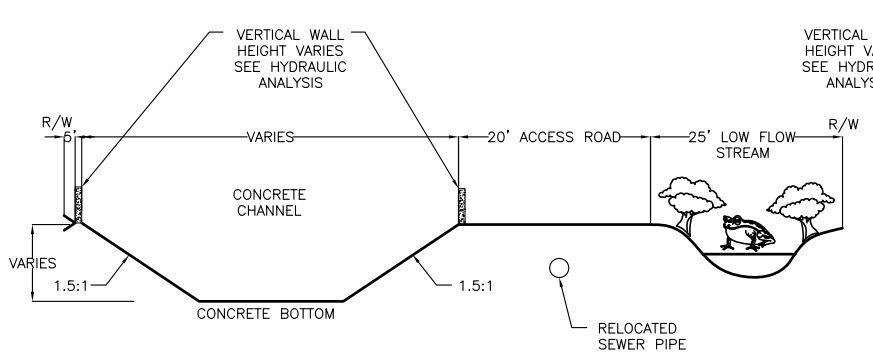
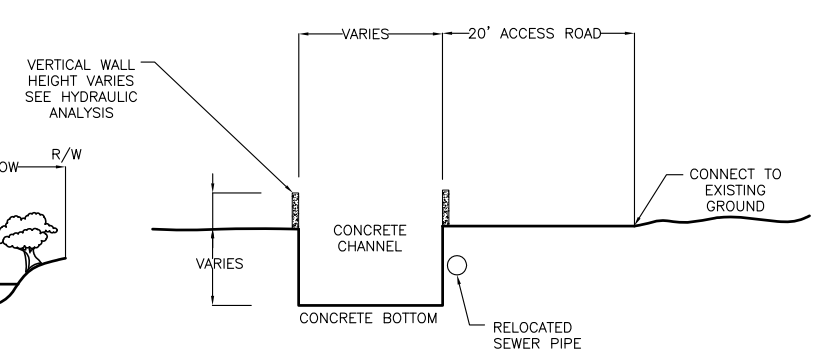


TYPICAL RECTANGULAR CHANNEL SECTION
N.T.S

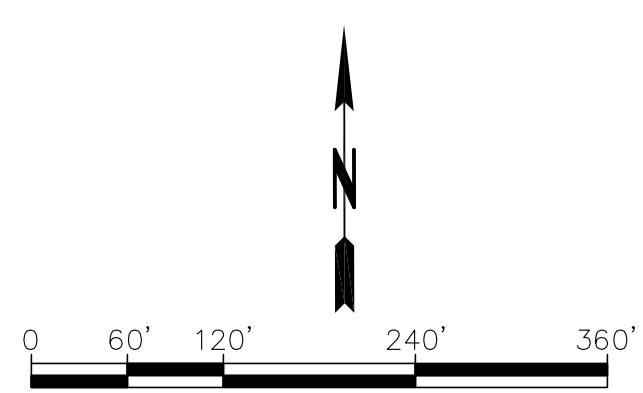
NOTES:
1. FOR CROSS-SECTION DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.



TYPICAL SECTION WITH VERTICAL WALLS
N.T.S



RECTANGULAR CHANNEL SECTION WITH VERTICAL WALLS
N.T.S



URS Corporation

ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
UPSTREAM/REACH 3

Proj. No.:	38001579.30002	Date: 6-16-2011	
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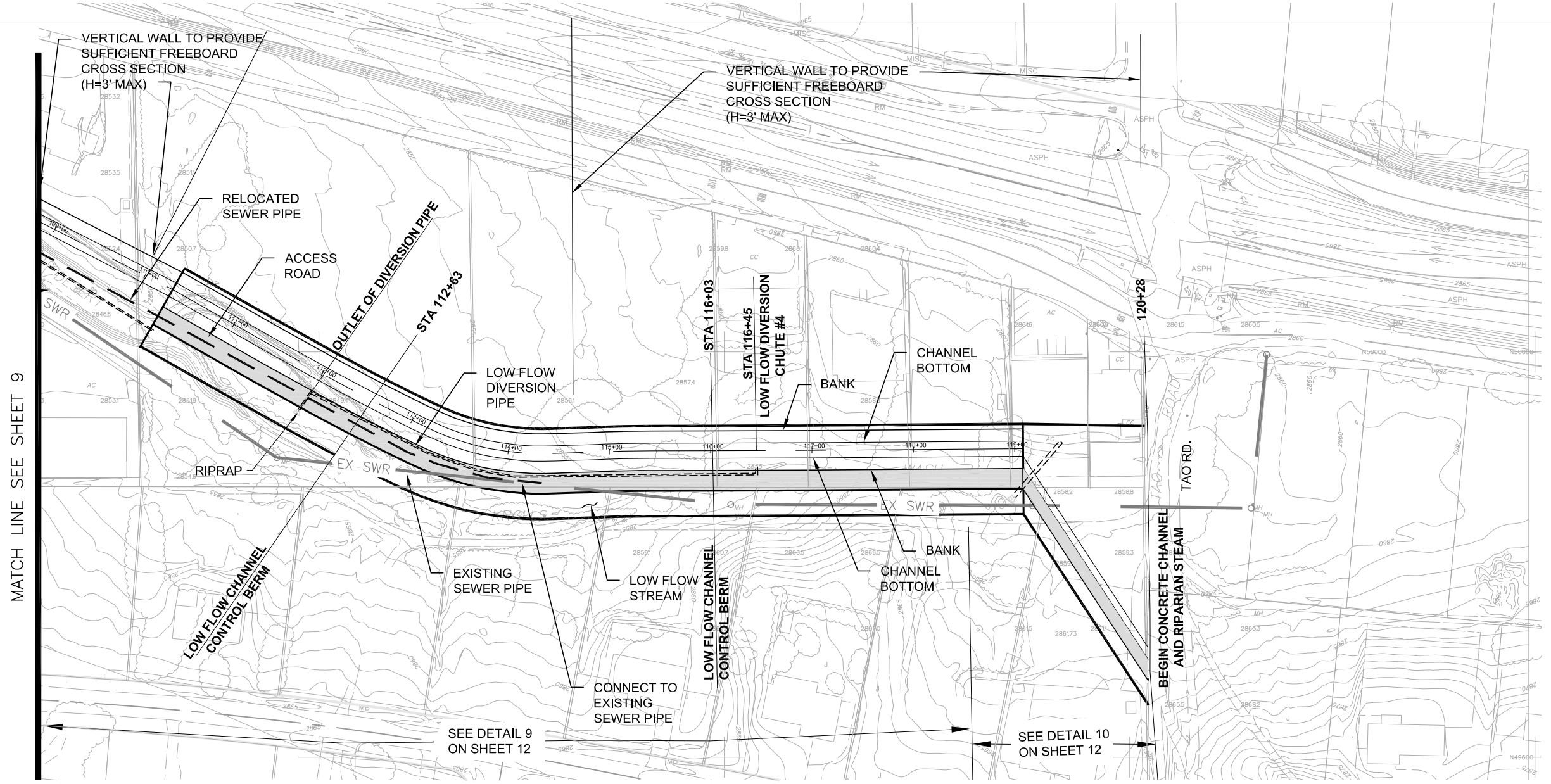
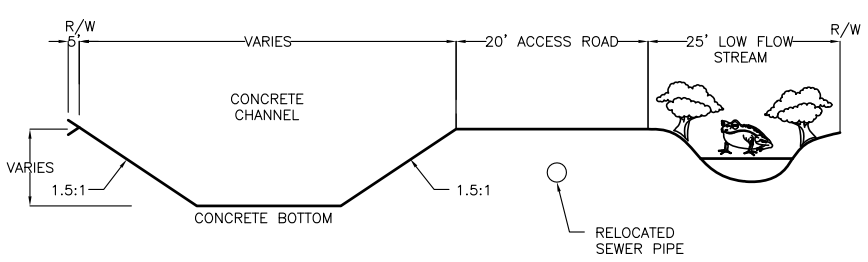
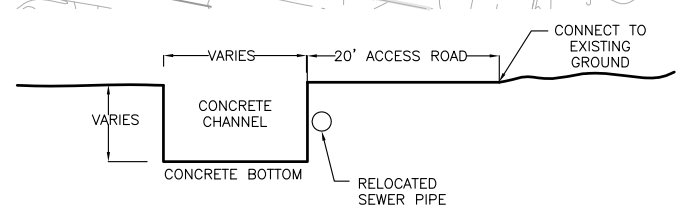


PLAN #1, UPSTREAM/REACH 3

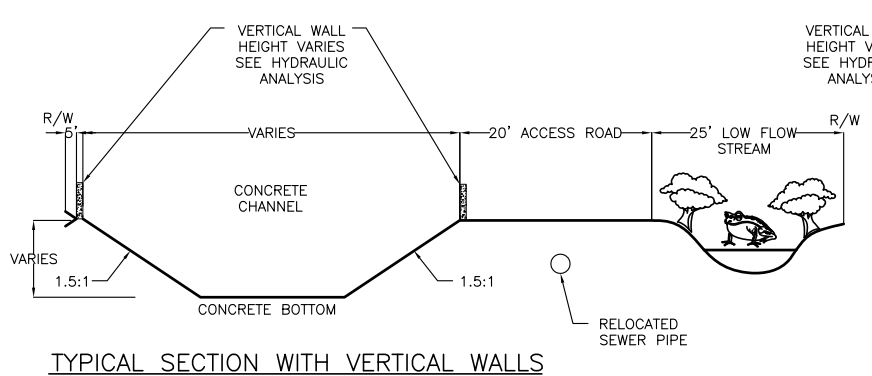


TYPICAL SECTION
N.T.S

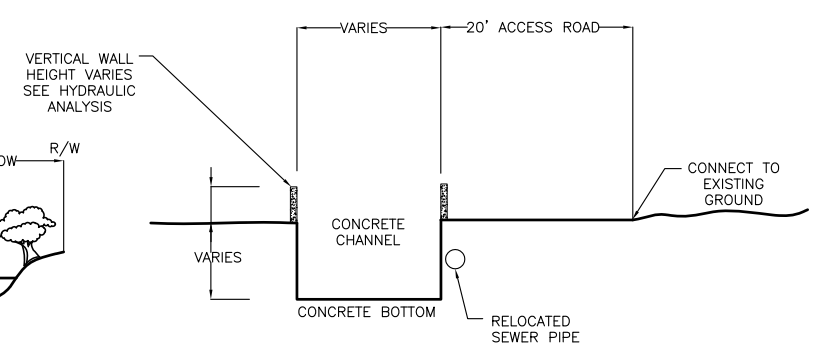


TYPICAL RECTANGULAR CHANNEL SECTION
N.T.S

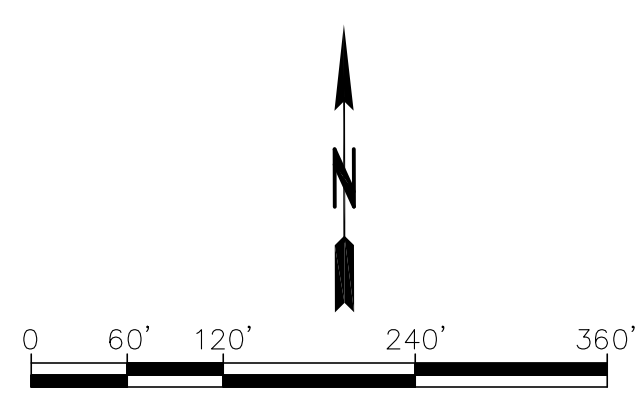
NOTES:
1.FOR CROSS-SECTION DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.



TYPICAL SECTION WITH VERTICAL WALLS
N.T.S



RECTANGULAR CHANNEL SECTION WITH VERTICAL WALLS
N.T.S



URS Corporation

ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
UPSTREAM/REACH 3

Proj. No.:	38001579.30002	Date:	6-16-2011
Project:	DESERT KNOLLS WASH	Sheet No.: 10 OF 14	Rev.: 2
		Scale:	SEE SCALE BAR

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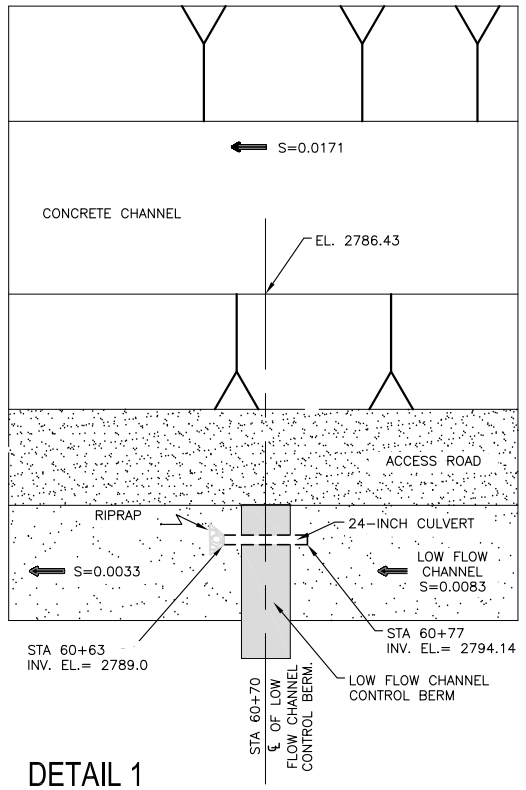
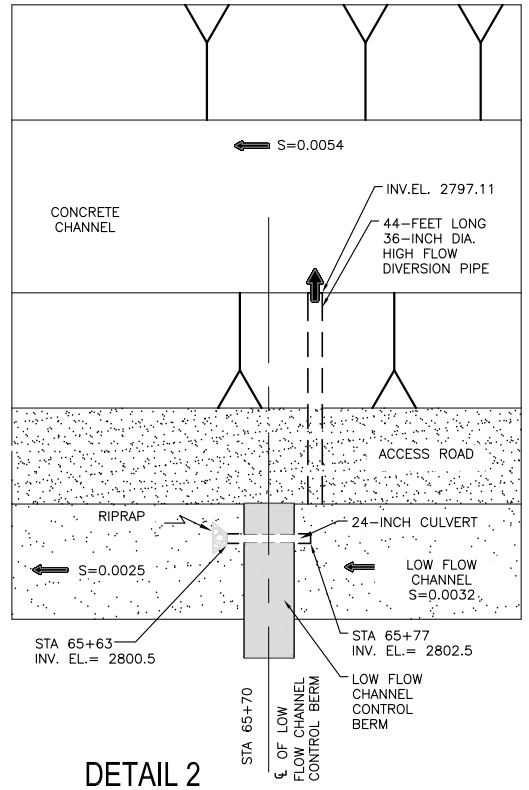


DETAIL 1

SCALE: N.T.S.



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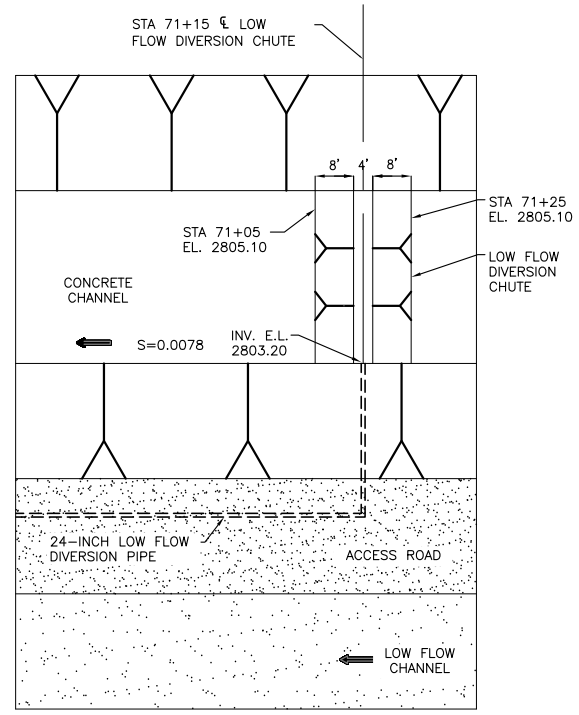

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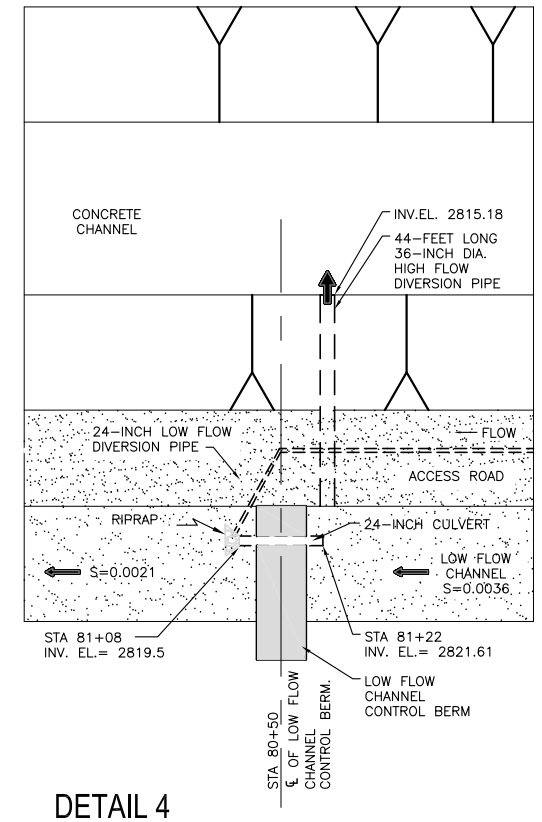

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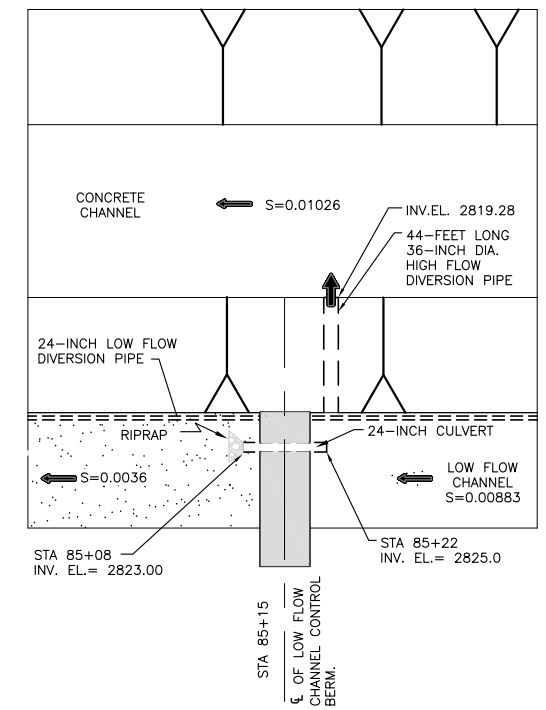

DETAIL 5

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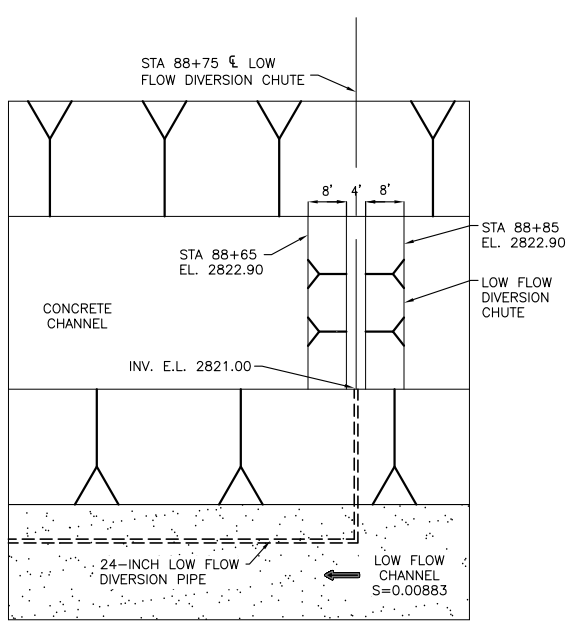

DETAIL 6

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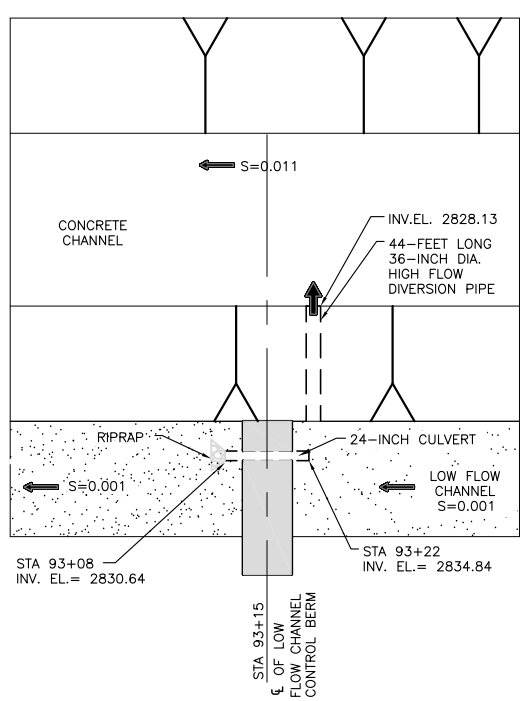

DETAIL 7

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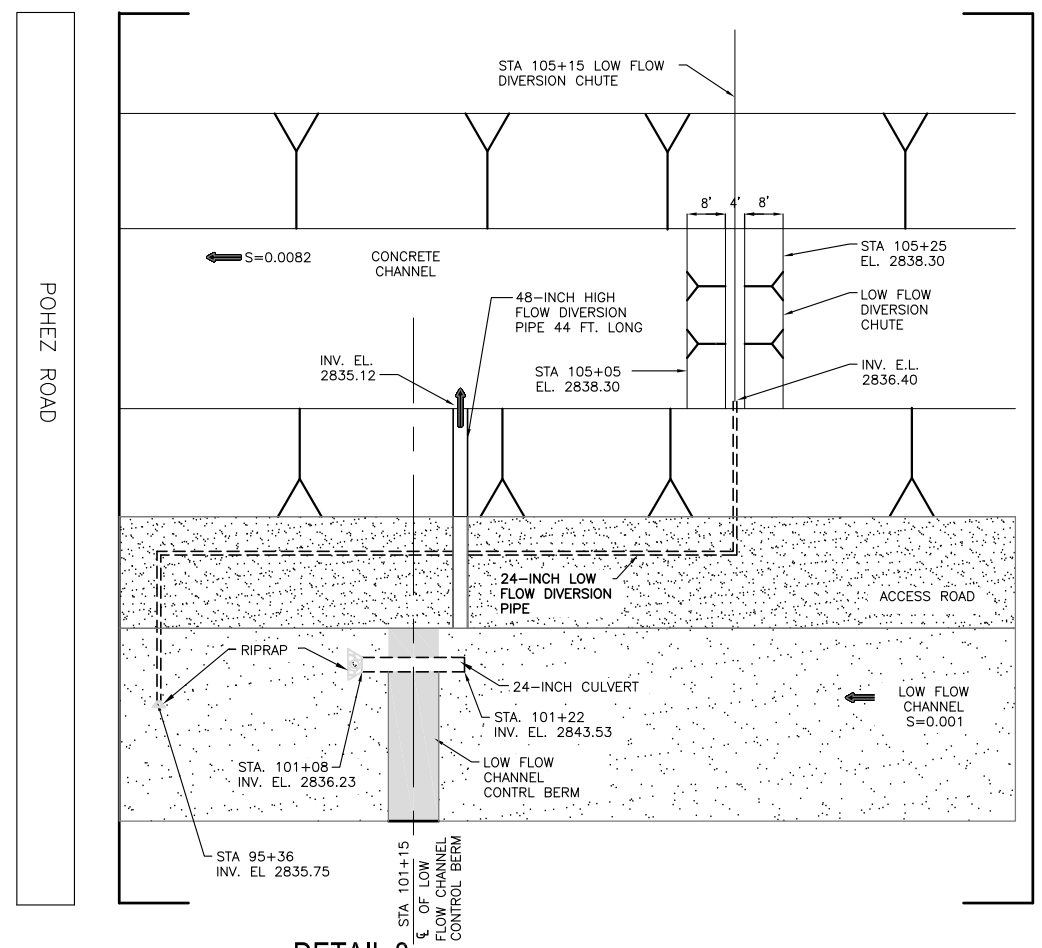

DETAIL 8

SCALE: N.T.S.

NOTE 1: FOR DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.

URS Corporation

DETAILS-1
ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
UPSTREAM/REACHES 2 AND 3

Proj. No.: 38001579.30002	Date: 6-16-2011		
	Sheet No.: 11 OF 14	Rev.: 2	
Project: DESERT KNOLLS WASH	Scale: N.T.S		

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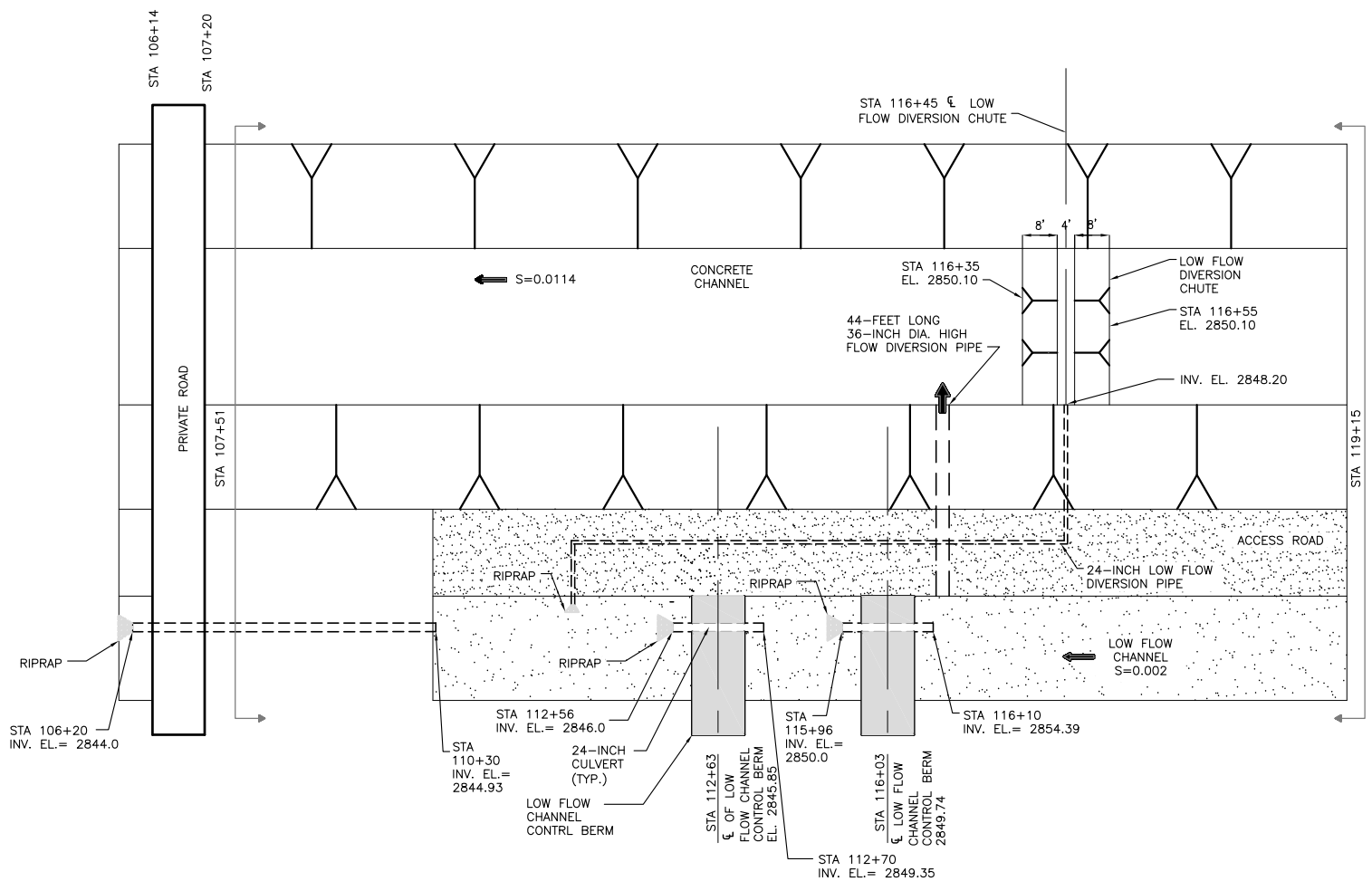

DETAIL 9

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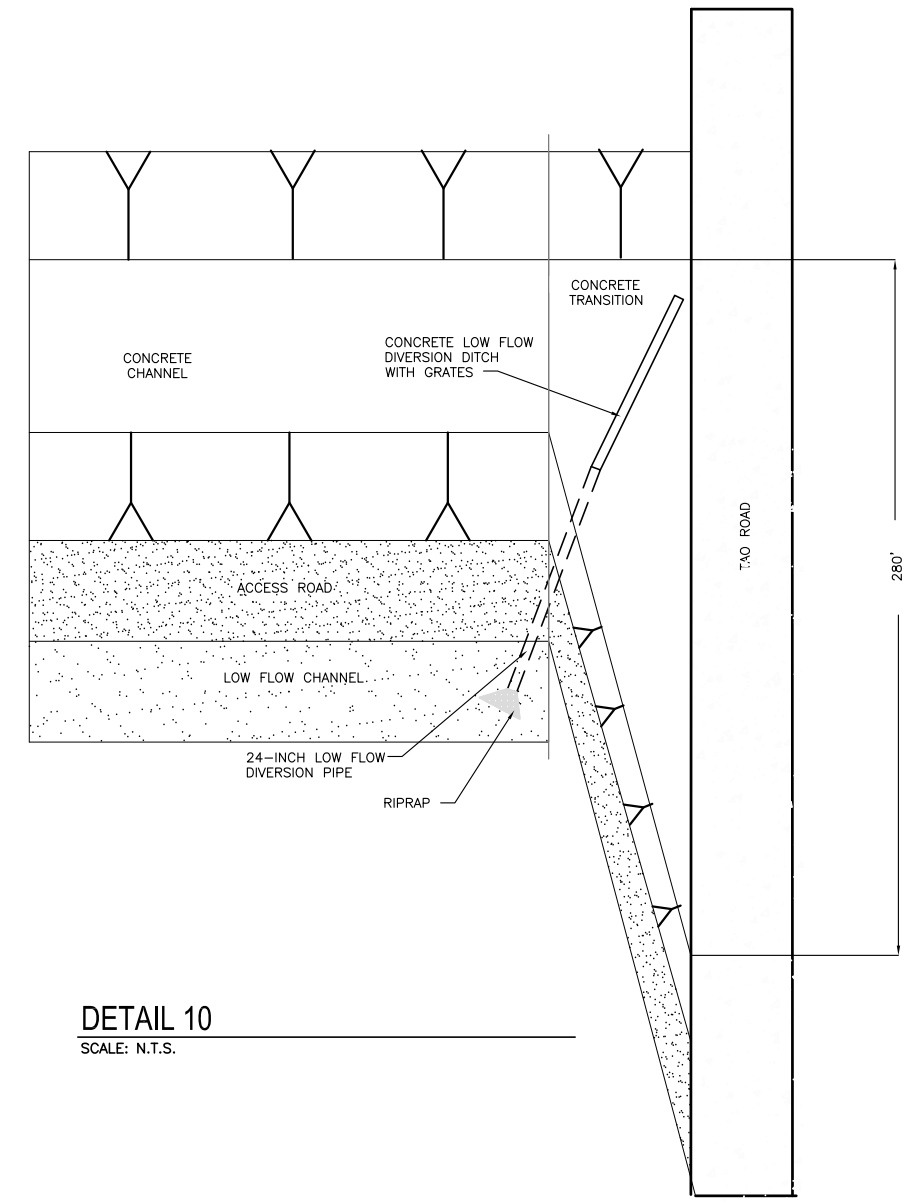

DETAIL 10

SCALE: N.T.S.

URS Corporation

DETAILS-2
ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
UPSTREAM/REACH 3

Proj. No.: 38001579.30002	Date: 6-16-2011		
	Sheet No.: 12 OF 14	Rev.: 2	
Project: DESERT KNOLLS WASH	Scale: N.T.S.		

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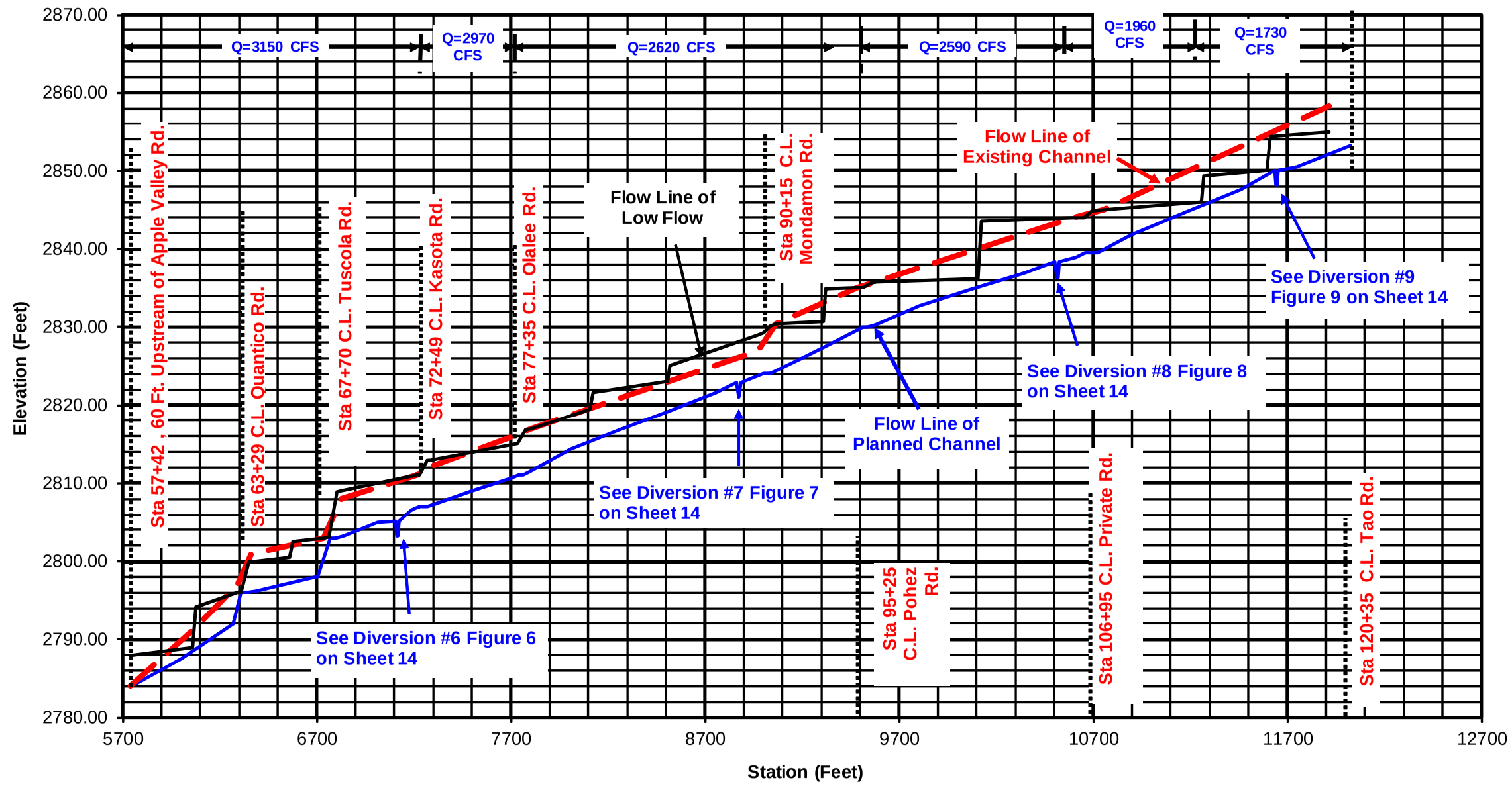

CONCEPTUAL ALTERNATIVE PLAN NO. 1

TRAPEZOIDAL CONCRETE CHANNEL WITH LOW FLOW STREAM (Upstream Reach)

UPSTREAM PROFILE, PLAN #1

SCALE: N.T.S.

URS Corporation

UPSTREAM PROFILE
ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
UPSTREAM/REACHES 2 AND 3

Proj. No.: 38001579.30002	Date: 6-16-2011		
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	Scale: N.T.S.		

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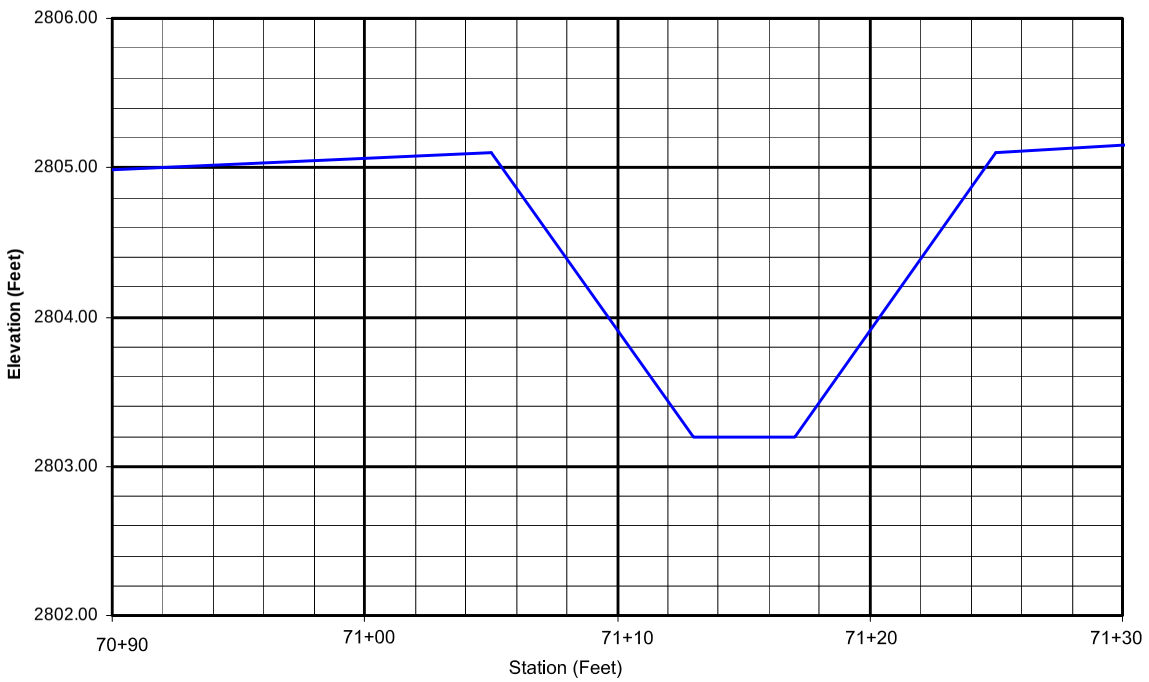

Figure 6 - Profile of Diversion #6

DIVERSION #6

SCALE: N.T.S.

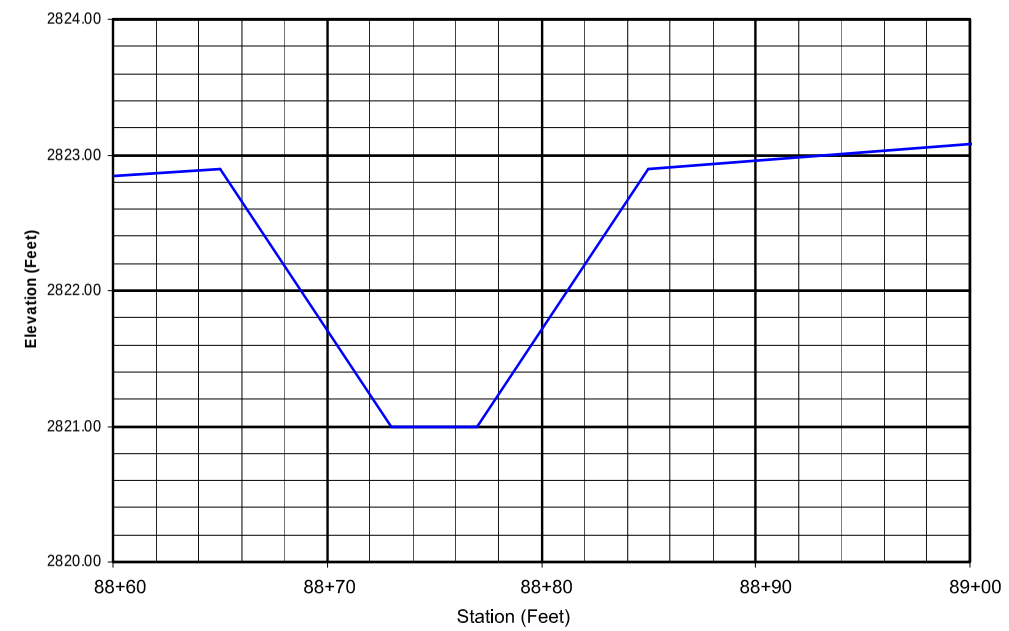

Figure 7 - Profile of Diversion #7

DIVERSION #7

SCALE: N.T.S.

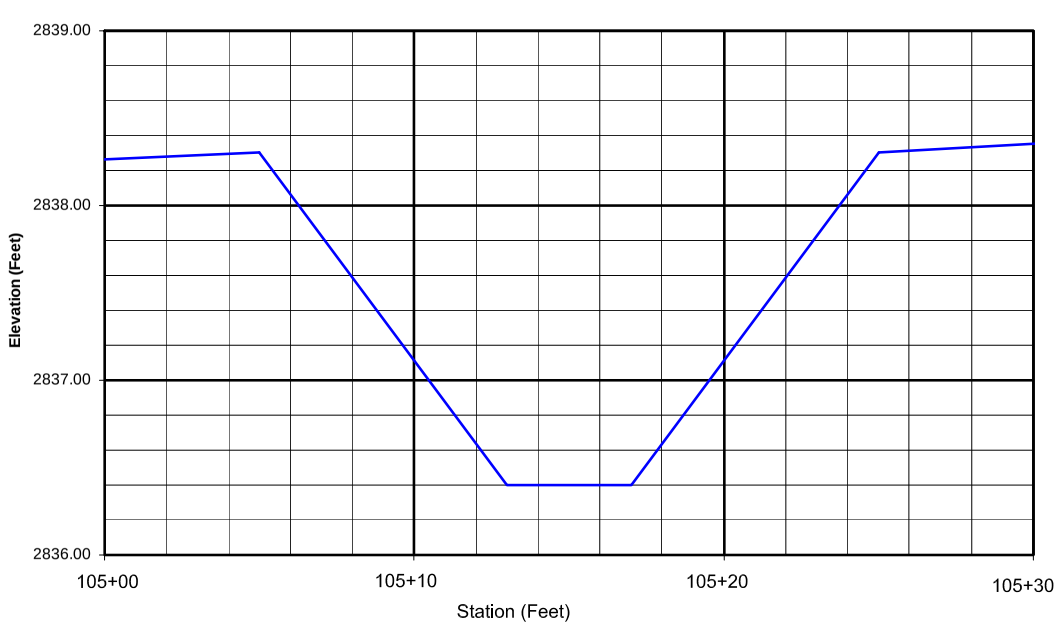

Figure 8 - Profile of Diversion #8

DIVERSION #8

SCALE: N.T.S.

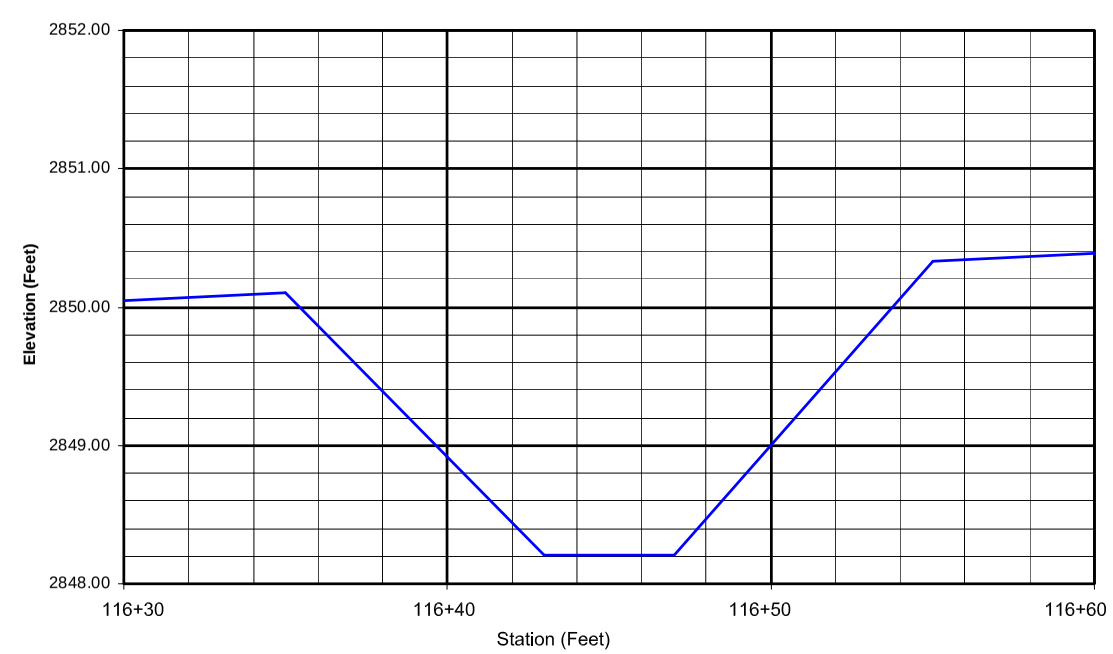

Figure 9 - Profile of Diversion #9

DIVERSION #9

SCALE: N.T.S.

URS Corporation

DIVERSIONS
ALTERNATIVE CONCEPT PLAN #1
LOW FLOW SIDE CHANNEL
UPSTREAM/REACH 3

Proj. No.: 38001579.30002	Date: 6-16-2011		
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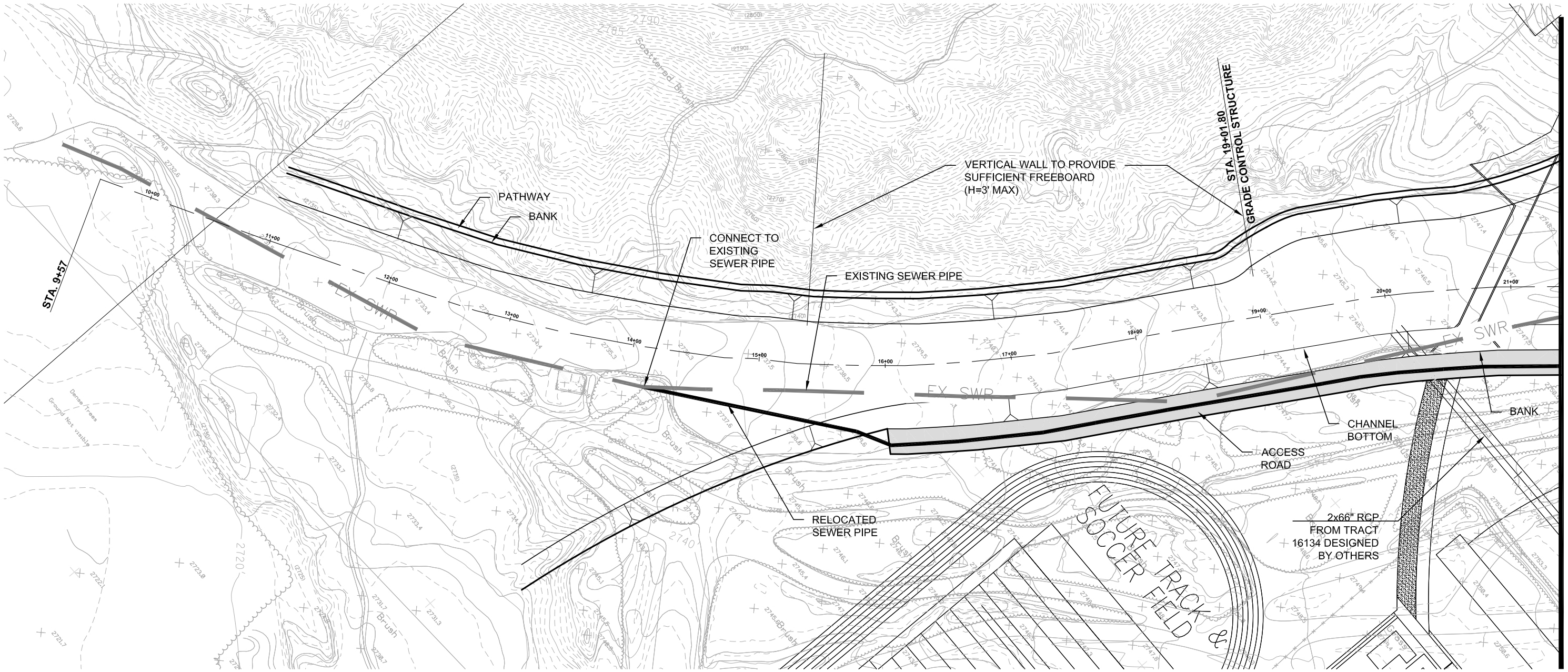
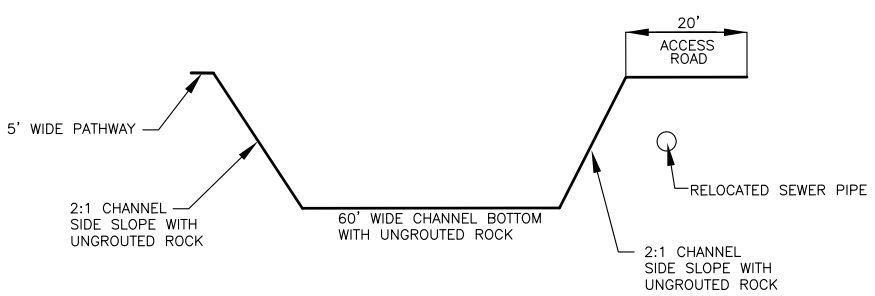
B. 1 Concept #2 Plans – Gabion Mat Drop Structure

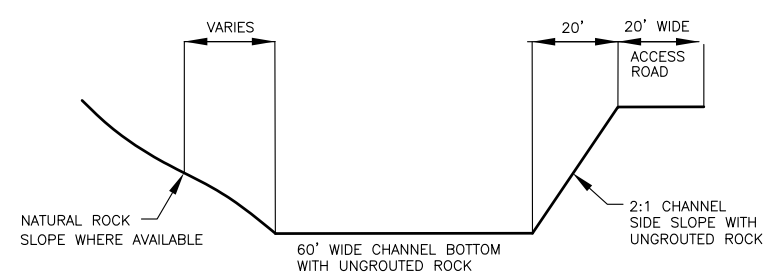


PLAN #2, DOWNSTREAM/REACH 1



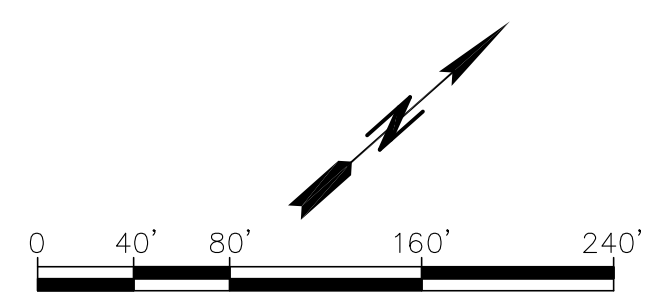
TYPICAL CHANNEL SECTION

N.T.S.



TYPICAL CHANNEL SECTION
W/NORTH SLOPE UTILIZING NATURAL ROCK SLOPE

N.T.S.



URS Corporation

ALTERNATIVE CONCEPT PLAN #2
GABION MAT DROP STRUCTURE
LEWIS CENTER CHANNEL/REACH 1

Proj. No.:	38001579.30002	Date:	6-16-2011
Project:	DESERT KNOLLS WASH	Sheet No.: 1 of 12	Rev.: 1
		Scale: SEE SCALE BAR	

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MATCH LINE SEE SHEET 1

STA. 21+98.33
GRADE CONTROL STRUCTURE

STA. 23+95.09
GRADE CONTROL STRUCTURE

STA. 26+78.97
GRADE CONTROL STRUCTURE

PARKWAY CROSSING

STA. 28+94.02
GRADE CONTROL STRUCTURE

STA. 32+61.91
GRADE CONTROL STRUCTURE

PATHWAY

BANK

CHANNEL BOTTOM

EXISTING SEWER PIPE

NOTE: THE SEDIMENT BASIN SHOWN IN LEWIS CENTER PLAN BY ALLARD ENGINEERING HAS BEEN REMOVED.

VERTICAL WALL TO PROVIDE SUFFICIENT FREEBOARD (H=3' MAX)

ACCESS ROAD

RELOCATED SEWER PIPE

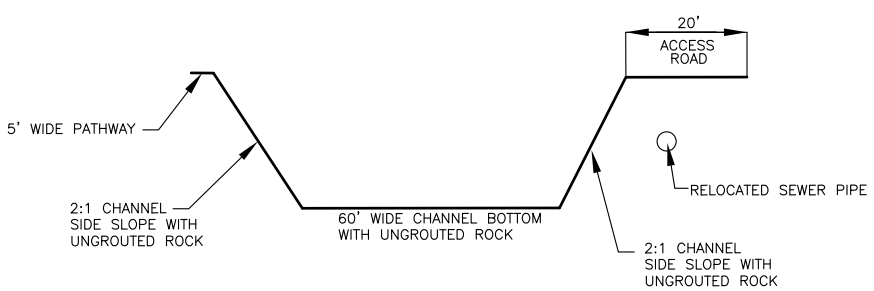
NEW SOFTBALL DIAMOND

NEW BASEBALL DIAMOND

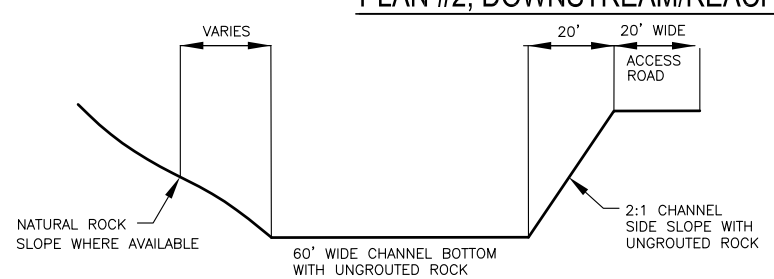
EX SWR

MATCH LINE SEE SHEET 3

PLAN #2, DOWNSTREAM/REACH 1



TYPICAL CHANNEL SECTION
N.T.S.



TYPICAL CHANNEL SECTION
W/NORTH SLOPE UTILIZING NATURAL ROCK SLOPE
N.T.S.

N

0 40' 80' 160' 240'

URS Corporation

ALTERNATIVE CONCEPT PLAN #2
GABION MAT DROP STRUCTURE
LEWIS CENTER CHANNEL/REACH 1

Proj. No.:	38001579.30002	Date:	6-16-2011
Project:	DESERT KNOLLS WASH	Sheet No.: 2 of 12	Rev.: 1
		Scale: SEE SCALE BAR	

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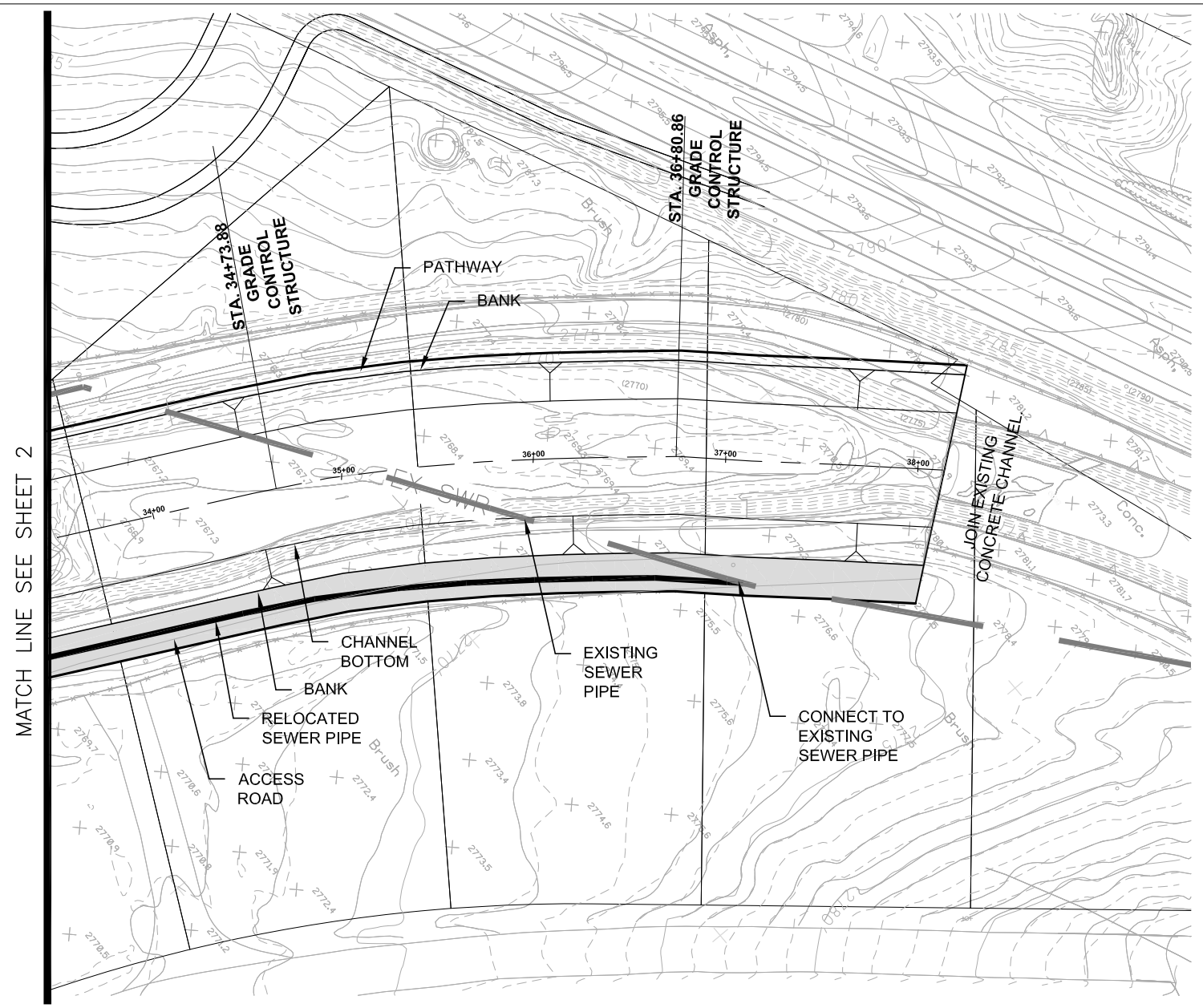
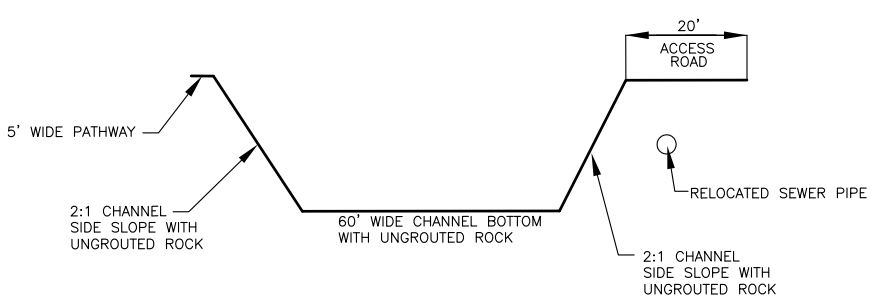
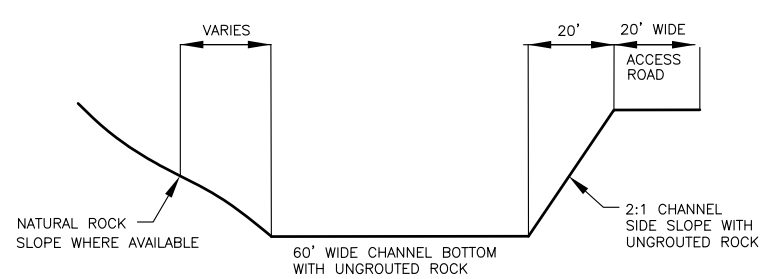


PLAN #2, DOWNSTREAM/REACH 1



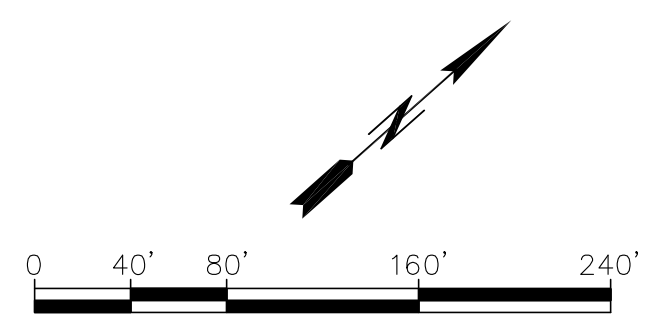
TYPICAL CHANNEL SECTION

N.T.S.



TYPICAL CHANNEL SECTION
W/NORTH SLOPE UTILIZING NATURAL ROCK SLOPE

N.T.S.

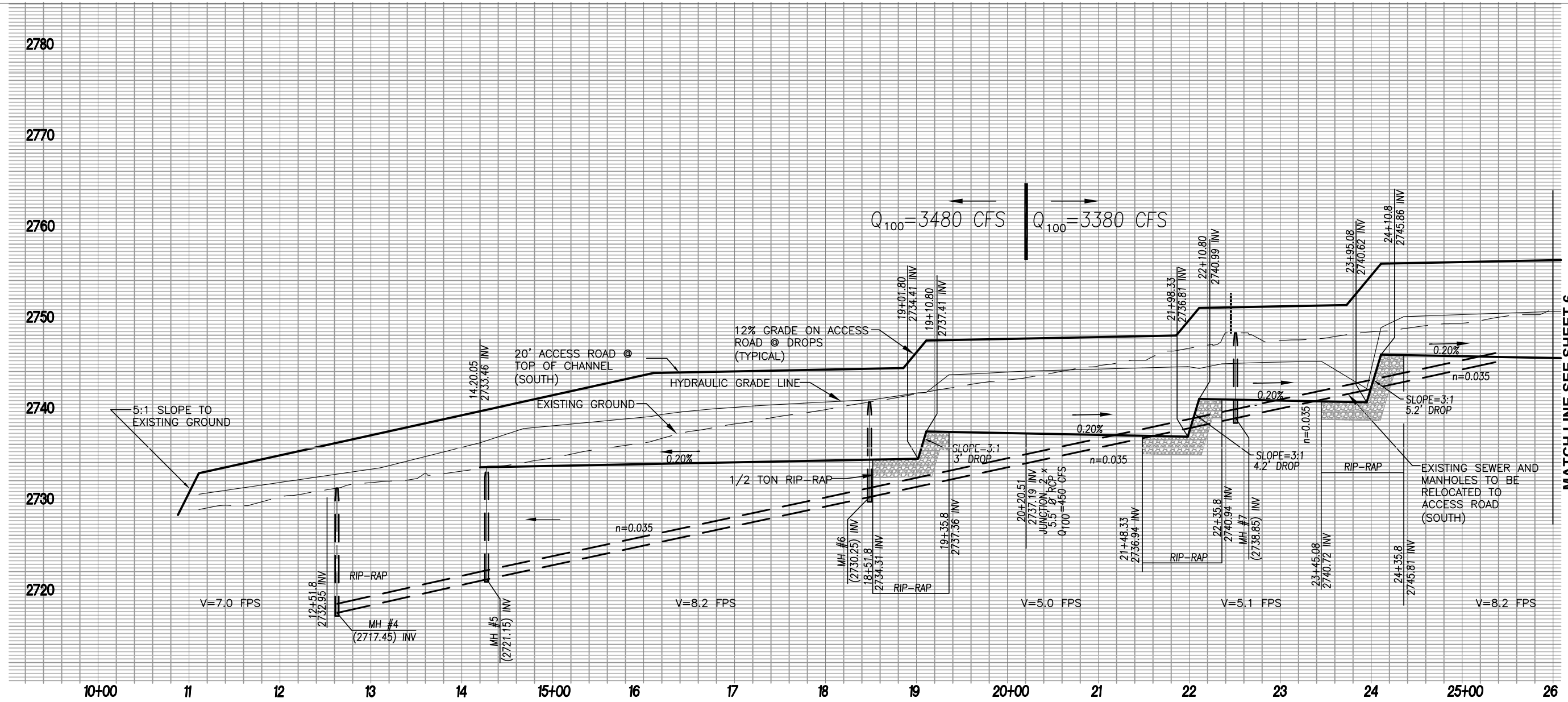


URS Corporation

ALTERNATIVE CONCEPT PLAN #2
GABION MAT DROP STRUCTURE
LEWIS CENTER CHANNEL/REACH 1

Proj. No.:	38001579.30002	Date: 6-16-2011	
Project:	DESERT KNOLLS WASH	Sheet No.: 3 OF 12	Rev.: 2
		Scale: SEE SCALE BAR	

P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN2\PLAN2_CAD\PLAN#2_SHTS_1-3_LEWIS_CTR.dwg



DOWNSTREAM PROFILE-1, PLAN #2

NOTES:

1. FOR ADDITIONAL DETAILS SEE THE PLAN BY ALLARD ENGINEERING PREPARED FOR LEWIS CENTER FOR EDUCATION RESEARCH.
2. SEE HYDRAULIC ANALYSIS FOR CHANNEL AND SECTION VELOCITIES.
3. THE SEDIMENT BASIN SHOWN IN LEWIS CENTER PLAN BY ALLARD ENGINEERING HAS BEEN REMOVED.

VERTICAL SCALE: 0 6' 12' 24' 36'

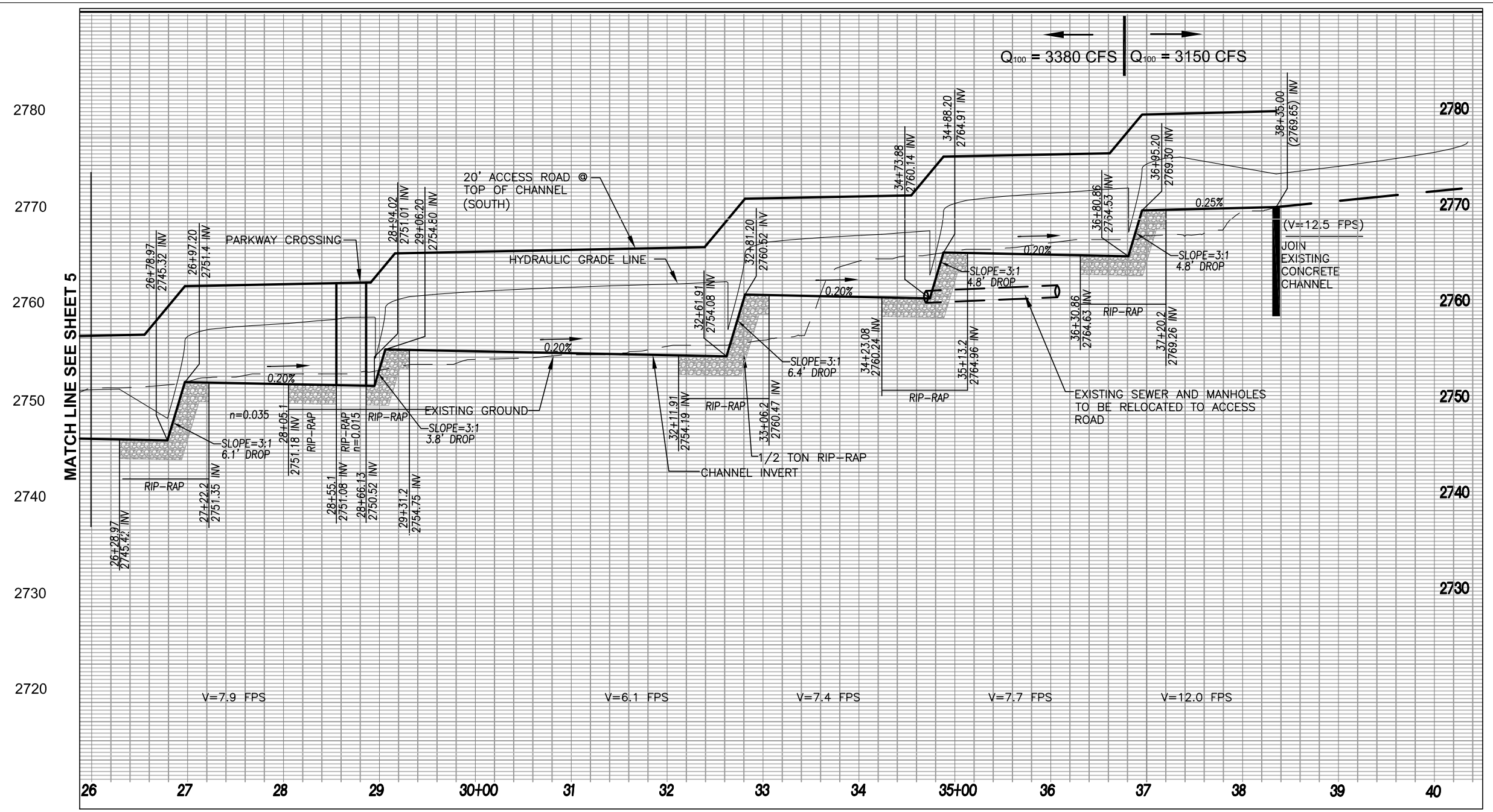
HORIZONTAL SCALE: 0 60' 120' 240' 360'

URS Corporation

DOWNSTREAM PROFILE
ALTERNATIVE CONCEPT PLAN #2
GABION MAT DROP STRUCTURE
DOWNSTREAM/REACH 1

Proj. No.: 38001579.30002	Date: 6-16-2011		
	Sheet No.: 4 OF 12	Rev.: 2	
Project: DESERT KNOLLS WASH	Scale: AS SHOWN		

P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN2\PLAN2_CAD\PLAN#2_SHTS_4-12.dwg



DOWNSTREAM PROFILE-2, PLAN #2

NOTES:

1. FOR ADDITIONAL DETAILS SEE THE PLAN BY ALLARD ENGINEERING PREPARED FOR LEWIS CENTER FOR EDUCATION RESEARCH.
2. SEE HYDRAULIC ANALYSIS FOR CHANNEL AND SECTION VELOCITIES.
3. THE SEDIMENT BASIN SHOWN IN LEWIS CENTER PLAN BY ALLARD ENGINEERING HAS BEEN REMOVED.

VERTICAL SCALE: 0 6' 12' 24' 36'

HORIZONTAL SCALE: 0 60' 120' 240' 360'

URS Corporation

DOWNSTREAM PROFILE
ALTERNATIVE CONCEPT PLAN #2
GABION MAT DROP STRUCTURE
DOWNSTREAM/REACH 1

Proj. No.: 38001579.30002	Date: 6-16-2001		
	Sheet No.: 5 OF 12	Rev.: 2	
Project: DESERT KNOLLS WASH	Scale: AS SHOWN		

P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN2\PLAN2_CAD\PLAN#2_SHTS_4-12.dwg

VERTICAL WALLS PROVIDEED FOR SUFFICIENT FREEBOARD (H=3' MAX)

CONNECT TO EXISTING SEWER PIPE

VERTICAL WALLS PROVIDEED FOR SUFFICIENT FREEBOARD (H=4' MAX)

VERTICAL WALLS PROVIDED FOR SUFFICIENT FREEBOARD (H=3' MAX)

STA 63+45

STA 65+55

DROP STRUCTURE

STA 67+69

EXISTING SEWER PIPE

CHANNEL BOTTOM

STA 63+65

STA 62+95

STA 61+70

STA 60+24

BANK

BANK

STABILIZER #1 SEE DETAILS ON SHEET 10

EX SWR

EXISTING CONCRETE CHANNEL

RECTANGULAR CHANNEL WITH VERTICAL WALL FOR SUFFICIENT FREEBOARD (H = 3' MAX)

CHANNEL BOTTOM

ACCESS ROAD

RELOCATED SEWER PIPE

Potomac Rd

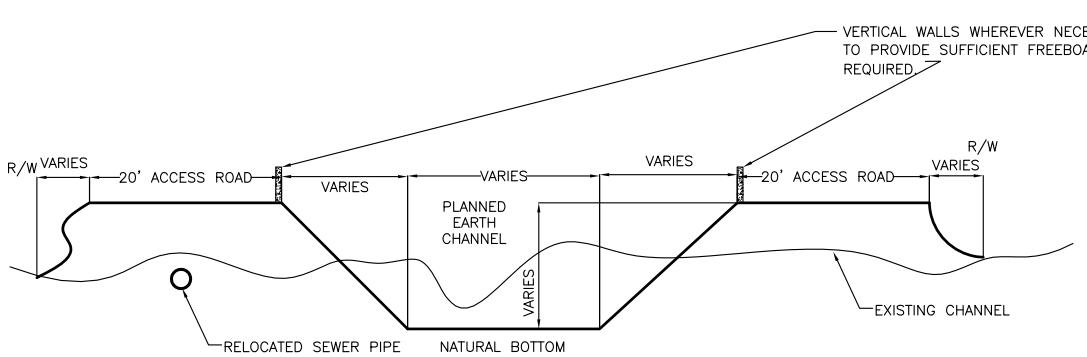
Apple Valley Road

Quantico Road

Tuscola Road

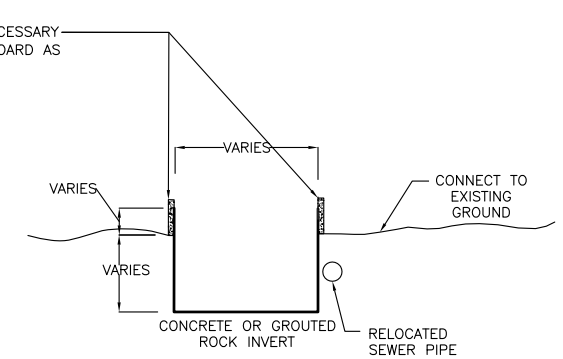
MATCH LINE SEE SHEET 7

PLAN #2, UPSTREAM/REACHES 2 AND 3



TYPICAL SECTION (LOOKING DOWNSTREAM)

0 10' 20'



TYPICAL RECTANGULAR CHANNEL SECTION

N

0 60' 120' 240' 360'

NOTES:

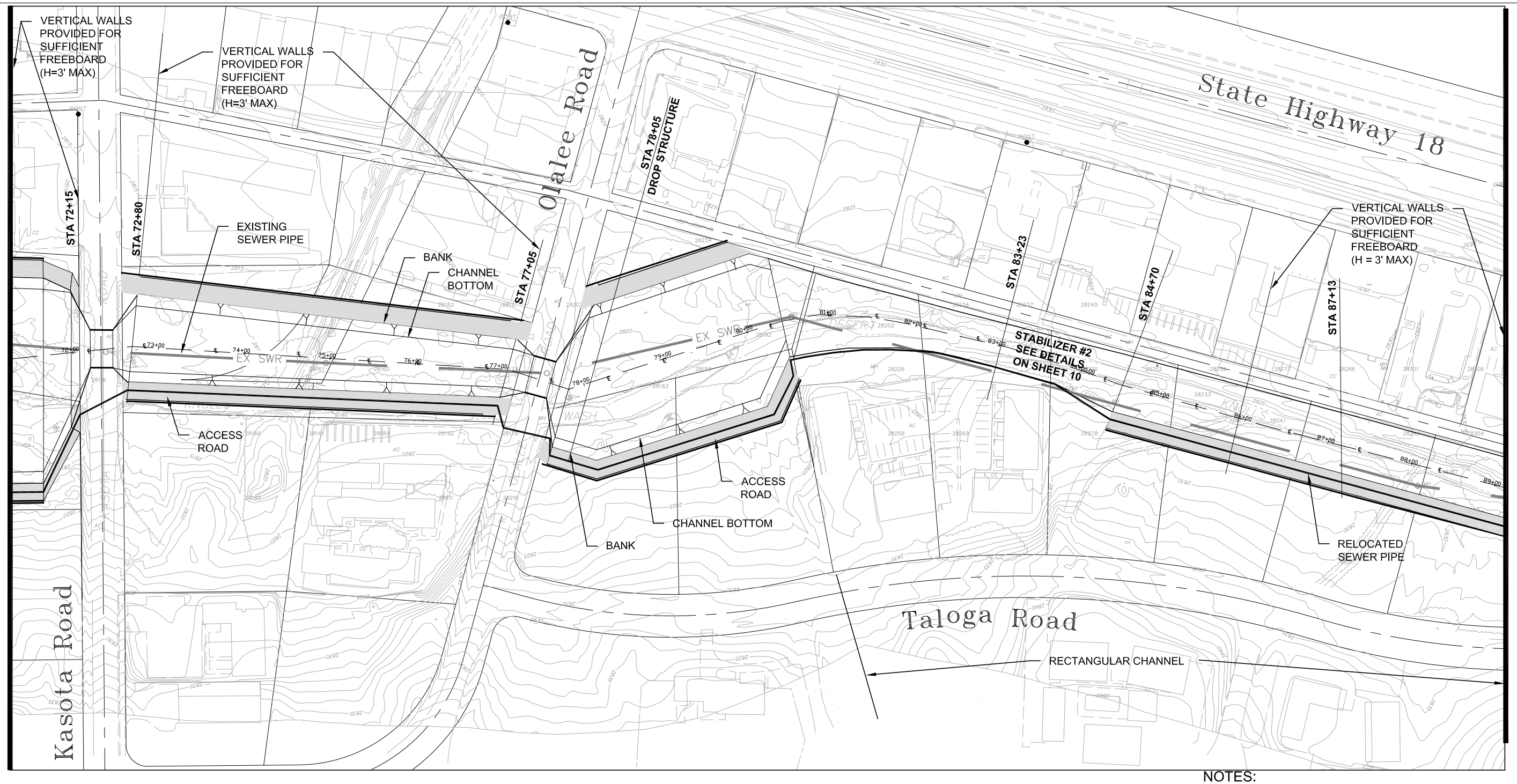
1. UNGROUTED ROCK CHANNEL LINING WILL BE USED WHERE VELOCITIES EXCEED EIGHT (8) FPS.
2. FOR TYPICAL CROSS SECTION DIMENSIONS SEE HYDRAULIC RESULTS.

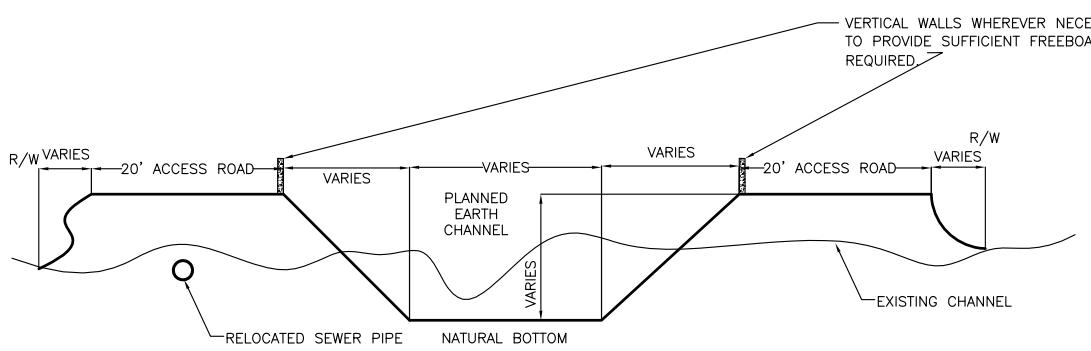
URS Corporation

ALTERNATIVE CONCEPT PLAN #2
GABION MAT DROP STRUCTURE
UPSTREAM/REACHES 2 AND 3

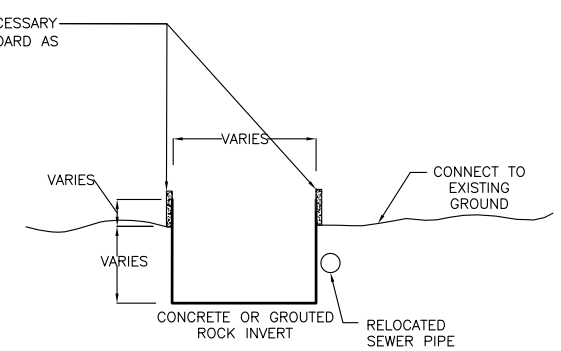
Proj. No.: 38001579.30002	Date: 6-16-2011		
	Sheet No.: 6 OF 12	Rev.: 2	
Project: DESERT KNOLLS WASH	Scale: SEE SCALE BAR		

P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN2\PLAN2_CAD\PLAN#2_SHTS_4-12.dwg





TYPICAL SECTION (LOOKING DOWNSTREAM)



TYPICAL RECTANGULAR CHANNEL SECTION

0 10' 20'

PLAN #2, UPSTREAM/REACH 3

N

0 60' 120' 240' 360'

NOTES:

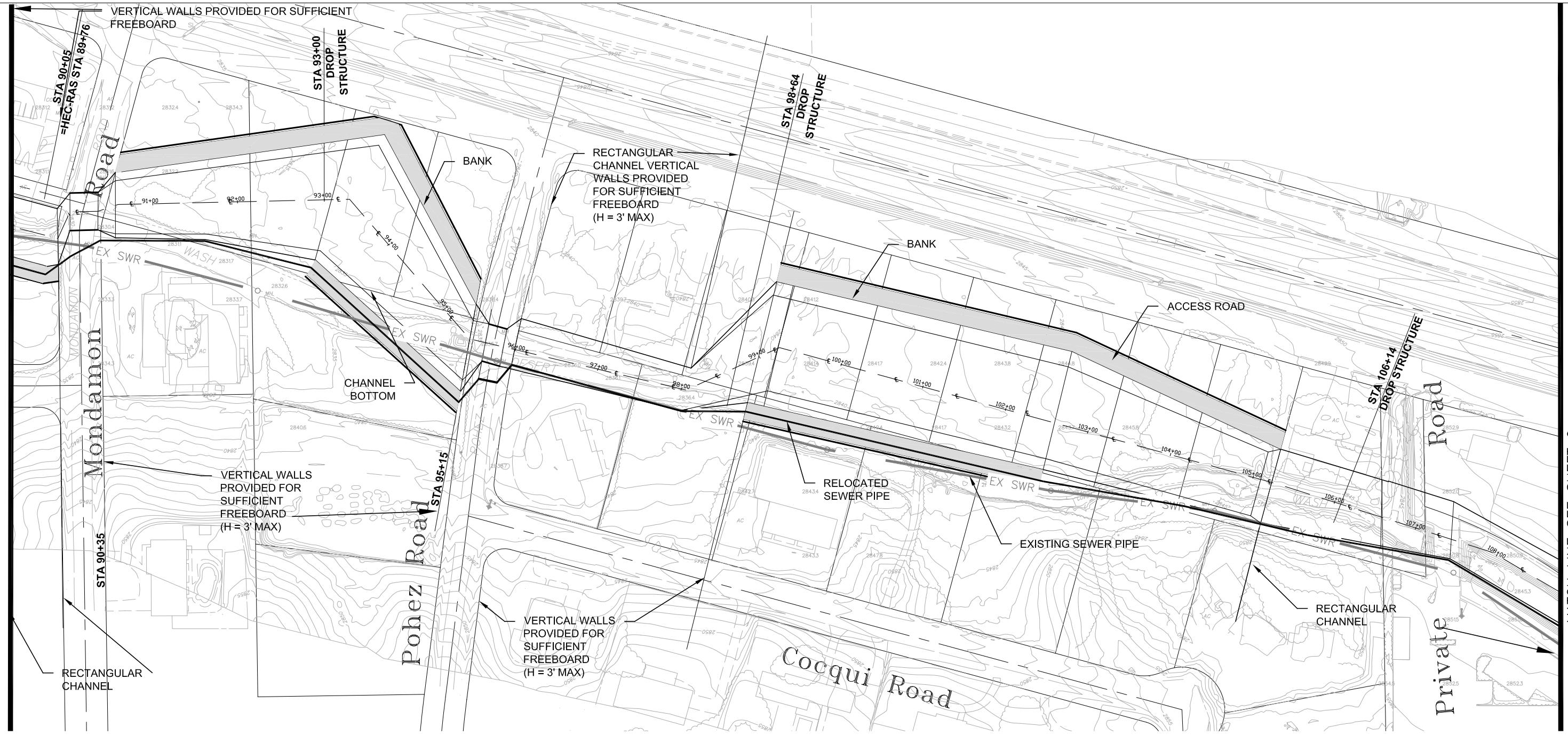
1. UNGROUTED ROCK CHANNEL LINING WILL BE USED WHERE VELOCITIES EXCEED EIGHT (8) FPS.
2. FOR TYPICAL CROSS SECTION DIMENSIONS SEE HYDRAULIC RESULTS.

URS Corporation

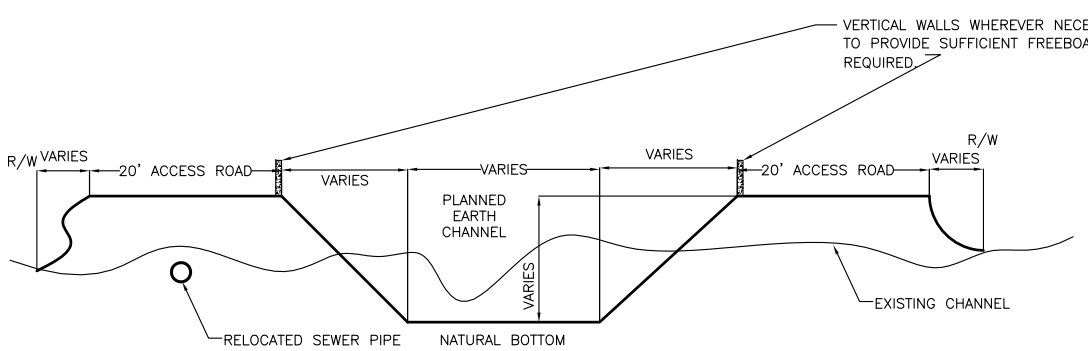
ALTERNATIVE CONCEPT PLAN #2
GABION MAT DROP STRUCTURE
UPSTREAM/REACH 3

Proj. No.: 38001579.30002	Date: 6-16-2011		
	Sheet No.: 7 OF 12	Rev.: 2	
Project: DESERT KNOLLS WASH	Scale: SEE SCALE BAR		

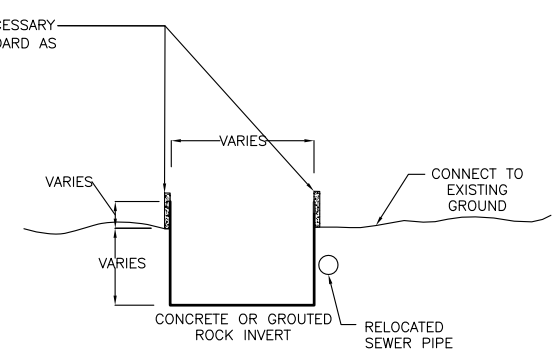
P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN2\PLAN2_CAD\PLAN#2_SHTS_4-12.dwg



PLAN #2, UPSTREAM/REACH 3



TYPICAL SECTION (LOOKING DOWNSTREAM)



TYPICAL RECTANGULAR CHANNEL SECTION

0 10' 20'

N

0 60' 120' 240' 360'

NOTES:

1. UNGROUTED ROCK CHANNEL LINING WILL BE USED WHERE VELOCITIES EXCEED EIGHT (8) FPS.
2. FOR TYPICAL CROSS SECTION DIMENSIONS SEE HYDRAULIC RESULTS.

URS Corporation

ALTERNATIVE CONCEPT PLAN #2
GABION MAT DROP STRUCTURE
UPSTREAM/REACH 3

Proj. No.:	38001579.30002	Date:	6-16-2011
Project:	DESERT KNOLLS WASH	Sheet No.: 8 OF 12	Rev.: 2
		Scale:	SEE SCALE BAR

P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN2\PLAN2_CAD\PLAN#2_SHTS_4-12.dwg

MATCH LINE SEE SHEET 8

State Highway 18

STA 110+24

STA 111+70

VERTICAL WALLS PROVIDED FOR SUFFICIENT FREEBOARD (H = 3' MAX)

VERTICAL WALL

BOTTOM CHANNEL

ACCESS ROAD

VERTICAL WALLS PROVIDED FOR SUFFICIENT FREEBOARD (H = 3' MAX)

STABILIZER #3 SEE DETAILS ON SHEET 11

STA 117+85

STA 117+90

STA 119+15

STA 120+93

STABILIZER #4 SEE DETAILS ON SHEET 11

CHANNEL TRANSITION WITH RIPRAP

Tao Road

EX SWR

BANK

EXISTING SEWER PIPE

CHANNEL BOTTOM

RELOCATED SEWER PIPE

ACCESS ROAD

CONNECT TO EXISTING SEWER PIPE

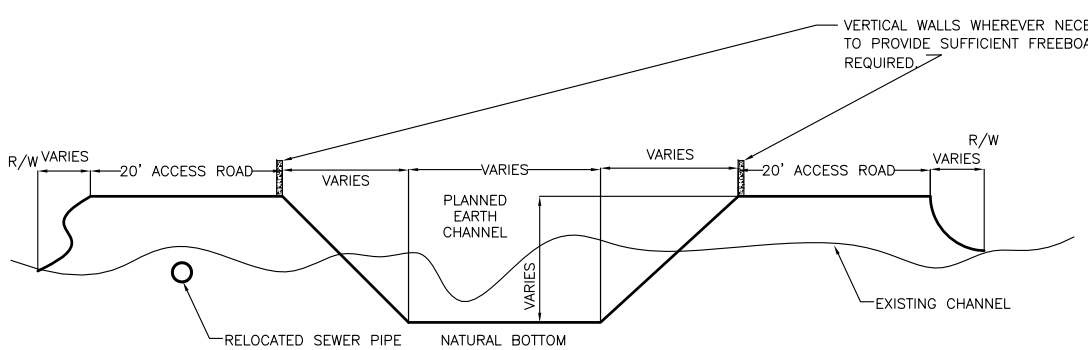
RECTANGULAR CHANNEL

Symeron Road

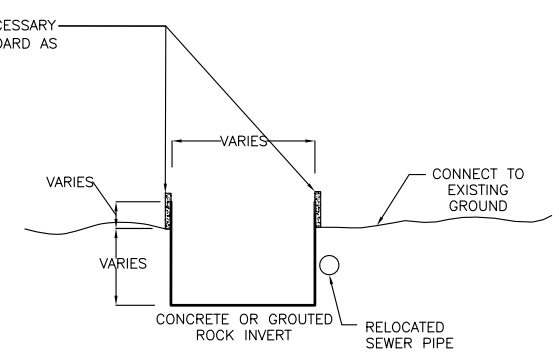
PLAN #2, UPSTREAM/REACH 3

NOTES:

1. UNGROUTED ROCK CHANNEL LINING WILL BE USED WHERE VELOCITIES EXCEED EIGHT (8) FPS.
2. FOR TYPICAL CROSS SECTION DIMENSIONS SEE HYDRAULIC RESULTS.



TYPICAL SECTION (LOOKING DOWNSTREAM)



TYPICAL RECTANGULAR CHANNEL SECTION

0 10' 20'

N

0 60' 120' 240' 360'

URS Corporation

ALTERNATIVE CONCEPT PLAN #2
GABION MAT DROP STRUCTURE
UPSTREAM/REACH 3

Proj. No.:	38001579.30002	Date: 6-16-2011	
		Sheet No.: 9 OF 12	Rev.: 2
Project:	DESERT KNOLLS WASH	Scale: SEE SCALE BAR	

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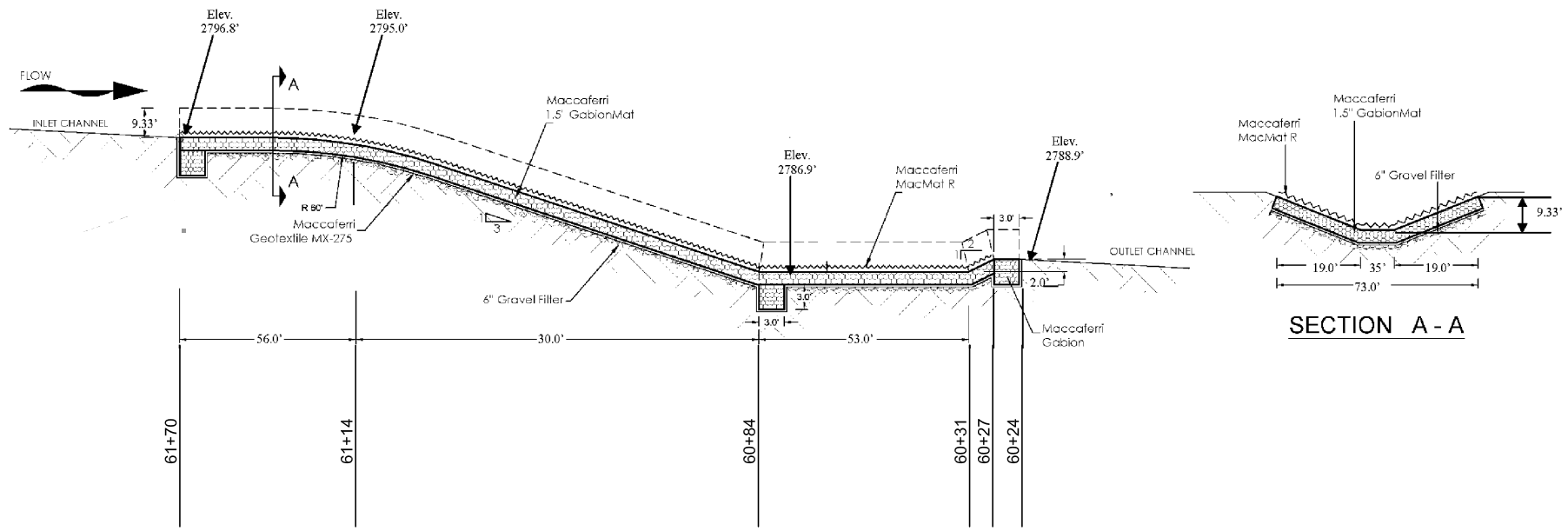
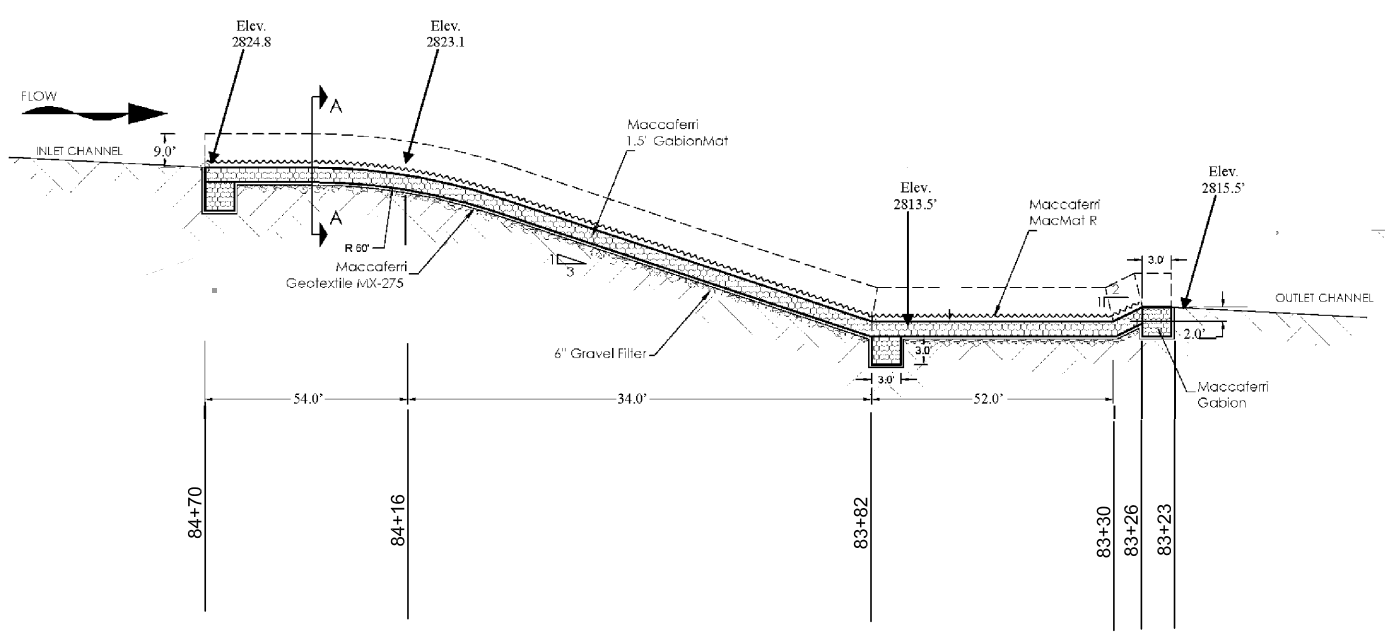


STABILIZER #1

N.T.S.

SECTION A - A



STABILIZER #2

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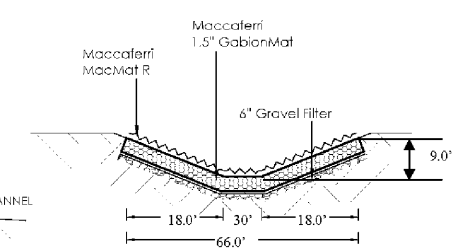

SECTION A - A

URS Corporation

DETAILS-1
ALTERNATIVE CONCEPT PLAN #2
GABION MAT DROP STRUCTURE
UPSTREAM/REACHES 2 AND 3

Proj. No.: 38001579.30002	Date: 6-16-2011		
	Sheet No.: 10 OF 12	Rev.: 2	
Project: DESERT KNOLLS WASH	Scale: SEE SCALE BAR		

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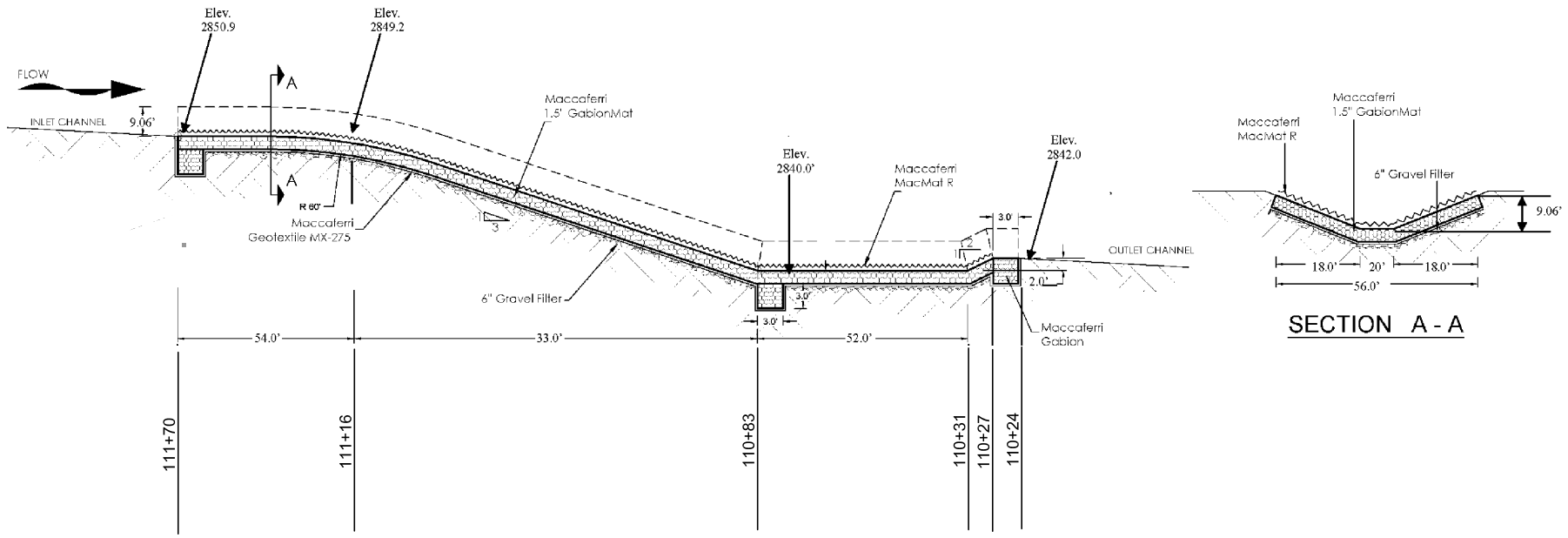

SECTION A - A

STABILIZER #3

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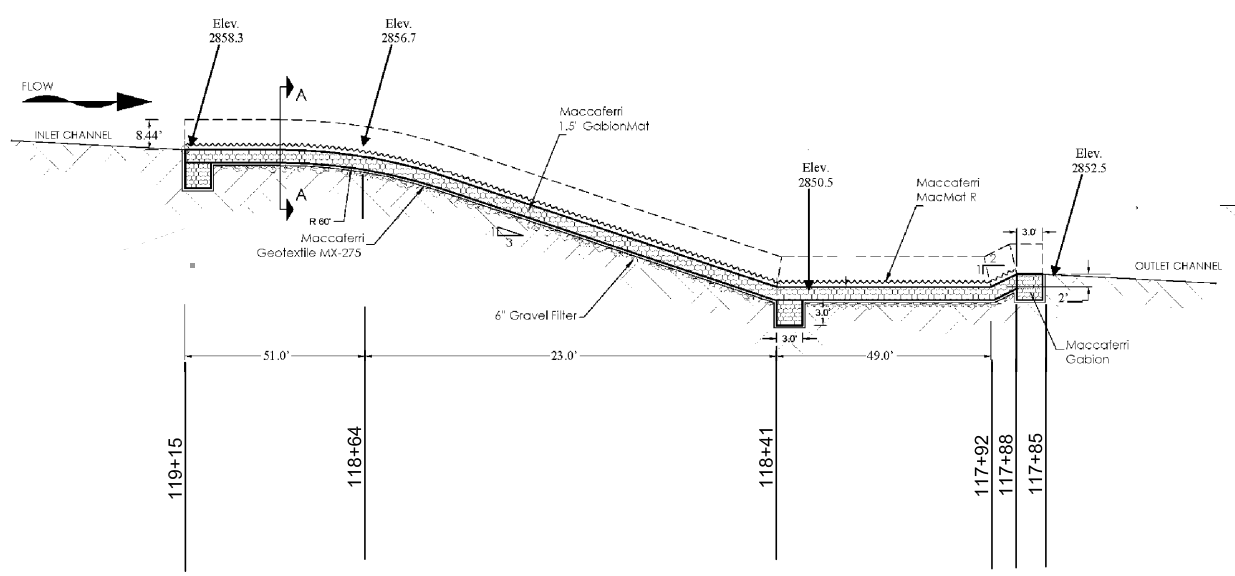
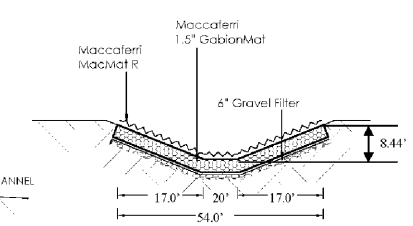




SECTION A - A

STABILIZER #4

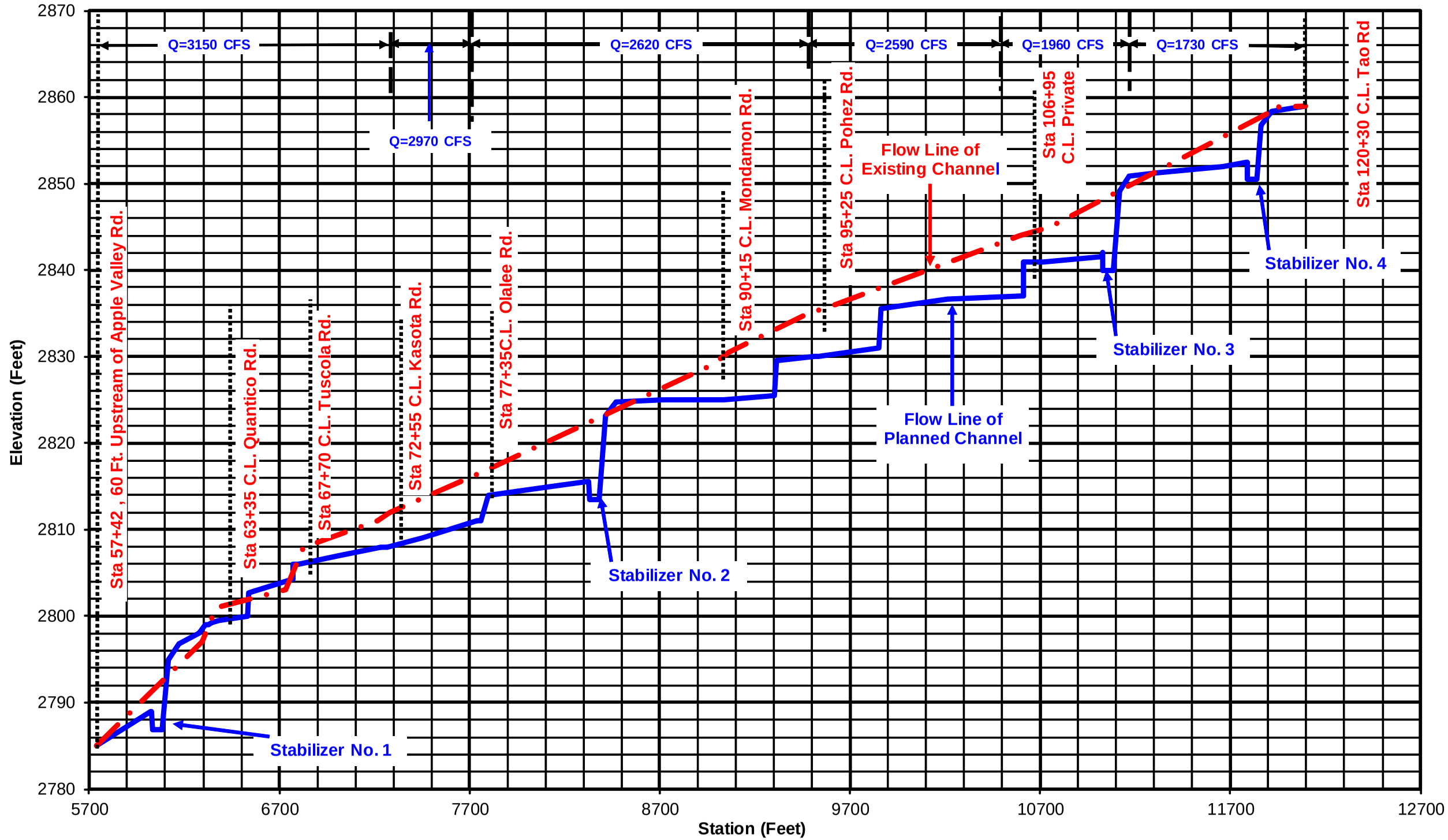
N.T.S.

URS Corporation

DETAILS-2
ALTERNATIVE CONCEPT PLAN #2
GABION MAT DROP STRUCTURE
UPSTREAM/REACH3

Proj. No.: 38001579.30002	Date: 6-16-2011		
	Sheet No.: 11 OF 12	Rev.: 2	
Project: DESERT KNOLLS WASH	Scale: SEE SCALE BAR		

P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN2\PLAN2_CAD\PLAN#2_SHTS_4-12.dwg



CONCEPTUAL ALTERNATIVE PLAN NO.2

GRADE CONTROL STABIIZERS (Upstream Reach)

UPSTREAM PROFILE, PLAN #2

N.T.S.

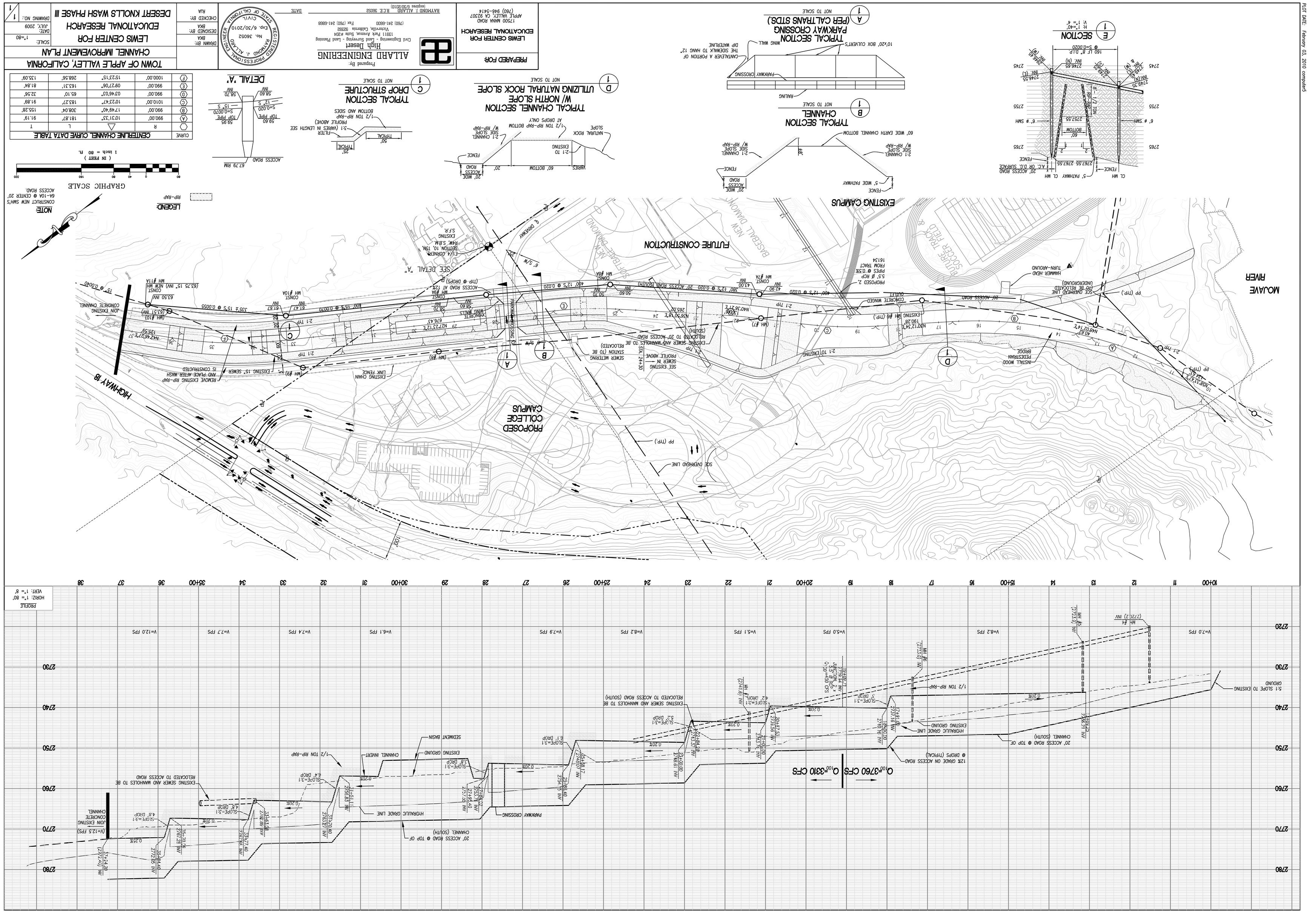
URS Corporation

UPSTREAM PROFILE
ALTERNATIVE CONCEPT PLAN #2
GABION MAT DROP STRUCTURE
UPSTREAM/REACHES 2 AND 3

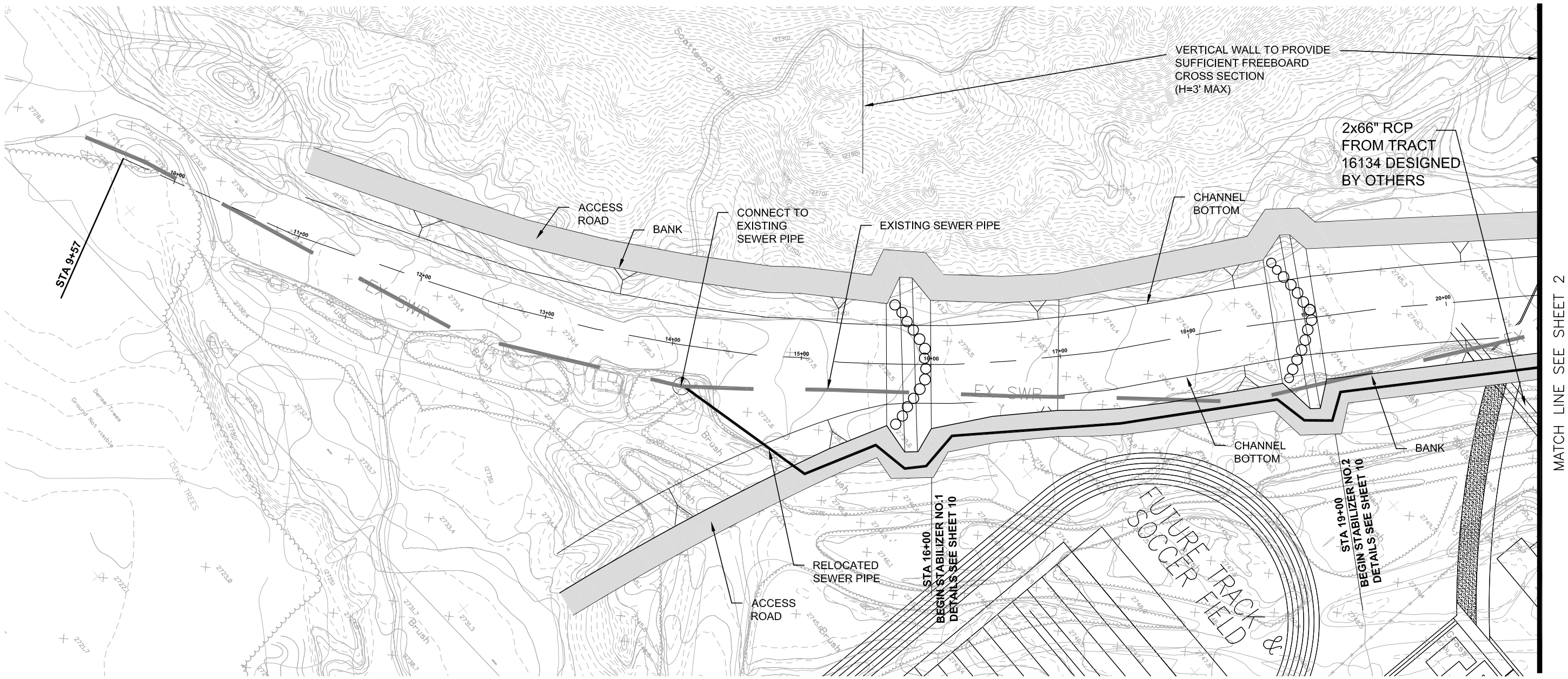
Proj. No.:	38001579.30002	Date:	6-16-2011
		Sheet No.: 12 OF 12	Rev.: 2
Project:	DESERT KNOLLS WASH	Scale:	SEE SCALE BAR

P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN2\PLAN2_CAD\PLAN#2_SHTS_4-12.dwg

B.2 Allard Engineering Concept Plan


PREPARED FOR
LEWIS CENTER FOR EDUCATIONAL RESEARCH
17500 MAA ROAD
APPLE VALLEY, CA 92307
(760) 946-5414
Prepared By:
ALLARD ENGINEERING
High Desert
Civil Engineering - Land Surveying - Land Planning
15911 Park Avenue, Suite #204
Victorville, California 92392
(760) 241-6500 Fax (760) 241-6868
RAYMOND J. ALLARD R.E.E. 30252
(expires 6/30/2010)
DATE
RAYMOND J. ALLARD
No. 30252
Exp. 6/30/2010
CIVIL
STATE OF CALIFORNIA
REGISTERED PROFESSIONAL ENGINEER
DRAWN BY: BKA
CHECKED BY: RAA
DESIGNED BY: BKA
CHECKED BY:
TOWN OF APPLE VALLEY, CALIFORNIA
CHANNEL IMPROVEMENT PLAN
LEWIS CENTER FOR EDUCATIONAL RESEARCH
DESERT KNOLLS WASH PHASE III
SCALE: 1"=80'
DATE: JULY, 2009
DRAWING NO.: 1
1
Filename: M:\DWG\HD.10127.01.03 LEWIS CENTER\SD\LEWIS CENTER-SD01.dwg
TYPICAL SECTION
PARKWAY CROSSING
(PER CALTRANS STDS.)
NOT TO SCALE
TYPICAL SECTION
CHANNEL
NOT TO SCALE
TYPICAL CHANNEL SECTION
W/ NORTH SLOPE
UTILIZING NATUVAL ROCK SLOPE
NOT TO SCALE
TYPICAL SECTION
DROP STRUCTURE
NOT TO SCALE
DETAIL "A"
SECTION
H: 1"=40'
V: 1"=4'
EXISTING CAMPUS
FUTURE CONSTRUCTION
PROPOSED COLLEGE CAMPUS
HIGHWAY 18
MOJAVE RIVER
NOTE
CONSTRUCT NEW SWM'S 64-10A @ CENTER 20' ACCESS ROAD.
LEGEND:
RIP-RAP
GRAPHIC SCALE
(IN FEET)
1 inch = 80 ft.
CURVE TABLE
PROFILE
HORIZ: 1"= 80'
VERT: 1"= 8'
O100=3760 CFS
O100=3310 CFS

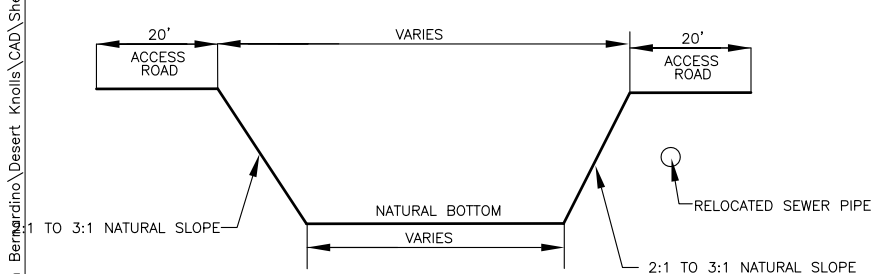
C. Concept #3 Plans – Boulder Stabilizer



PLAN #3, DOWNSTREAM/REACH 1

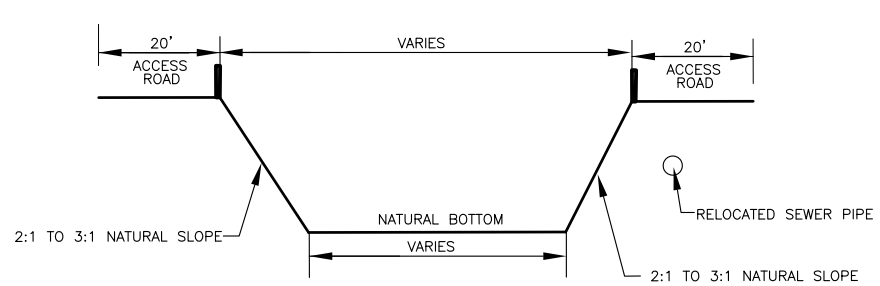
NOTES:

1. FOR TYPICAL CROSS-SECTIOIN DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.
2. UNGROUTED ROCK CHANNEL LINNING WILL BE USED WHERE VELOCITIES EXCEED EIGHT(8) FPS.



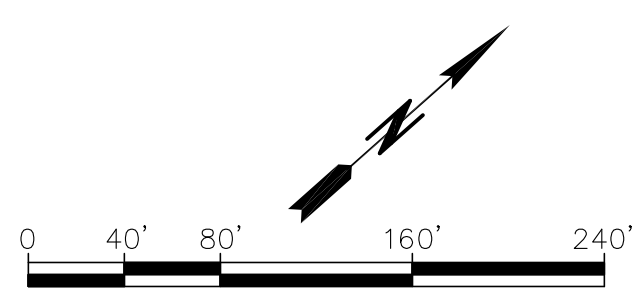
TYPICAL CHANNEL SECTION

N.T.S.



TYPICAL CHANNEL SECTION WITH VERTICAL WALL

N.T.S.



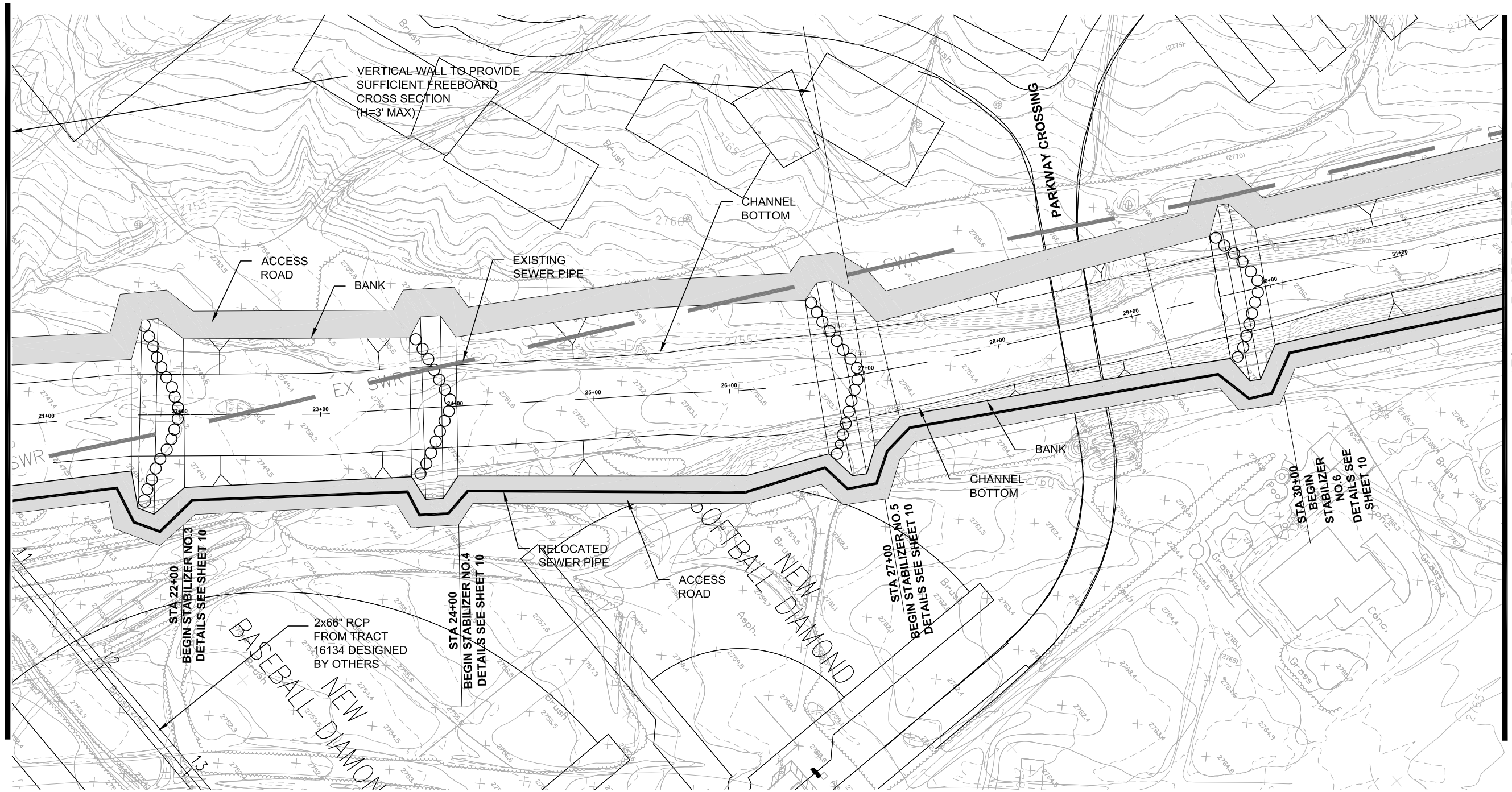
URS Corporation

ALTERNATIVE CONCEPT PLAN #3
BOULDER STABILIZER
LEWIS CENTER CHANNEL/REACH 1

Proj. No.: 38001579.30002	Date: 6-16-2011		
Project: DESERT KNOLLS WASH	Sheet No.: 1 OF 10	Rev.: 2	
	Scale: SEE SCALE BAR		

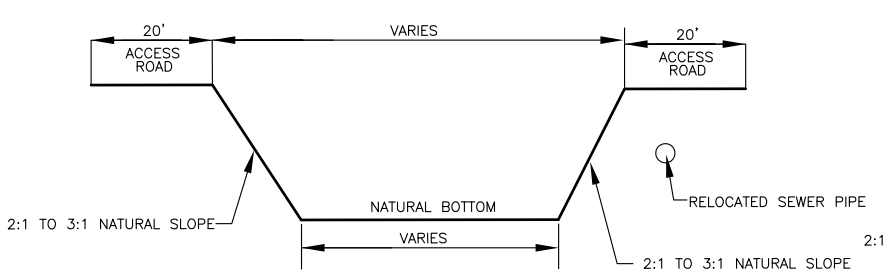
P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN3\PLAN3_CAD\PLAN#3_SHTS_1-3_LEWIS_CTR.dwg

MATCH LINE SEE SHEET 1



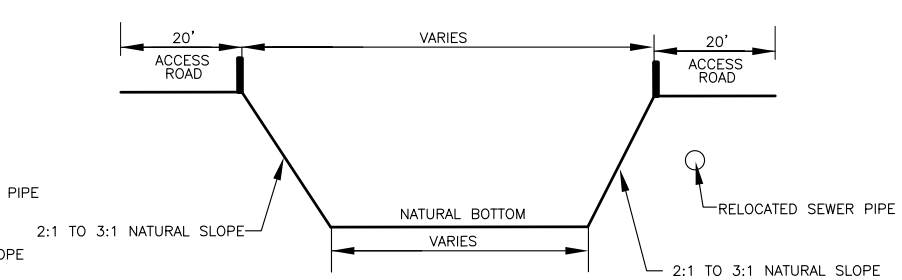
MATCH LINE SEE SHEET 3

PLAN #3, DOWNSTREAM/REACH 1



TYPICAL CHANNEL SECTION

N.T.S.

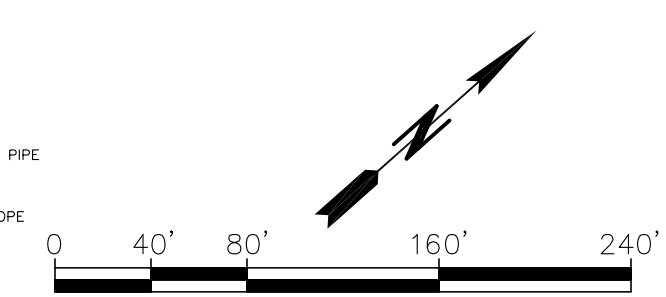


TYPICAL CHANNEL SECTION

N.T.S.

NOTES:

1. FOR TYPICAL CROSS-SECTIOIN DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.
2. UNGROUTED ROCK CHANNEL LINING WILL BE USED WHERE VELOCITIES EXCEED EIGHT(8) FPS.

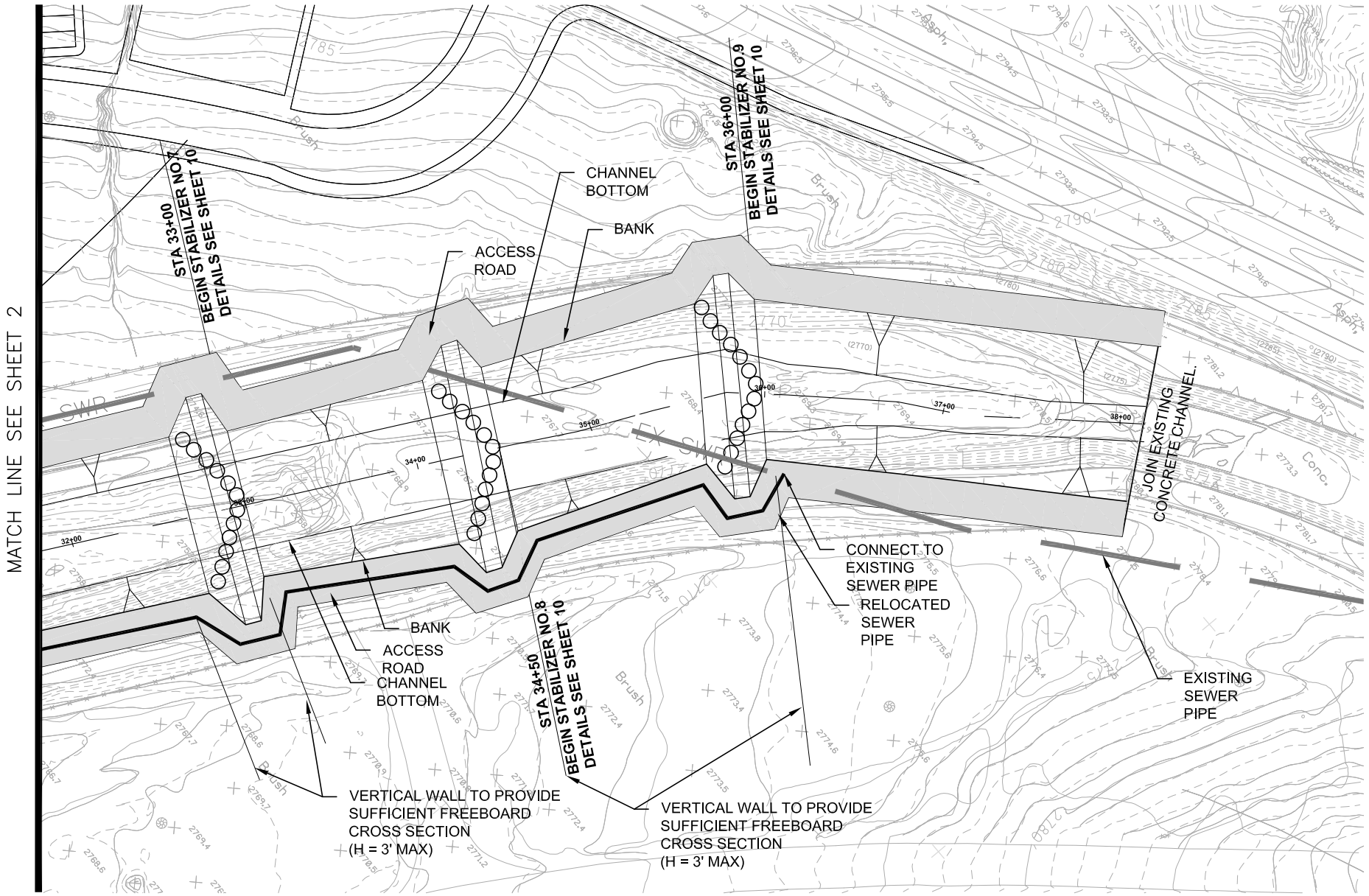


URS Corporation

ALTERNATIVE CONCEPT PLAN #3
BOULDER STABILIZER
LEWIS CENTER CHANNEL/REACH 1

Proj. No.:	38001579.30002	Date:	6-16-2011
Project:	DESERT KNOLLS WASH	Sheet No.: 2 OF 10	Rev.: 2
		Scale:	SEE SCALE BAR

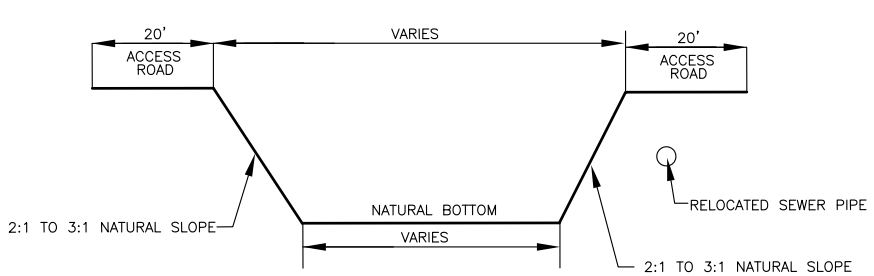
P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN3\PLAN3_CAD\PLAN#3_SHTS_1-3_LEWIS_CTR.dwg



PLAN #3, DOWNSTREAM/REACH 1

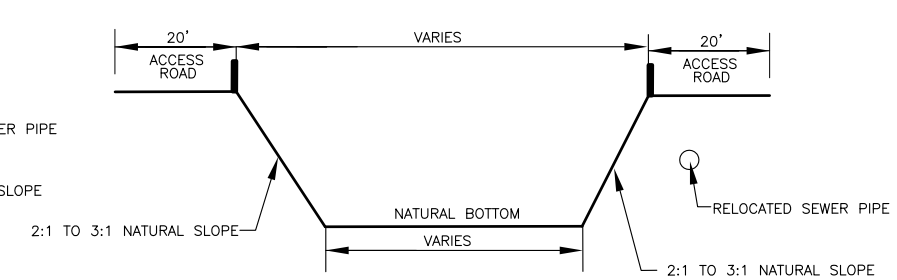
NOTES:

1. FOR TYPICAL CROSS-SECTIOIN DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.
2. UNGROUTED ROCK CHANNEL LINING WILL BE USED WHERE VELOCITIES EXCEED EIGHT(8) FPS.



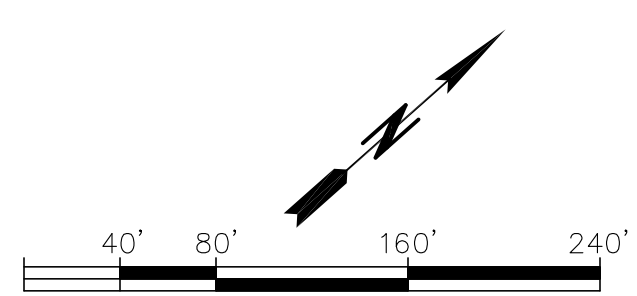
TYPICAL CHANNEL SECTION

N.T.S.



TYPICAL CHANNEL SECTION

N.T.S.

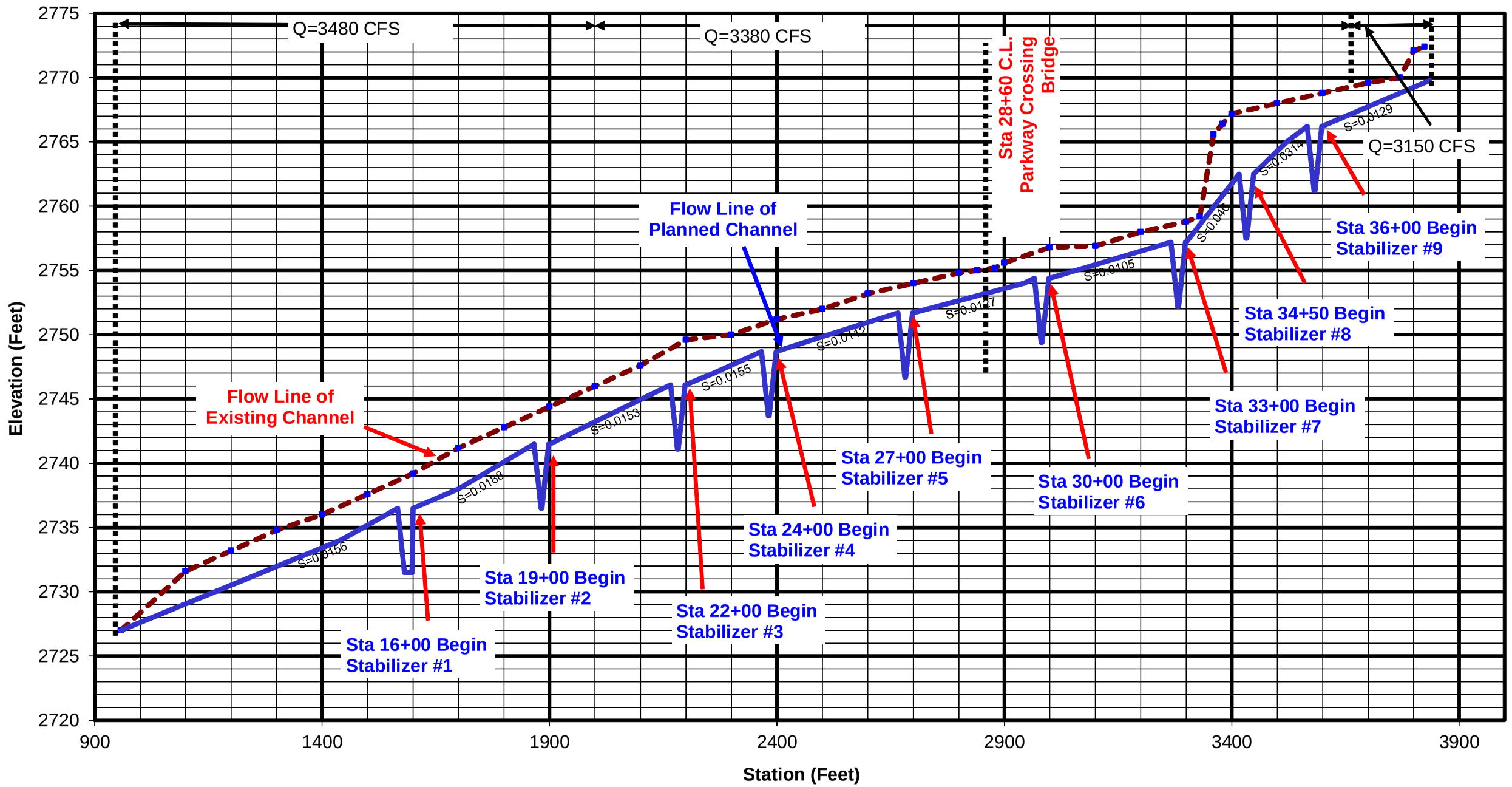


URS Corporation

ALTERNATIVE CONCEPT PLAN #3
BOULDER STABILIZER
LEWIS CENTER CHANNEL/REACH 1

Proj. No.: 38001579.30002	Date: 6-16-20011		
Project: DESERT KNOLLS WASH	Sheet No.: 3 OF 10	Rev.: 2	
	Scale: SEE SCALE BAR		

P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN3\PLAN3_CAD\PLAN#3_SHTS_1-3_LEWIS_CTR.dwg



CONCEPTUAL ALTERNATIVE PLAN NO. 3

BOULDER STABILIZERS FOR THE LEWIS CENTER REACH/DOWNSTREAM

DOWNSTREAM PROFILE, PLAN #3

N.T.S.

URS Corporation

DOWNSTREAM PROFILE
ALTERNATIVE CONCEPT PLAN #3
BOULDER STABILIZER
LEWIS CENTER CHANNEL/REACH 1

Proj. No.: 38001579.30002	Date: 06-16-11		
	Sheet No.: 4 OF 10	Rev.: X	
Project: DESERT KNOLLS WASH	Scale: AS SHOWN		

P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN3\PLAN3_CAD\PLAN#3_SHTS_4-10.dwg

VERTICAL WALL TO PROVIDE SUFFICIENT FREEBOARD CROSS SECTION (H=3' MAX)

EXISTING SEWER PIPE

63+45 DROP STRUCTURE

ACCESS ROAD

68+02 DROP STRUCTURE

CHANNEL BOTTOM

BANK

STA 72+15

STA 72+67 DROP STRUCTURE

72+49

STA 72+75

MATCH LINE SEE SHEET 6

EXISTING CONCRETE CHANNEL

CONNECT TO EXISTING SEWER PIPE

RELOCATED SEWER PIPE

ACCESS ROAD

BANK

CHANNEL BOTTOM

Potomac Rd

Apple Valley Road

Quantico Road

Tuscola Road

Kasota Road

55+15 56+00 57+00 58+00 59+00 60+00 61+00 62+00 63+00 64+00 65+00 66+00 67+00 68+00 69+00 70+00 71+00 72+00

63+13 63+45 67+70 68+02

N50800 N50400

NOTES:

1. FOR TYPICAL CROSS-SECTIOIN DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.
2. UNGROUTED ROCK CHANNEL LINNING WILL BE USED WHERE VELOCITIES EXCEED EIGHT(8) FPS.

PLAN #3, UPSTREAM/REACHES 2 AND 3

N

0 60' 120' 240' 360'

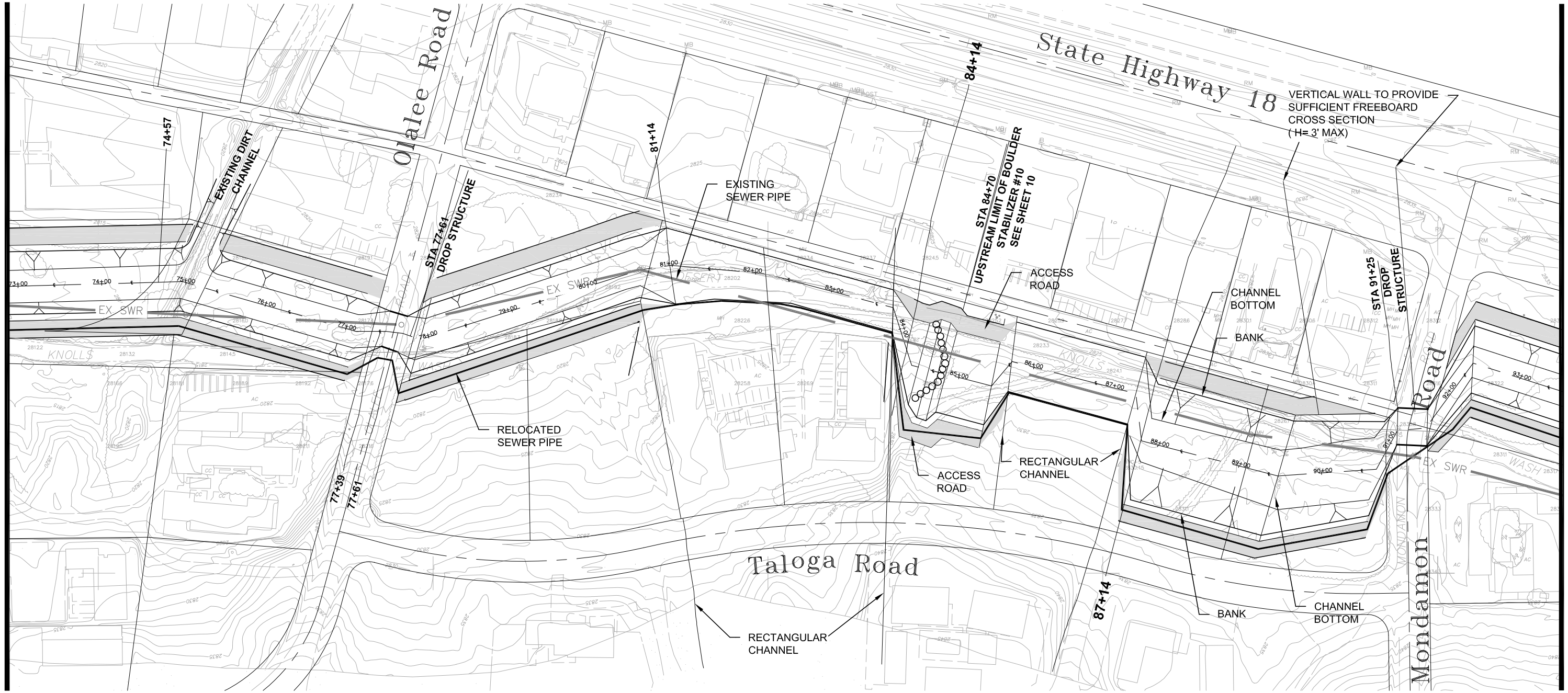
URS Corporation

ALTERNATIVE CONCEPT PLAN #3
BOULDER STABILIZER
UPSTREAM/REACHES 2 AND 3

Proj. No.: 38001579.30002	Date: 6-16-2011		
Project: DESERT KNOLLS WASH	Sheet No.: 5 OF 10	Rev.: 2	
	Scale: SEE SCALE BAR		

P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN3\PLAN3_CAD\PLAN#3_SHTS_4-10.dwg

MATCH LINE SEE SHEET 5

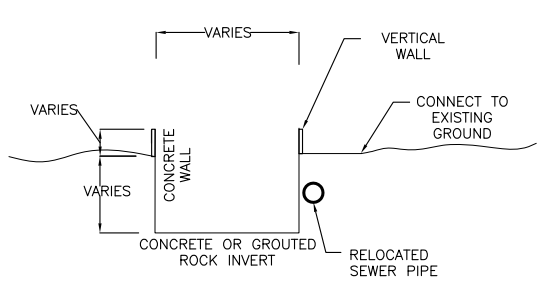


MATCH LINE SEE SHEET 7

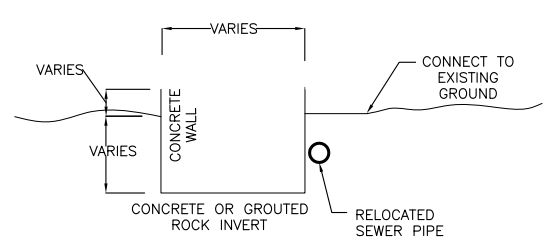
NOTES:

1. FOR TYPICAL CROSS-SECTIOIN DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.
2. UNGROUTED ROCK CHANNEL LINING WILL BE USED WHERE VELOCITIES EXCEED EIGHT(8) FPS.

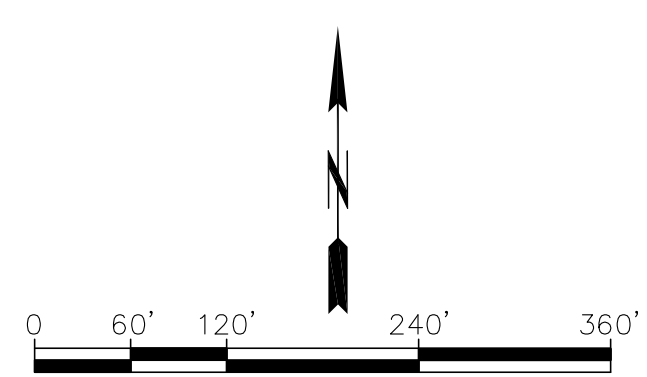
PLAN #3, UPSTREAM/REACH 3



RECTANGULAR CHANNEL WITH VERTICAL WALL
SCALE: NOT TO SCALE



RECTANGULAR CHANNEL SECTION
SCALE: NOT TO SCALE



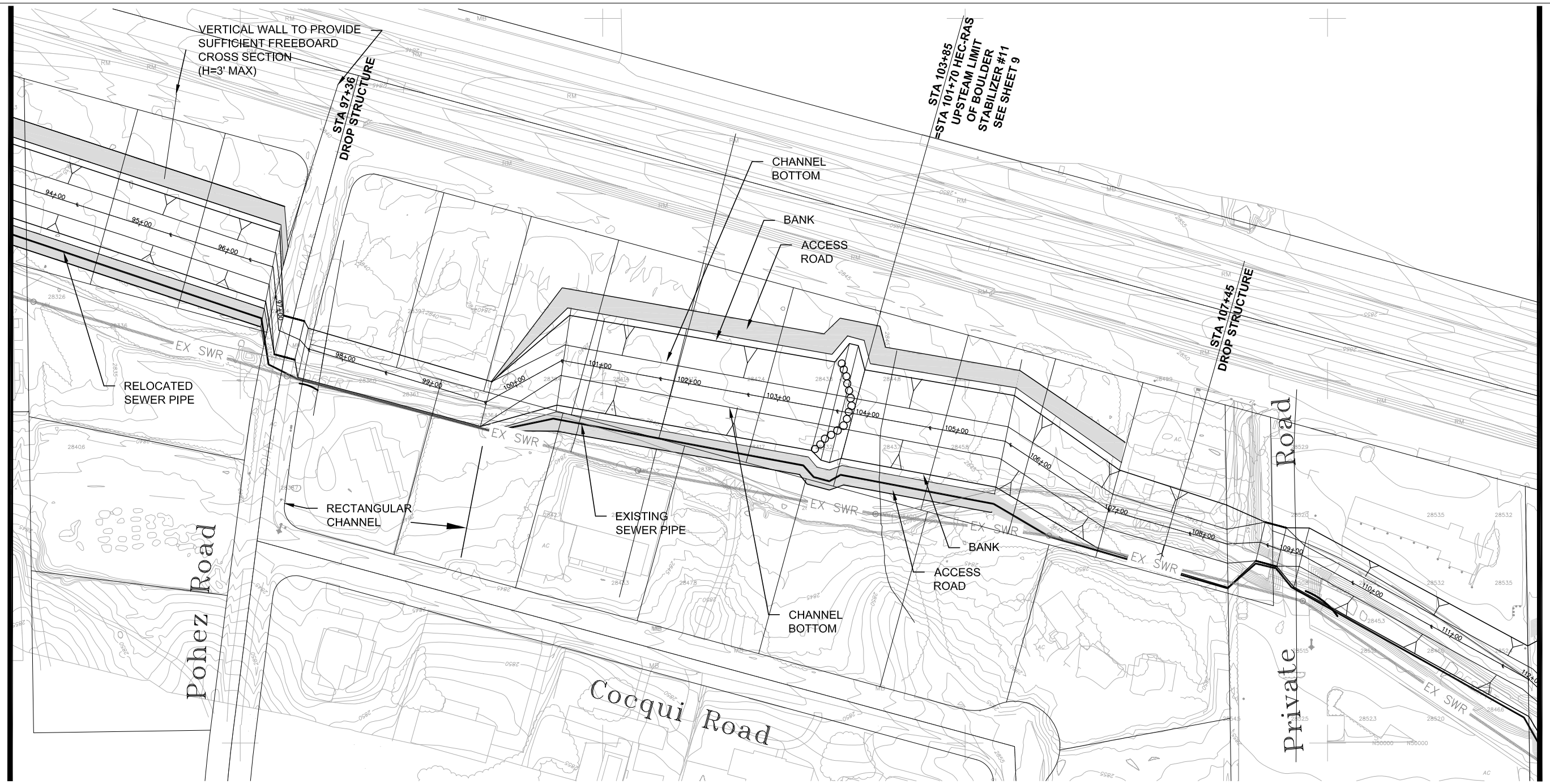
URS Corporation

ALTERNATIVE CONCEPT PLAN #3
BOULDER STABILIZER
UPSTREAM/REACH 3

Proj. No.:	38001579.30002	Date:	6-16-2011
		Sheet No.: 6 OF 10	Rev.: 2
Project:	DESERT KNOLLS WASH	Scale:	N.T.S

P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN3\PLAN3_CAD\PLAN#3_SHTS_4-10.dwg

MATCH LINE SEE SHEET 6

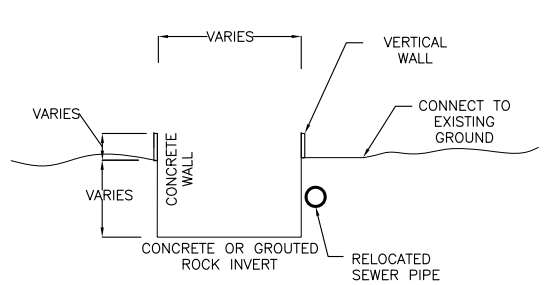


MATCH LINE SEE SHEET 8

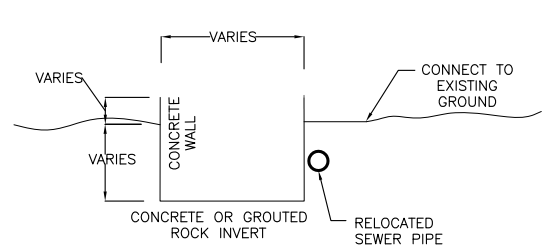
NOTES:

1. FOR TYPICAL CROSS-SECTIOIN DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.
2. UNGROUTED ROCK CHANNEL LINING WILL BE USED WHERE VELOCITIES EXCEED EIGHT(8) FPS.

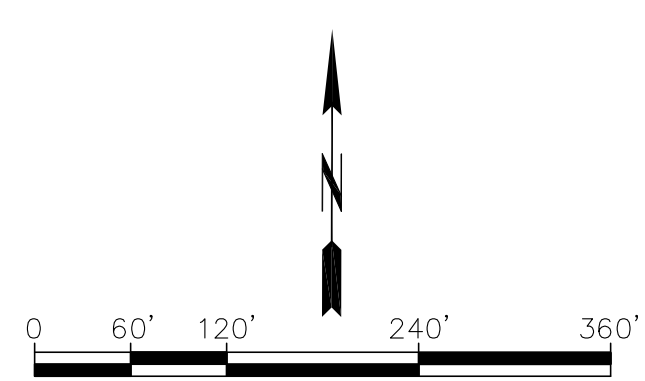
PLAN #3, UPSTREAM/REACH 3



RECTANGULAR CHANNEL WITH VERTICAL WALL
SCALE: NOT TO SCALE



RECTANGULAR CHANNEL SECTION
SCALE: NOT TO SCALE



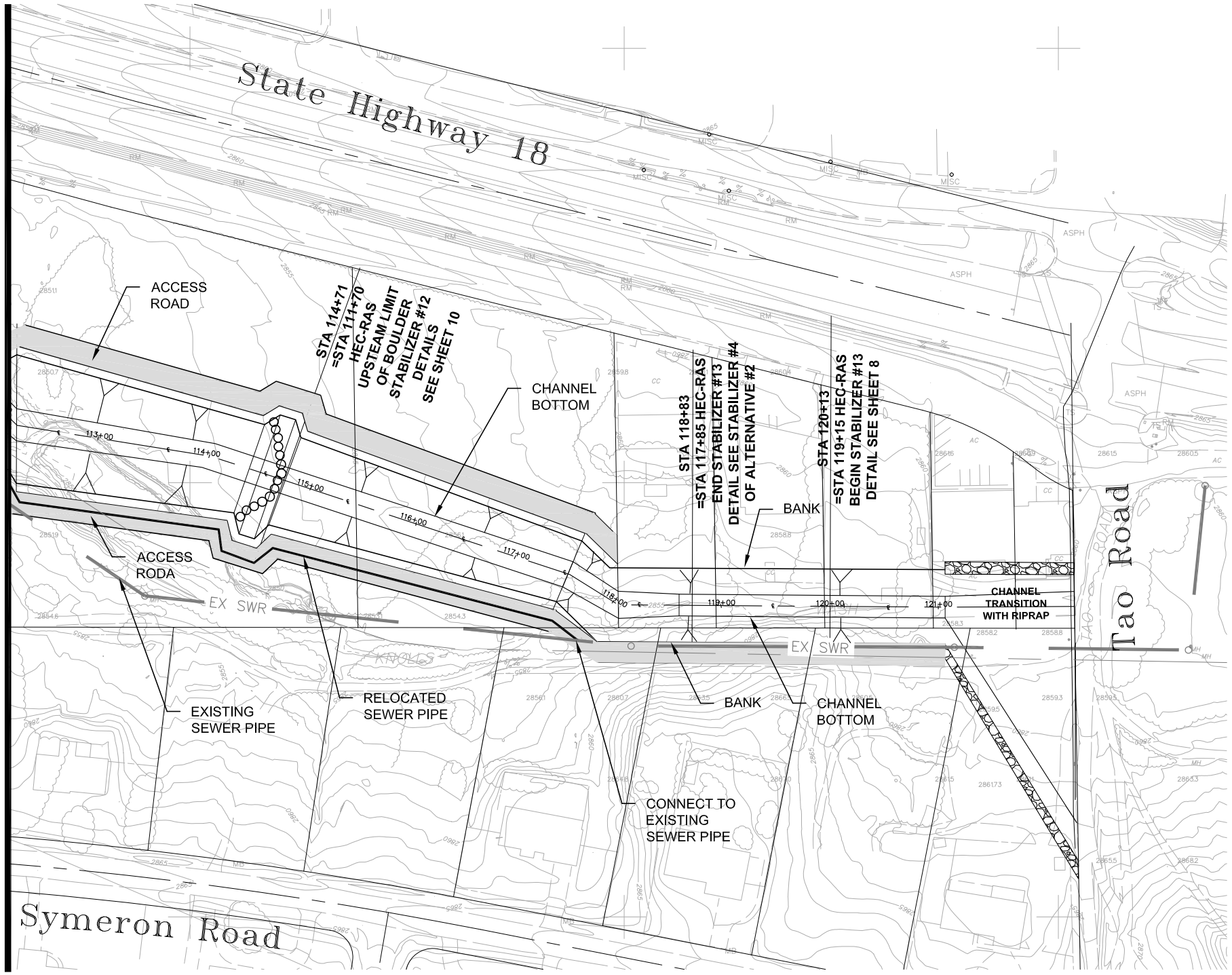
URS Corporation

ALTERNATIVE CONCEPT PLAN #3
BOULDER STABILIZER
UPSTREAM/REACH 3

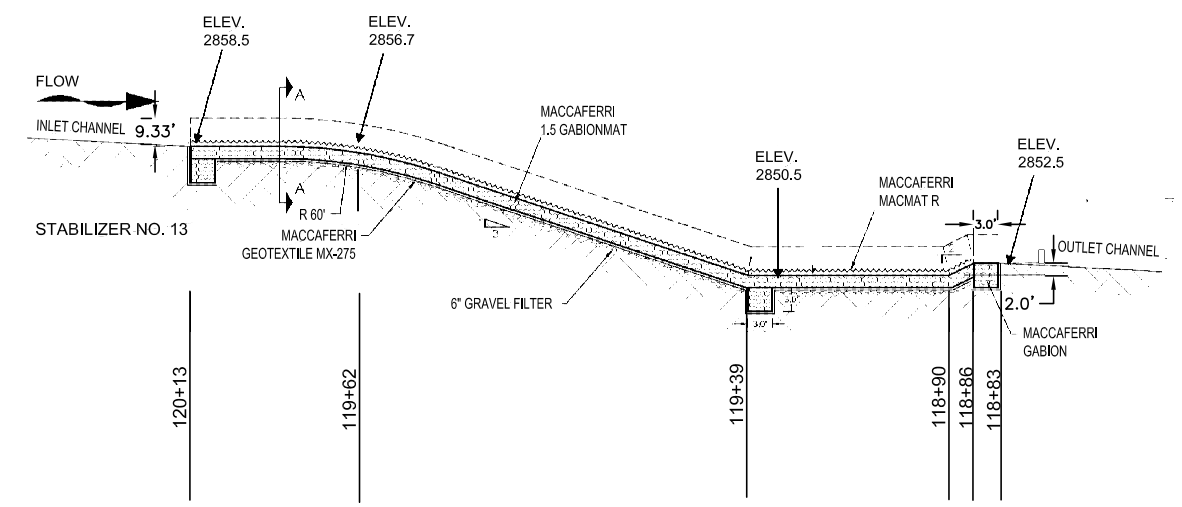
Proj. No.: 38001579.30002	Date: 6-16-2011		
	Sheet No.: 7 OF 10	Rev.: 2	
Project: DESERT KNOLLS WASH	Scale: N.T.S		

P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN3\PLAN3_CAD\PLAN#3_SHTS_4-10.dwg

MATCH LINE SEE SHEET 7



PLAN #3, UPSTREAM/REACH 3



STABILIZER #13

N.T.S.

NOTES:

1. FOR TYPICAL CROSS-SECTIOIN DIMENSIONS SEE HYDRAULIC ANALYSIS RESULTS.
2. UNGROUTED ROCK CHANNEL LINING WILL BE USED WHERE VELOCITIES EXCEED EIGHT(8) FPS.

N

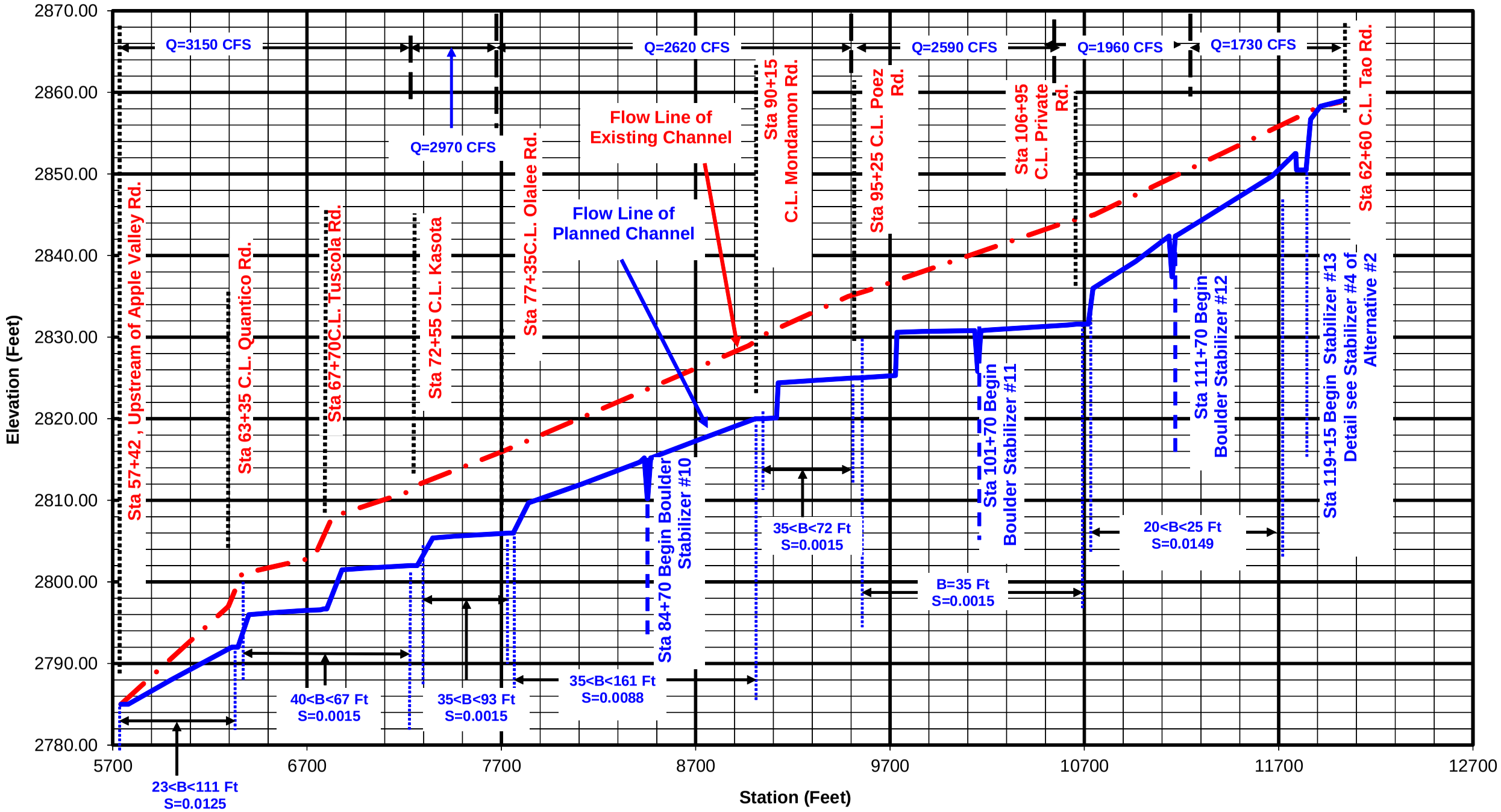
0 60' 120' 240' 360'

URS Corporation

ALTERNATIVE CONCEPT PLAN #3
BOULDER STABILIZER
UPSTREAM/REACH3

Proj. No.: 38001579.30002	Date: 6-16-2011		
Project: DESERT KNOLLS WASH	Sheet No.: 8 OF 10	Rev.: 2	
	Scale: N.T.S		

P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN3\PLAN3_CAD\PLAN#3_SHTS_4-10.dwg



CONCEPTUAL ALTERNATIVE PLAN NO. 3

BOULDER GRADE CONTROL STABILIZERS (Upstream Reach)

UPSTREAM PROFILE, PLAN #3

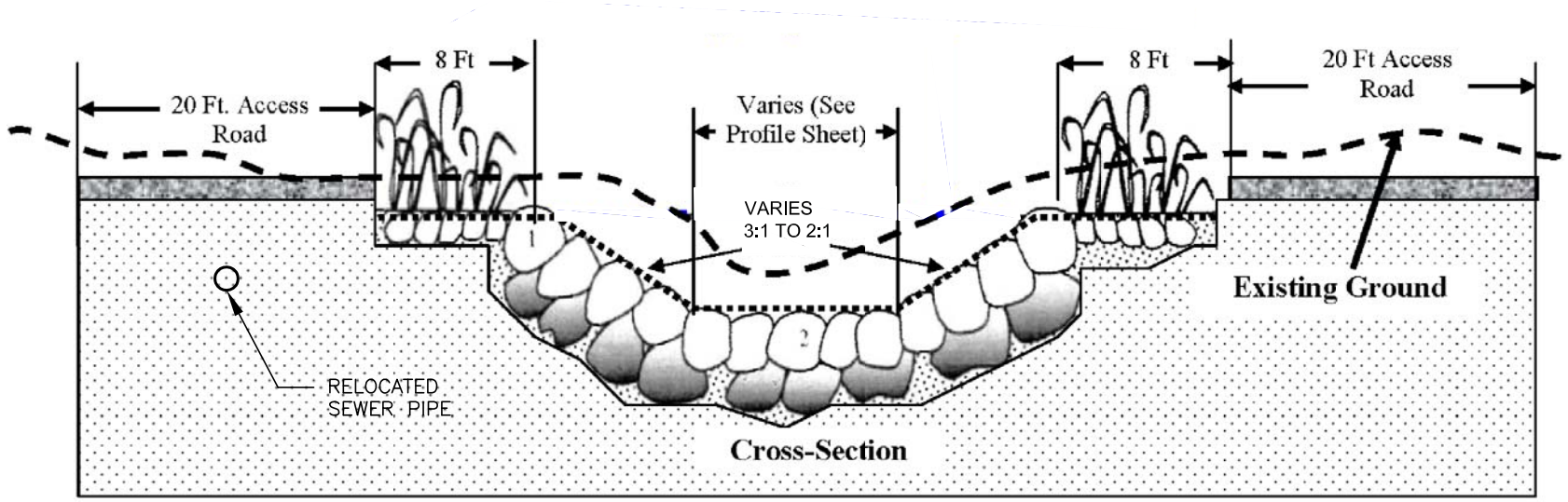
N.T.S.

URS Corporation

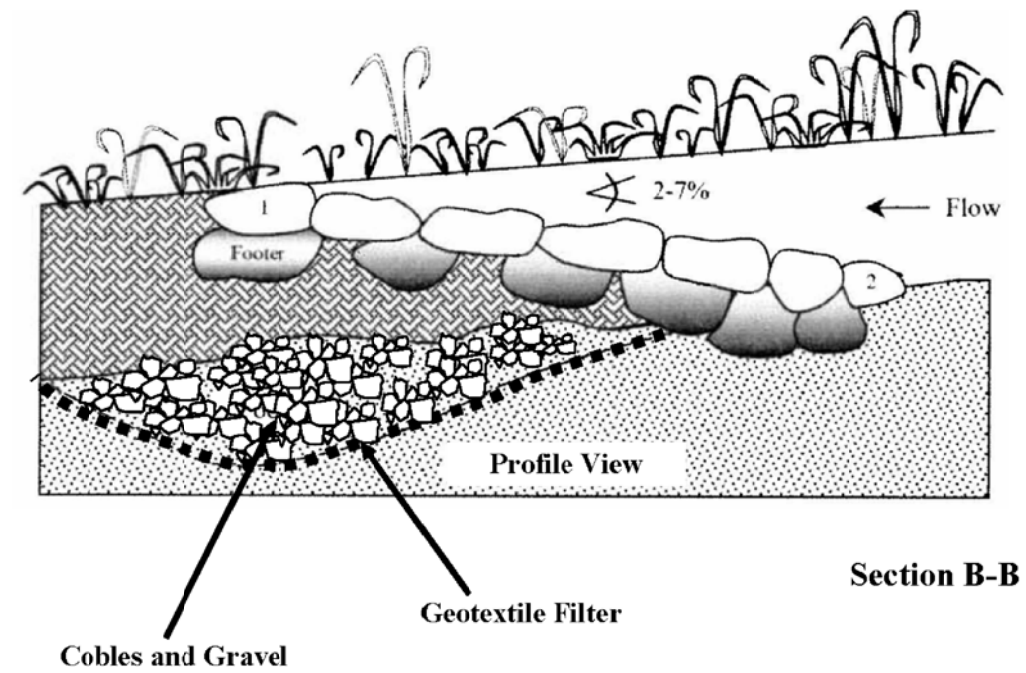
UPSTREAM PROFILE
ALTERNATIVE CONCEPT PLAN #3
BOULDER STABILIZER
UPSTREAM/REACHES 2 AND 3

Proj. No.: 38001579.30002	Date: 6-16-2011		
	Sheet No.: 9 OF 10	Rev.: 2	
Project: DESERT KNOLLS WASH	Scale: N.T.S		

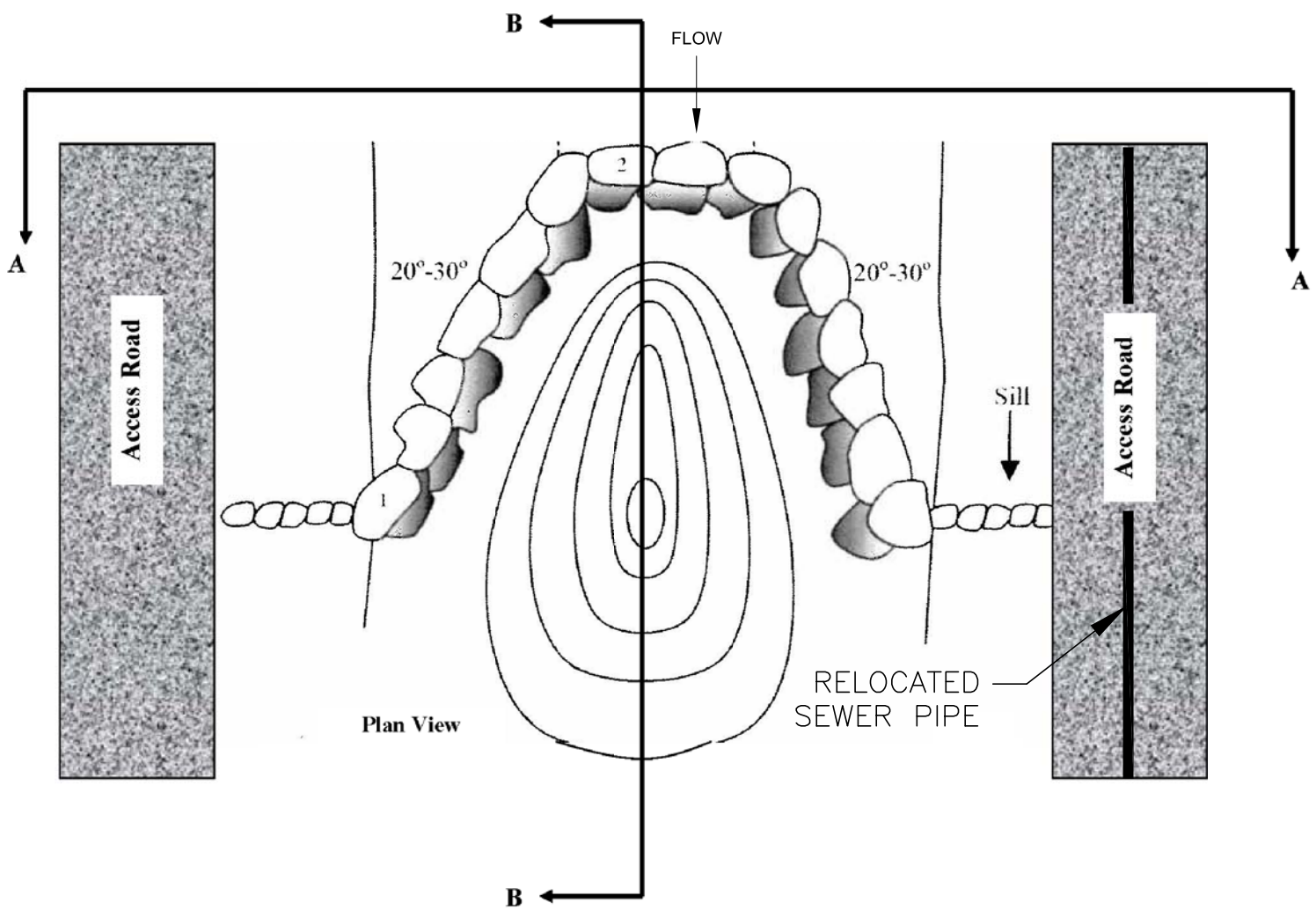
P:\Projects\County of San Bernardino\Desert Knolls\CAD\Sheet Files\PLAN3\PLAN3_CAD\PLAN#3_SHTS_4-10.dwg



SECTION A-A
N.T.S.



SECTION B-B
N.T.S.



TYPICAL PLAN, PROFILE AND SECTION OF BOULDER STABILIZER
N.T.S.

NOTES:
1. SILLS ARE NOT PROVIDED FOR REACH 1.

URS Corporation

DETAILS
ALTERNATIVE CONCEPT PLAN #3
BOULDER STABILIZER

Proj. No.: 38001579.30002	Date: 6-16-2011		
	Sheet No.: 10 OF 10	Rev.: 2	
Project: DESERT KNOLLS WASH	Scale: N.T.S		

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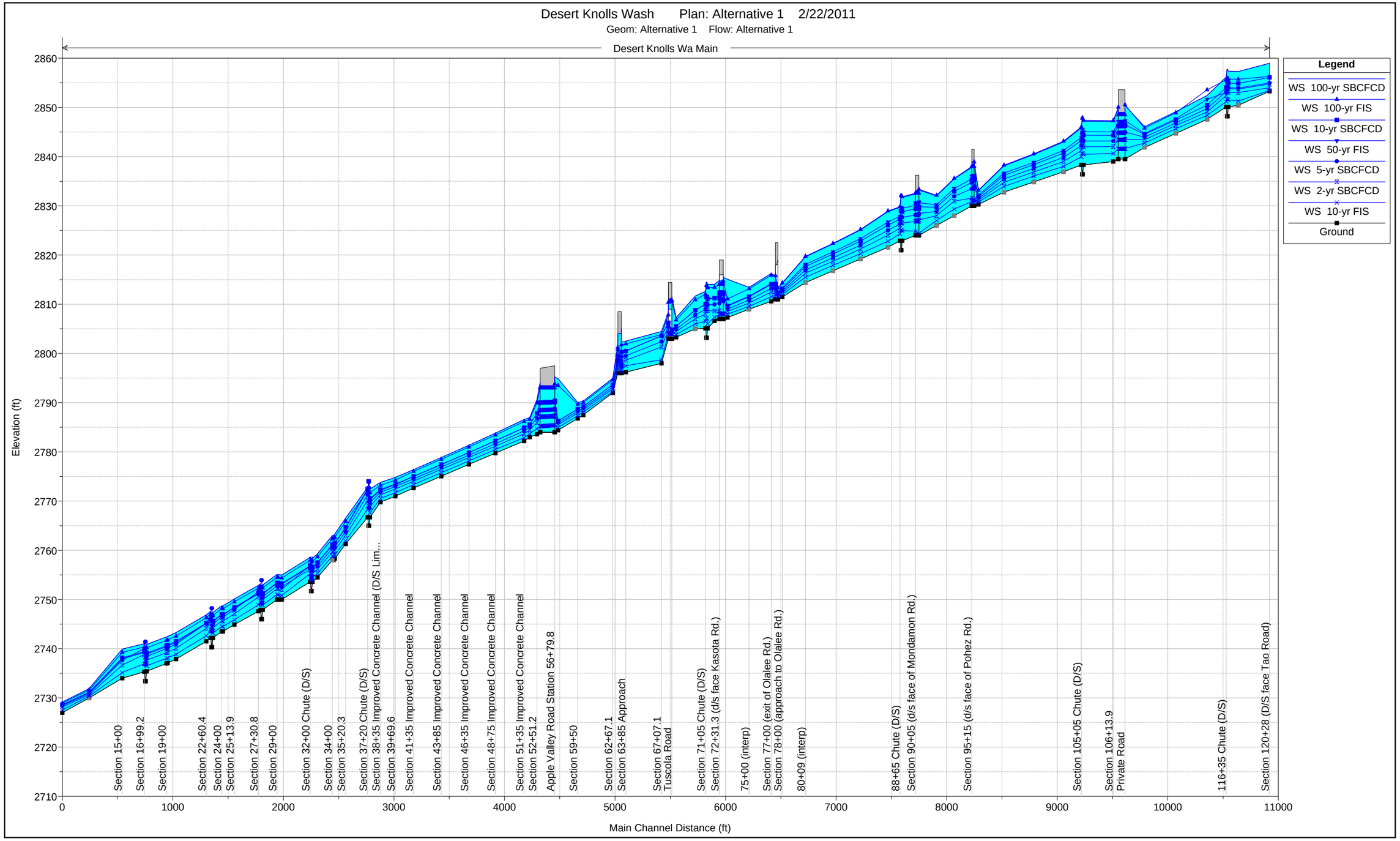
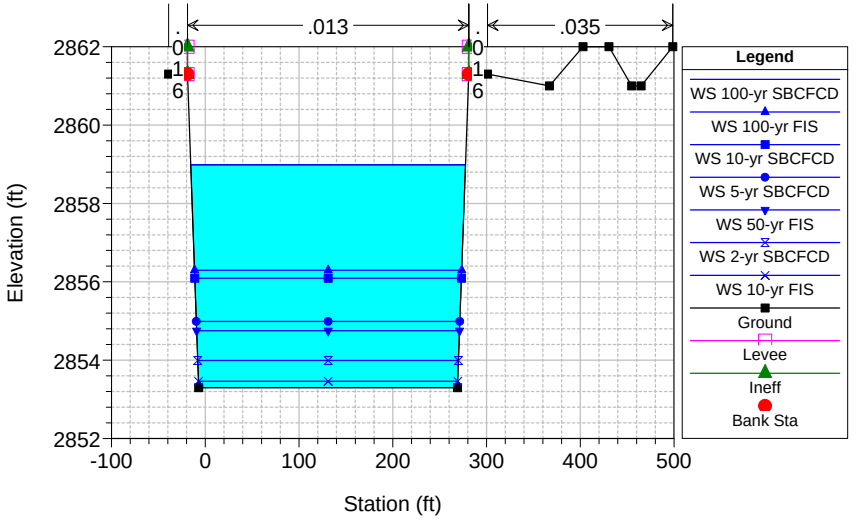
D. Draft Hydraulic & Sediment Transport Analyses


Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
Desert Knolls Wa Main
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Elevation (ft)
2860
2850
2840
2830
2820
2810
2800
2790
2780
2770
2760
2750
2740
2730
2720
2710
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
11000
Main Channel Distance (ft)
Section 15+00
Section 16+99.2
Section 19+00
Section 22+60.4
Section 24+00
Section 25+13.9
Section 27+30.8
Section 29+00
Section 32+00 Chute (D/S)
Section 34+00
Section 35+20.3
Section 37+20 Chute (D/S)
Section 38+35 Improved Concrete Channel (D/S Lim...
Section 39+69.6
Section 41+35 Improved Concrete Channel
Section 43+85 Improved Concrete Channel
Section 46+35 Improved Concrete Channel
Section 48+75 Improved Concrete Channel
Section 51+35 Improved Concrete Channel
Section 52+51.2
Apple Valley Road Station 56+79.8
Section 59+50
Section 62+67.1
Section 63+85 Approach
Section 67+07.1
Tuscola Road
Section 71+05 Chute (D/S)
Section 72+31.3 (d/s face Kasota Rd.)
75+00 (interp)
Section 77+00 (exit of Olalee Rd.)
Section 78+00 (approach to Olalee Rd.)
80+09 (interp)
88+65 Chute (D/S)
Section 90+05 (d/s face of Mondamon Rd.)
Section 95+15 (d/s face of Pohez Rd.)
Section 105+05 Chute (D/S)
Section 106+13.9
Private Road
116+35 Chute (D/S)
Section 120+28 (D/S face Tao Road)

Desert Knolls Wash Plan: Alternative 1 2/22/2011

Geom: Alternative 1 Flow: Alternative 1

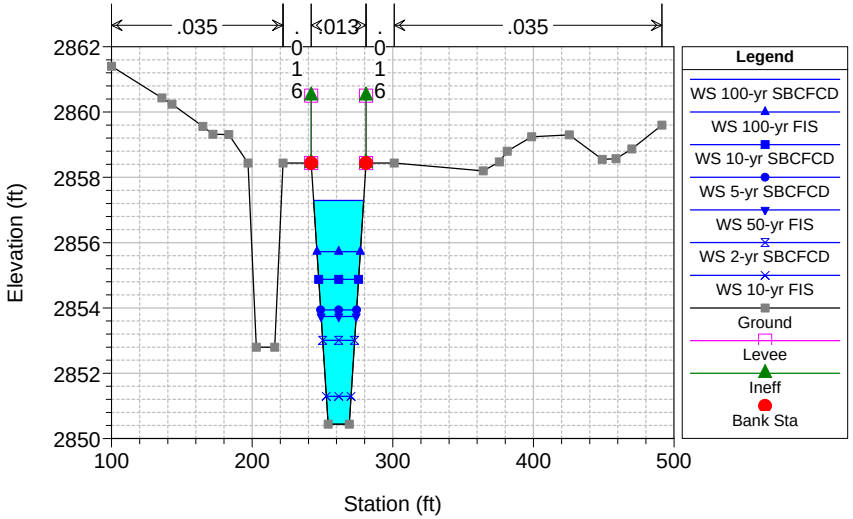
River = Desert Knolls Wa Reach = Main RS = 12028.1 Section 120+28 (D/S face Tao Road)



Desert Knolls Wash Plan: Alternative 1 2/22/2011

Geom: Alternative 1 Flow: Alternative 1

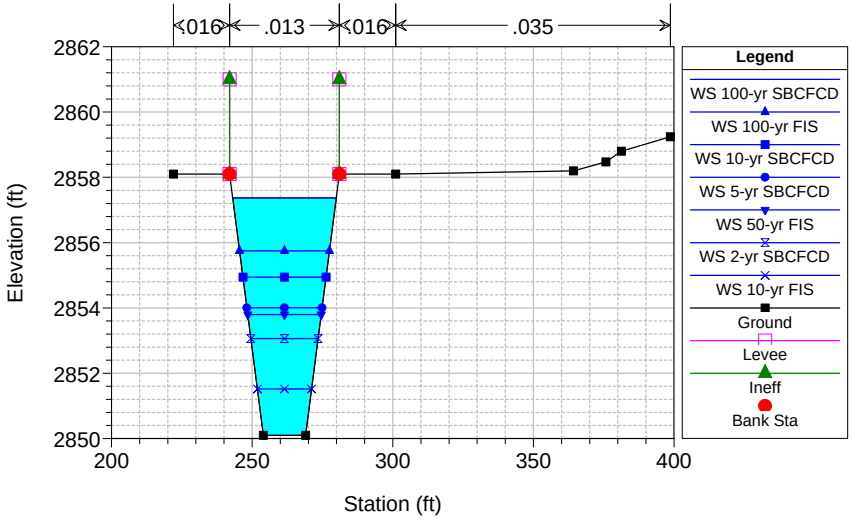
River = Desert Knolls Wa Reach = Main RS = 11745.2*



Desert Knolls Wash Plan: Alternative 1 2/22/2011

Geom: Alternative 1 Flow: Alternative 1

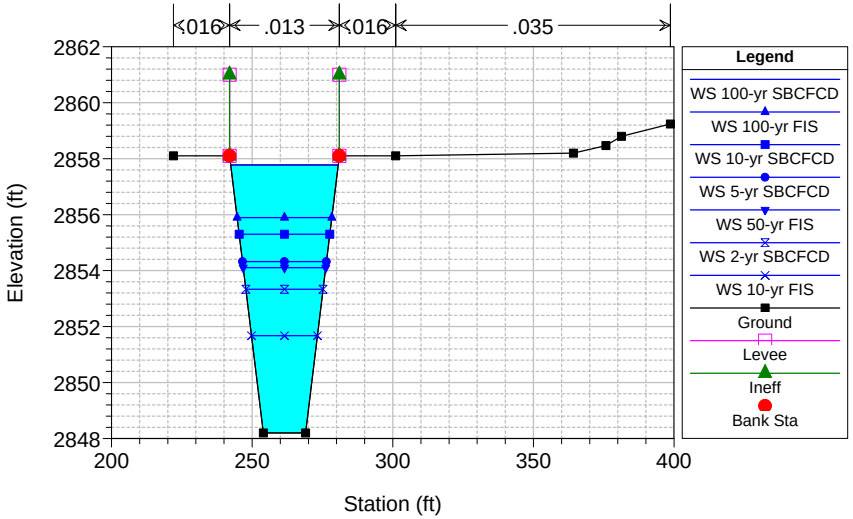
River = Desert Knolls Wa Reach = Main RS = 11655 116+35 Chute (U/S)

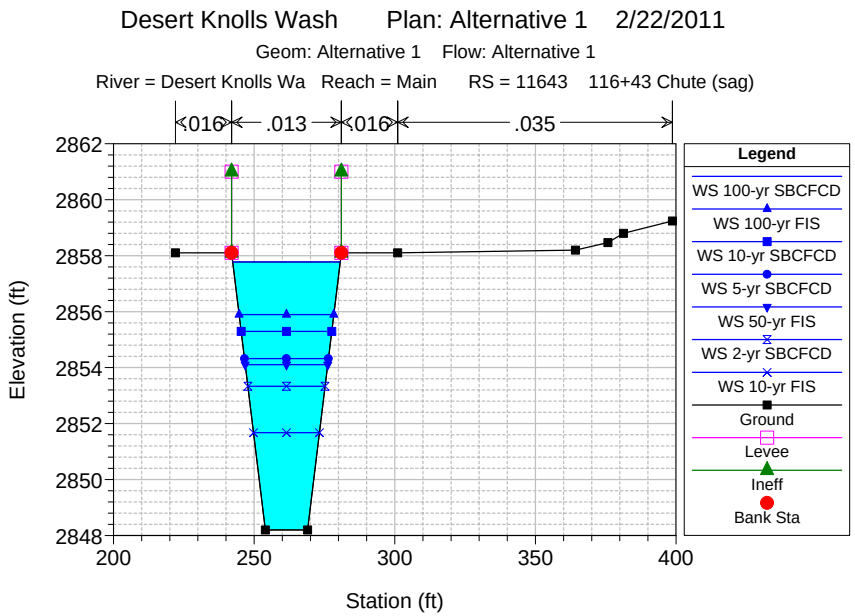


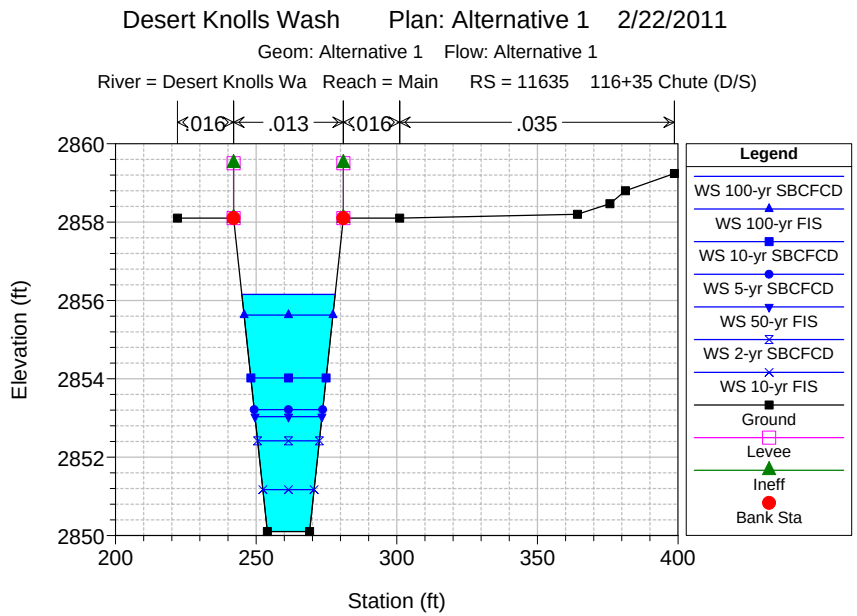
Desert Knolls Wash Plan: Alternative 1 2/22/2011

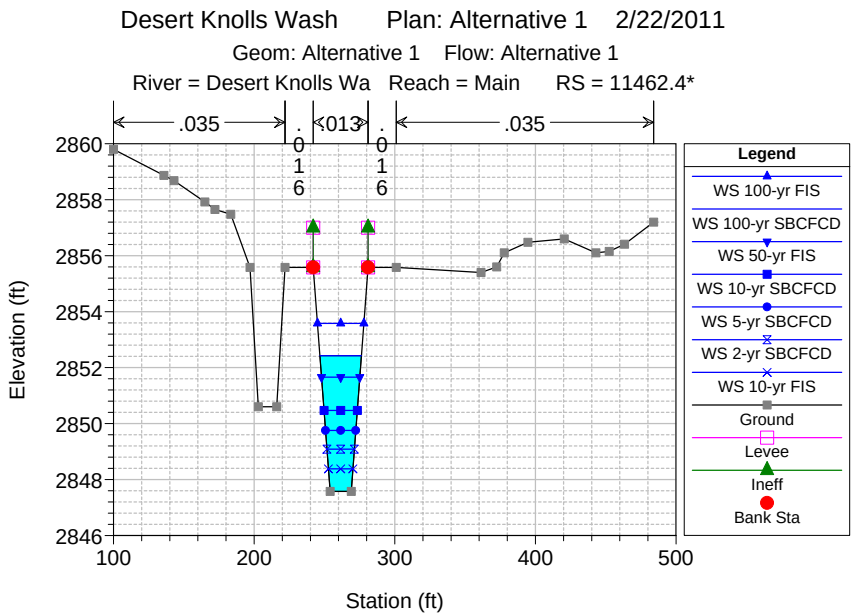
Geom: Alternative 1 Flow: Alternative 1

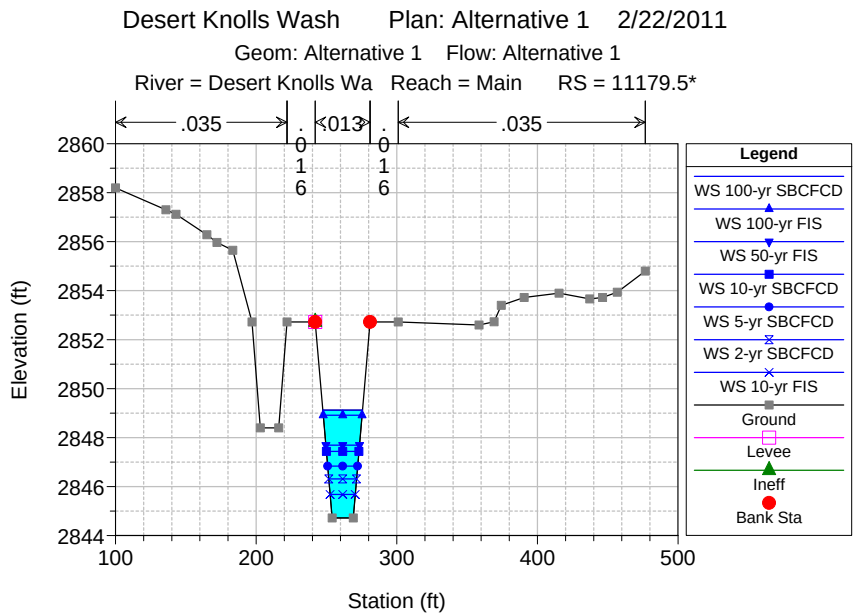
River = Desert Knolls Wa Reach = Main RS = 11647 116+43 Chute (sag)

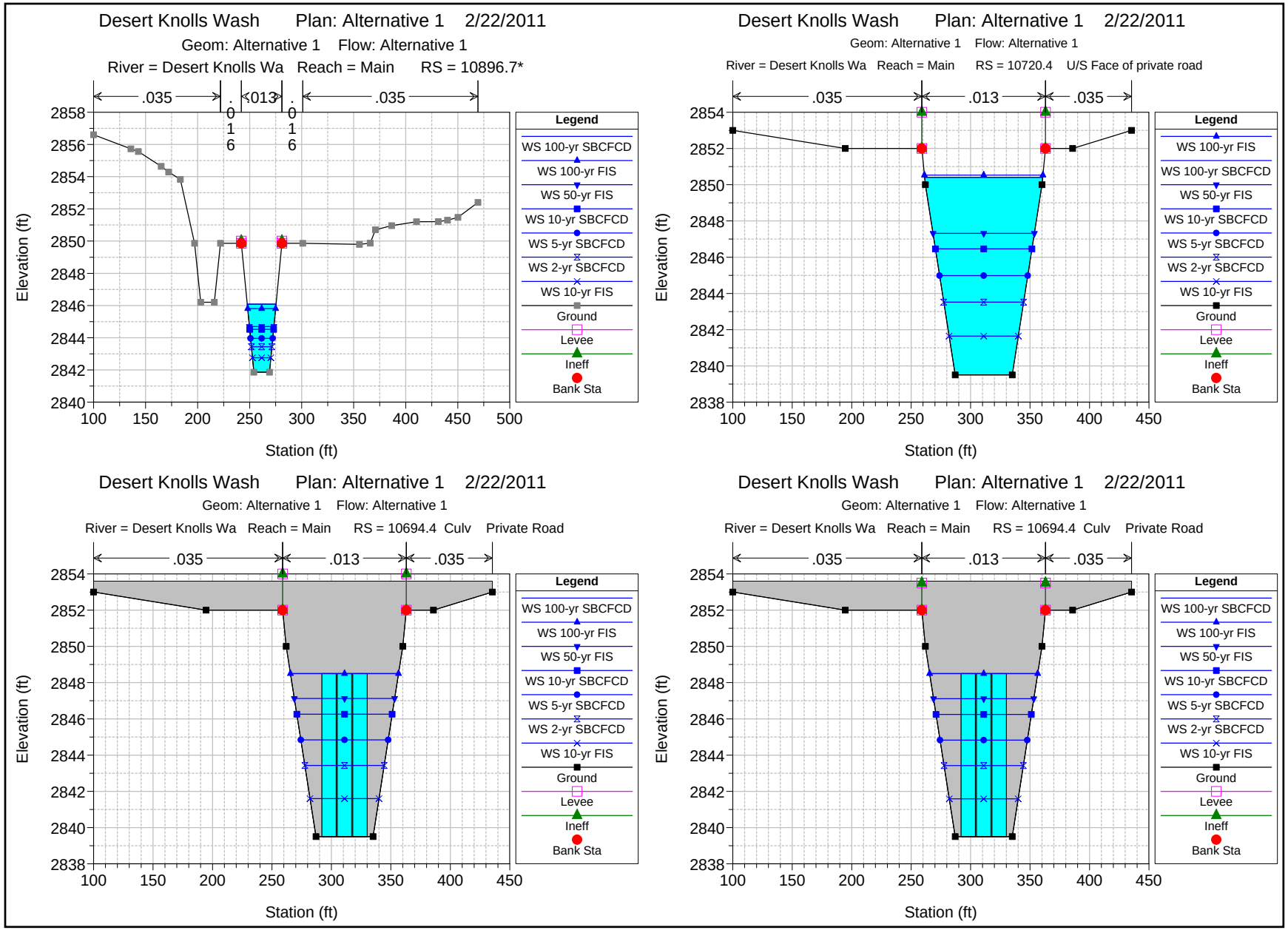


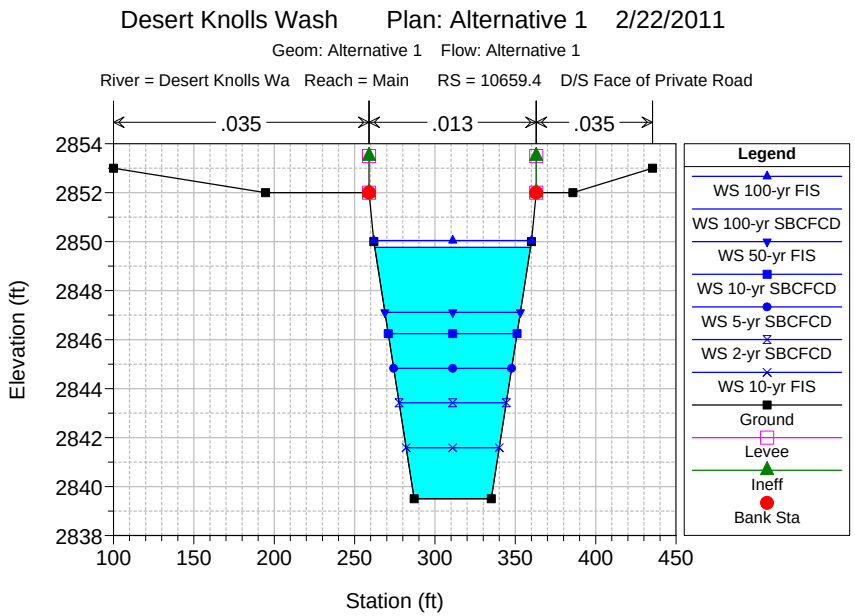

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 11643 116+43 Chute (sag)
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

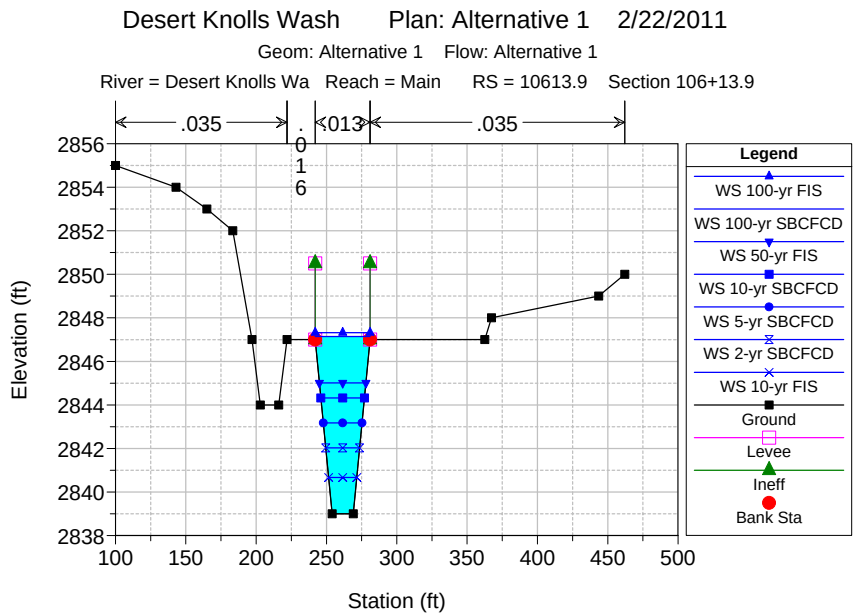

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 11635 116+35 Chute (D/S)
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

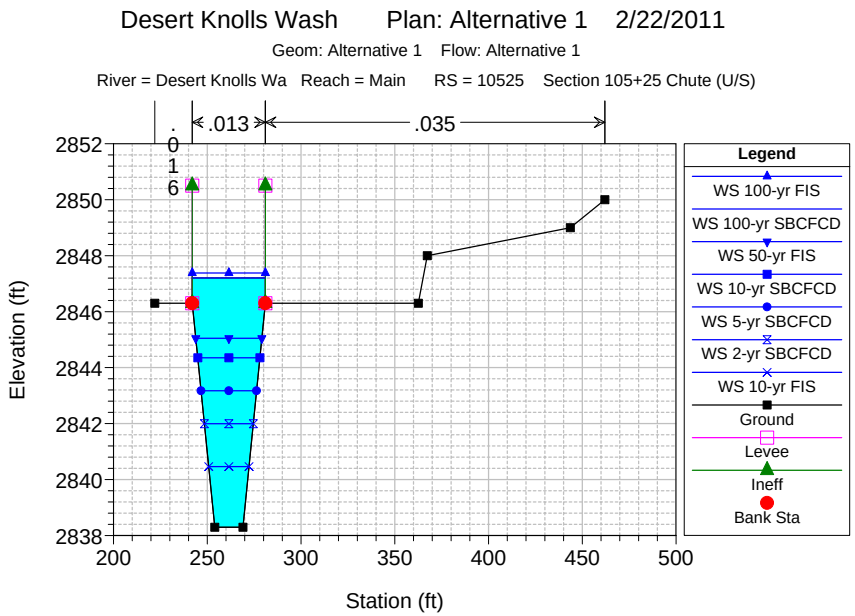

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 11462.4*
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

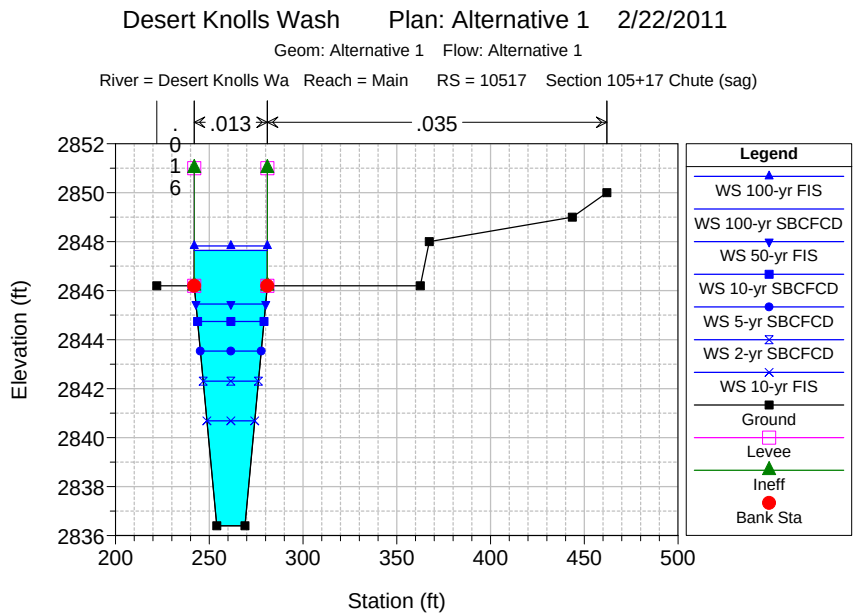

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 11179.5*
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

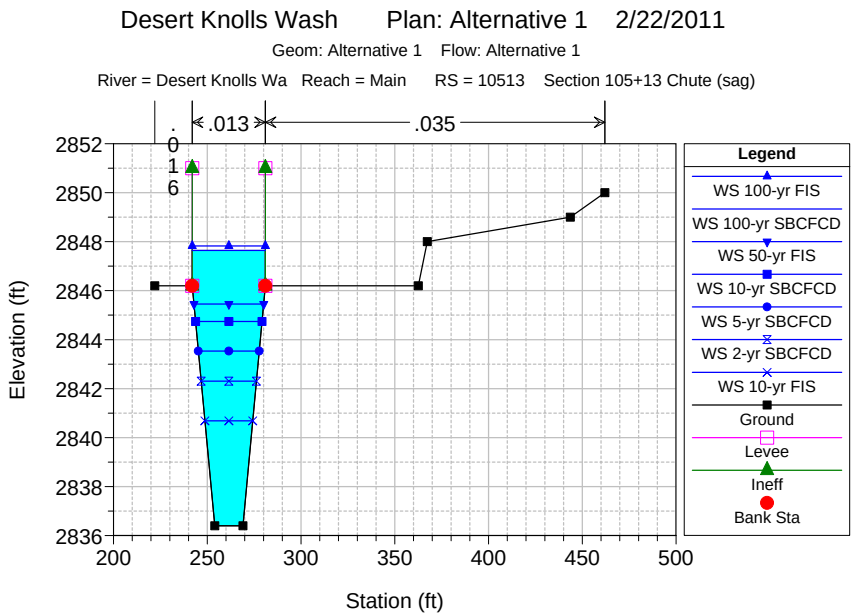

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 10896.7*
.035
.013
.035
.016
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 10720.4 U/S Face of private road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 10694.4 Culv Private Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 10694.4 Culv Private Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

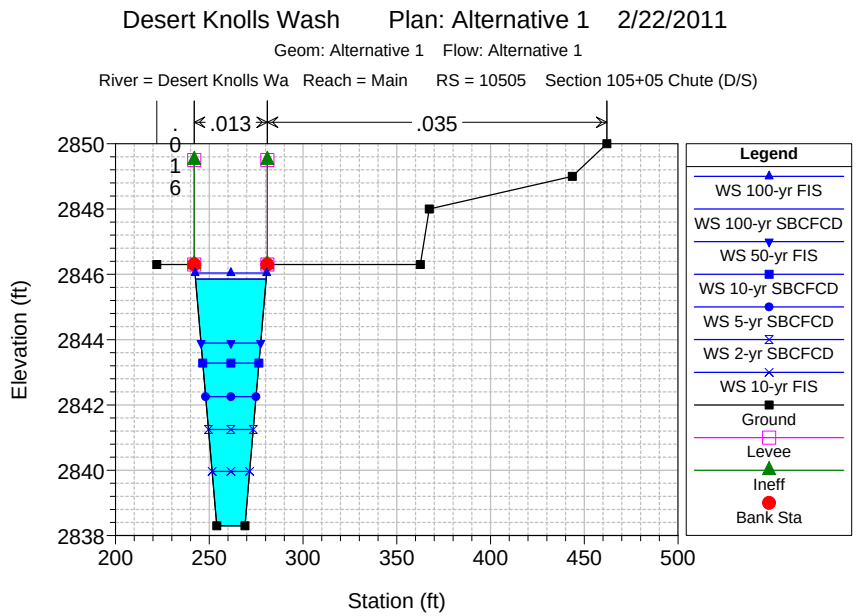

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 10659.4 D/S Face of Private Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

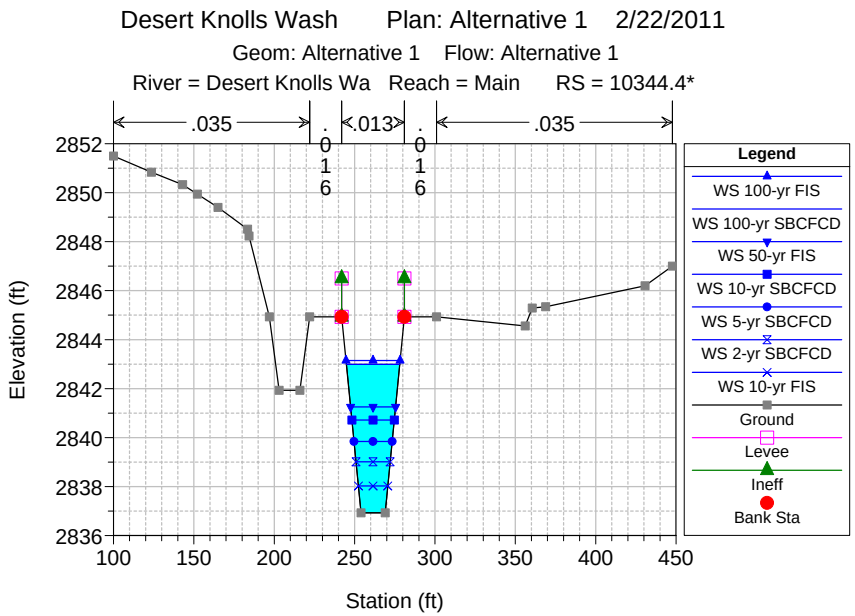

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 10613.9 Section 106+13.9
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

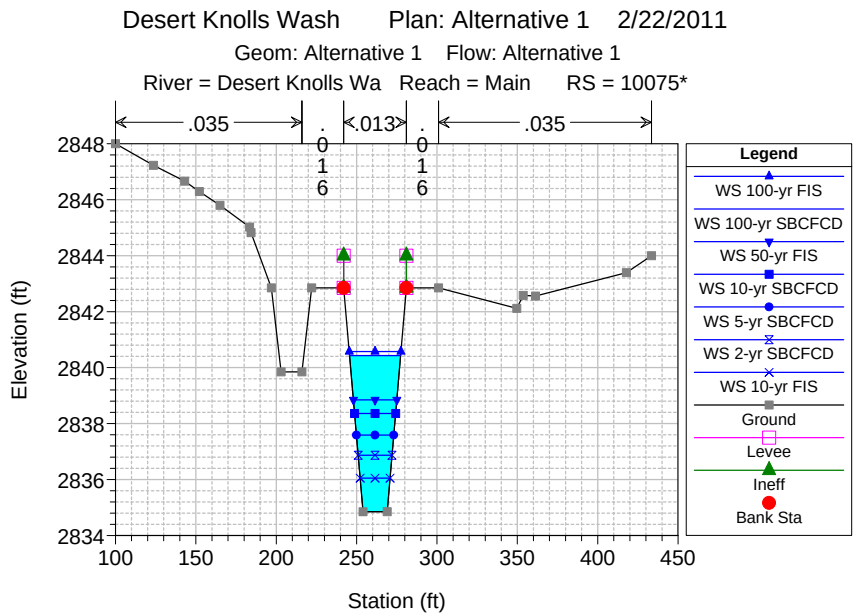

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 10525 Section 105+25 Chute (U/S)
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

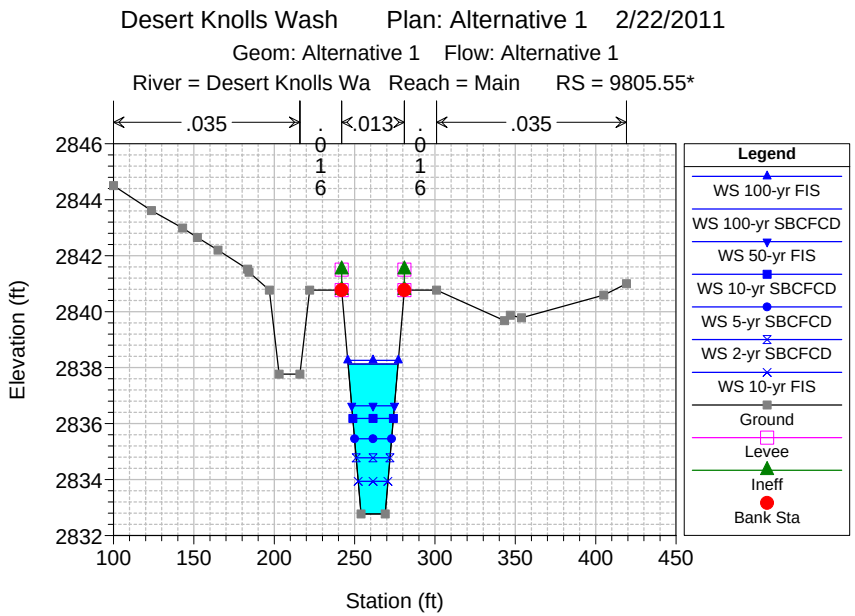

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 10517 Section 105+17 Chute (sag)
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

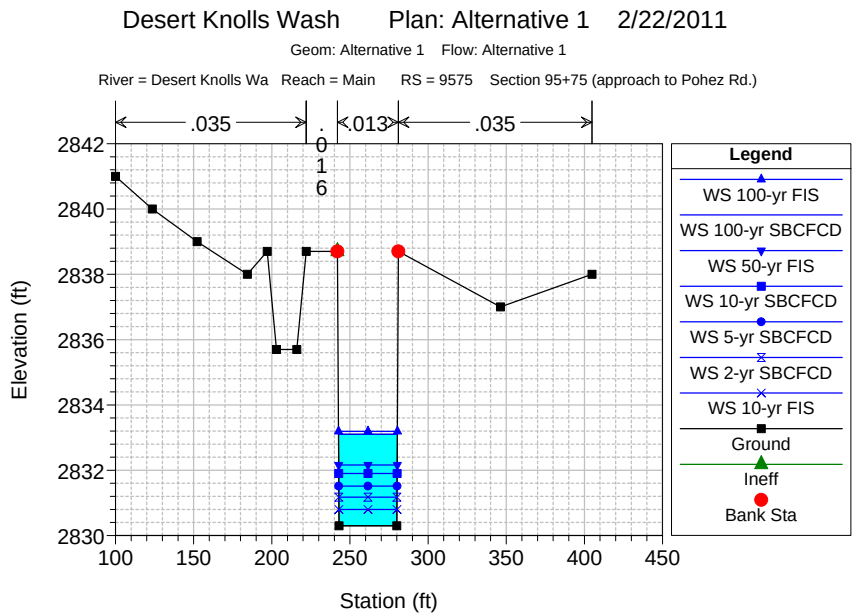

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 10513 Section 105+13 Chute (sag)
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

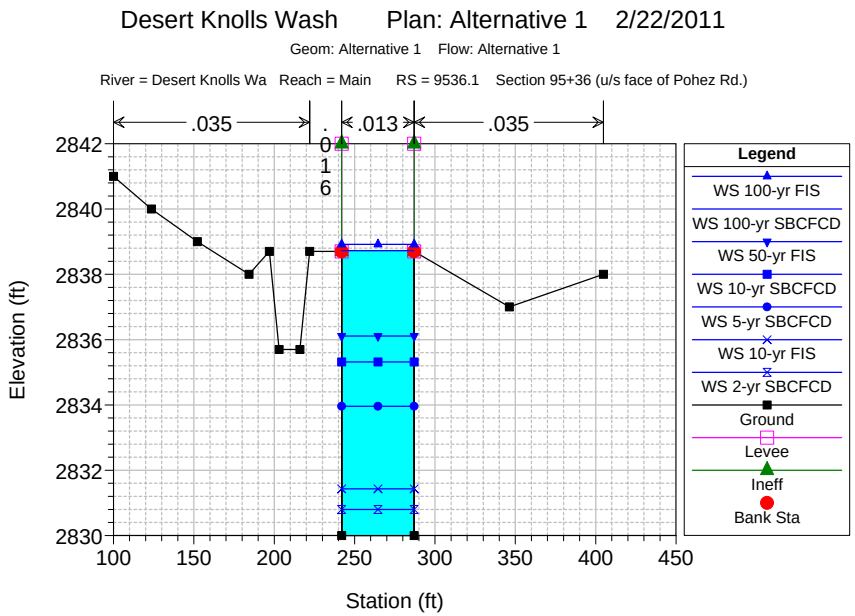

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 10505 Section 105+05 Chute (D/S)
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

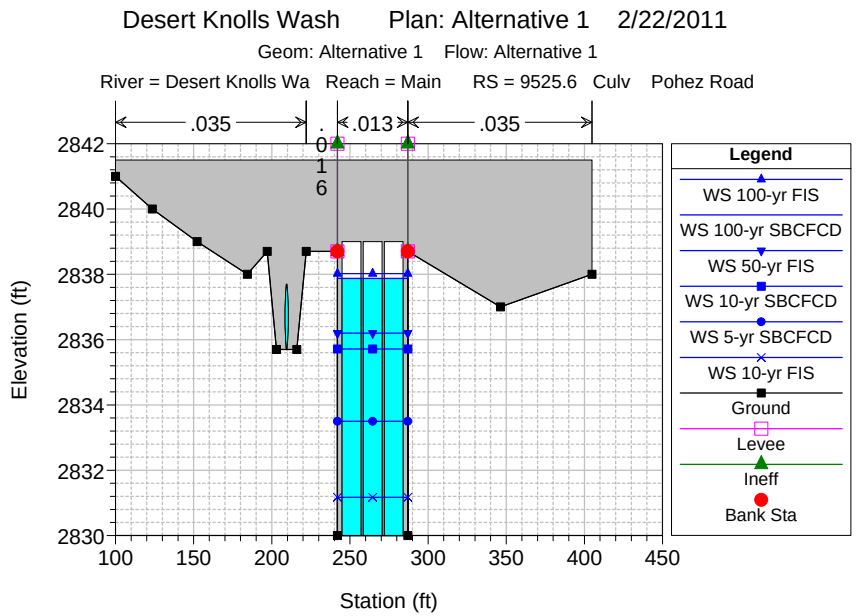

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 10344.4*
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

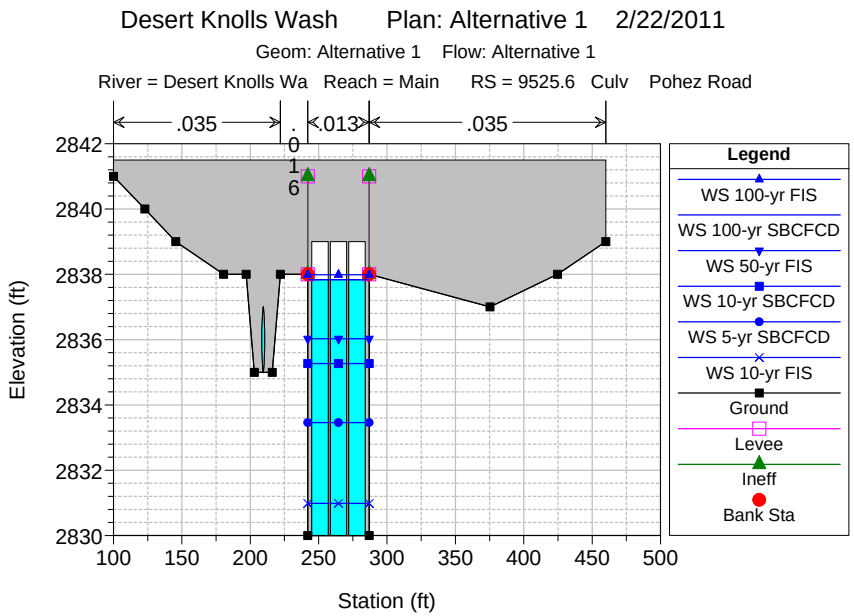

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 10075*
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

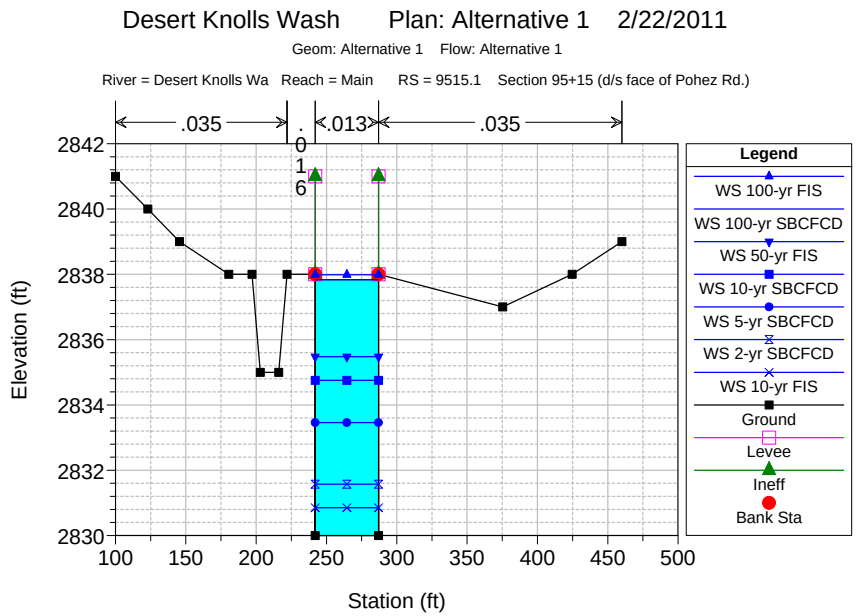

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 9805.55*
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

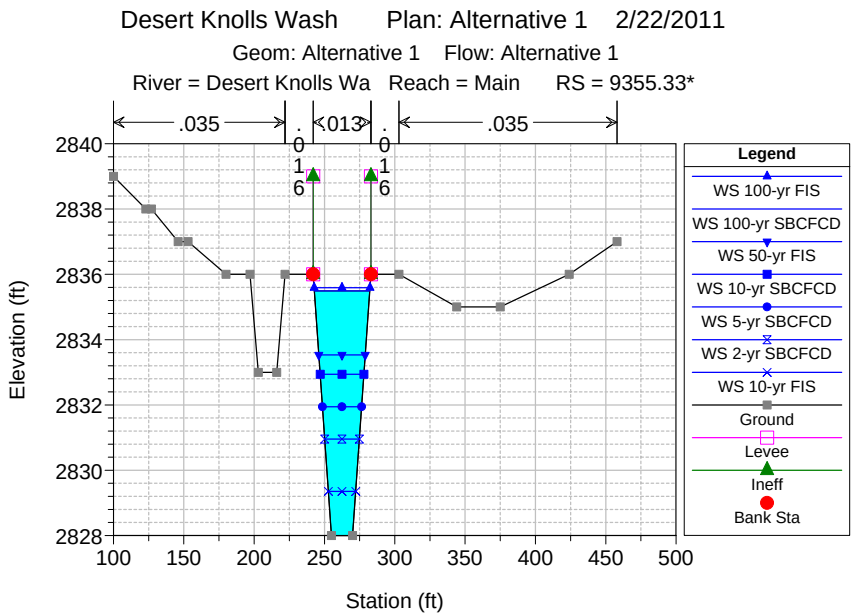

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 9575 Section 95+75 (approach to Pohez Rd.)
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

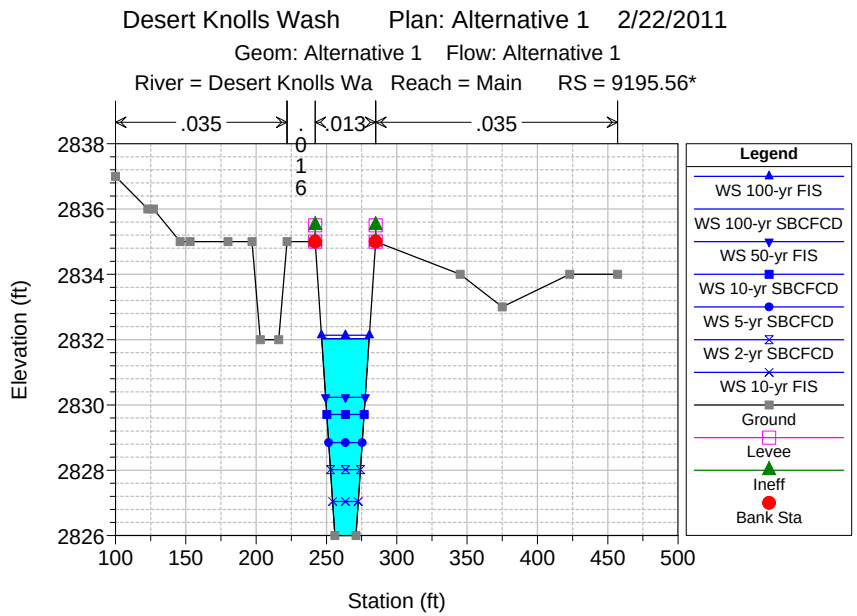

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 9536.1 Section 95+36 (u/s face of Pohez Rd.)
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 10-yr FIS
WS 2-yr SBCFCD
Ground
Levee
Ineff
Bank Sta

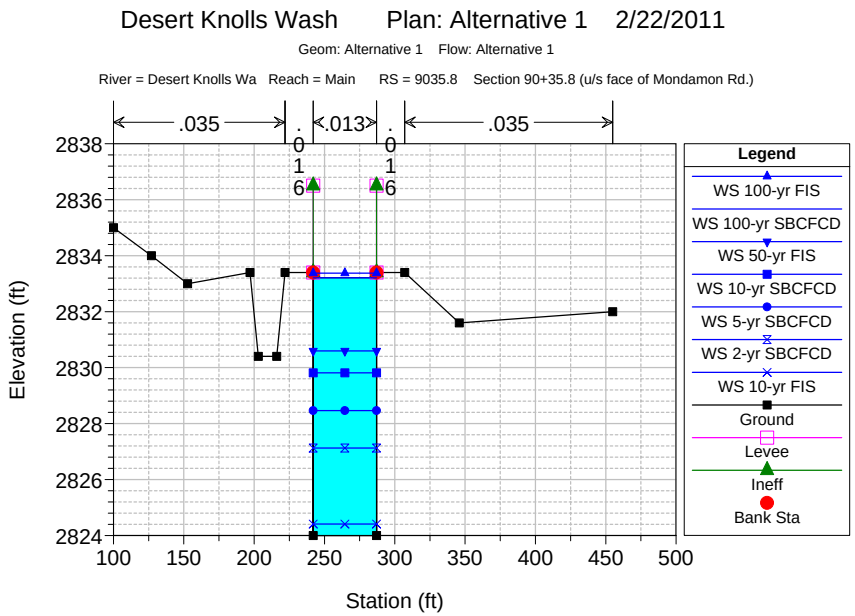

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 9525.6 Culv Pohez Road
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

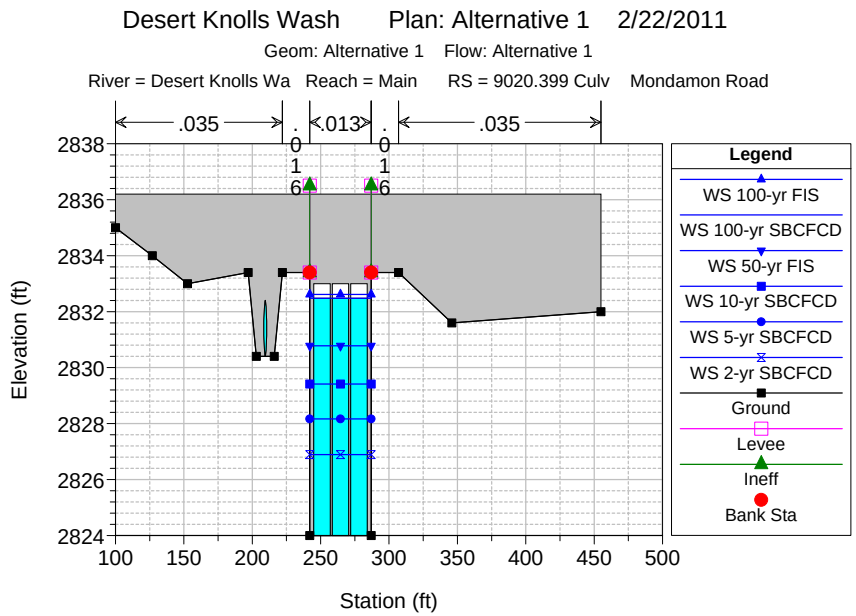

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 9525.6 Culv Pohez Road
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

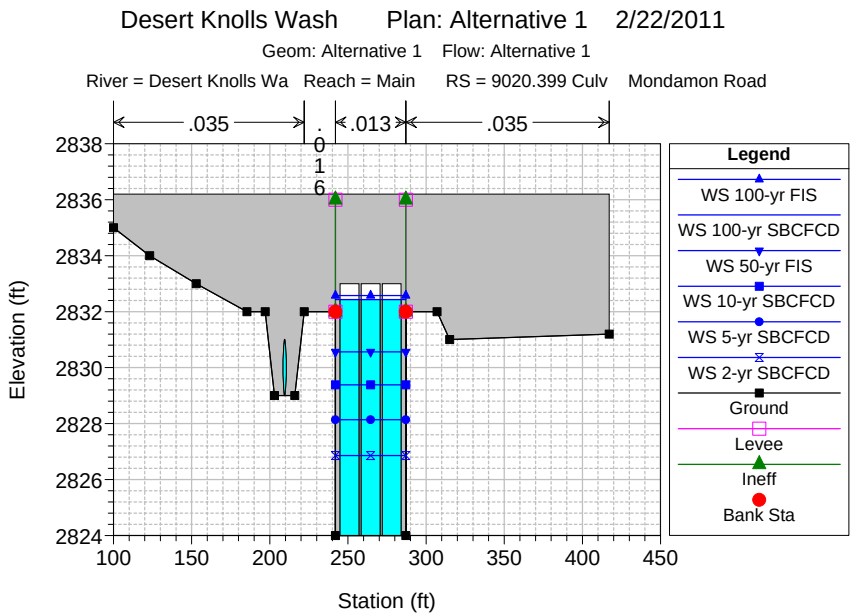

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 9515.1 Section 95+15 (d/s face of Pohez Rd.)
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

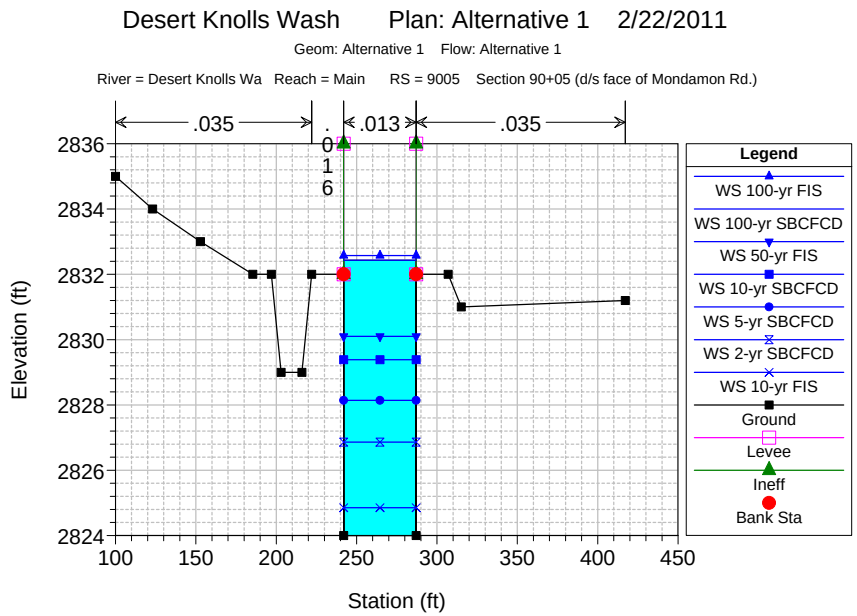

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 9355.33*
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

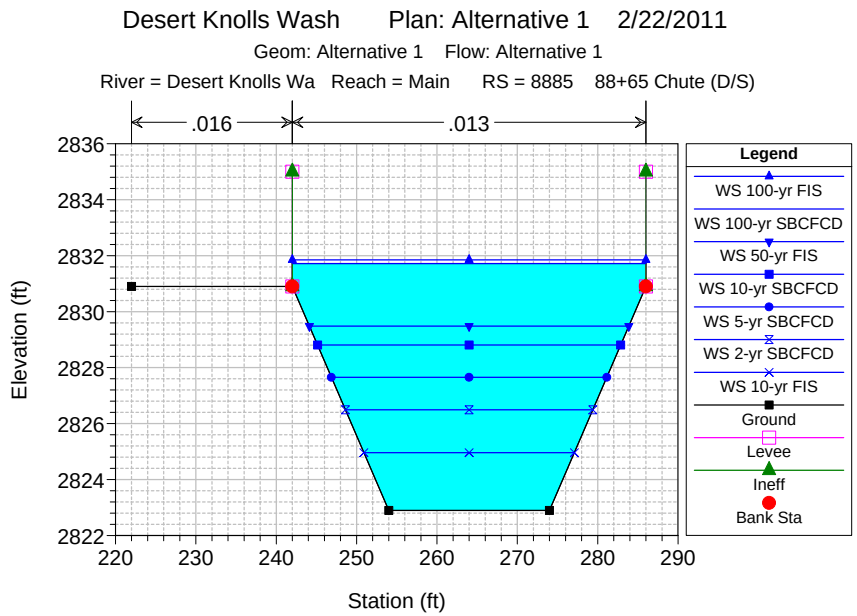

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 9195.56*
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

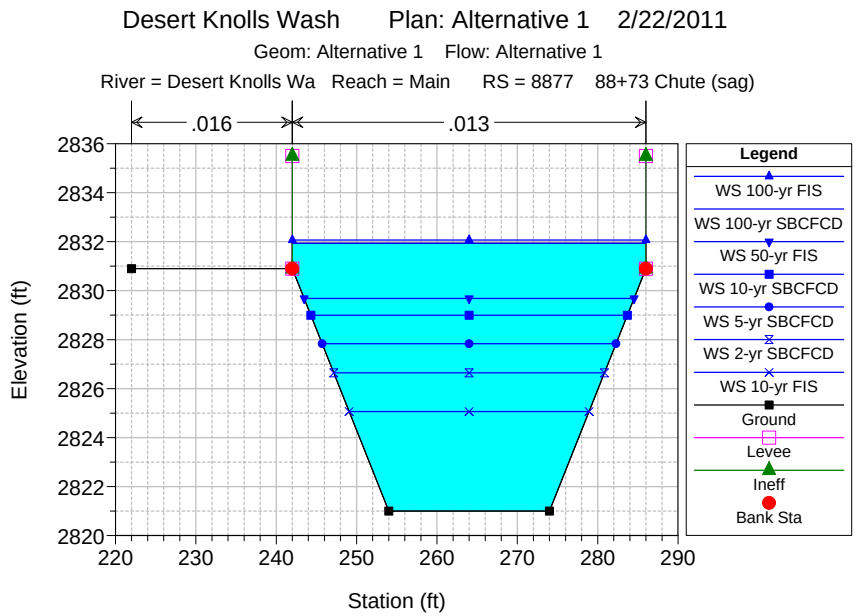

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 9035.8 Section 90+35.8 (u/s face of Mondamon Rd.)
.035
.013
.035
.016
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

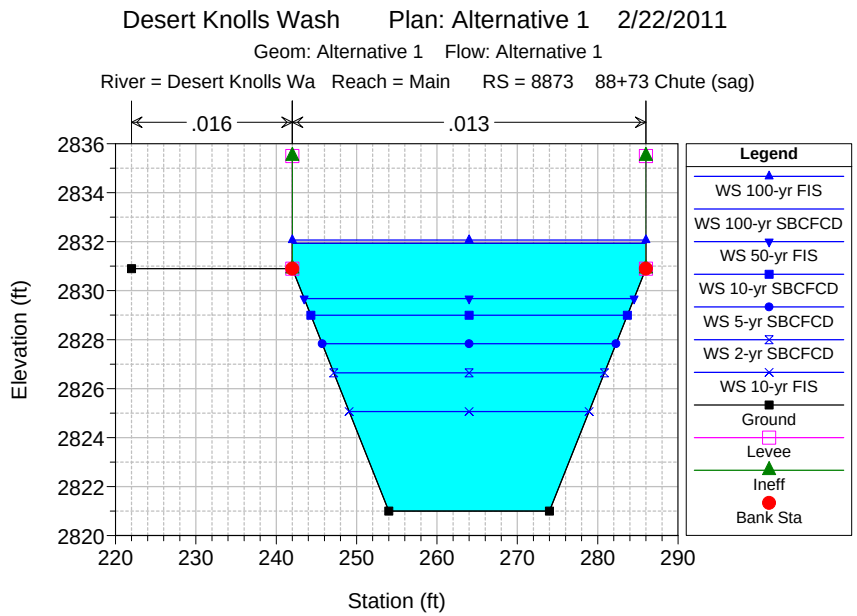

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 9020.399 Culv Mondamon Road
.035
.013
.035
.016
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
Ground
Levee
Ineff
Bank Sta

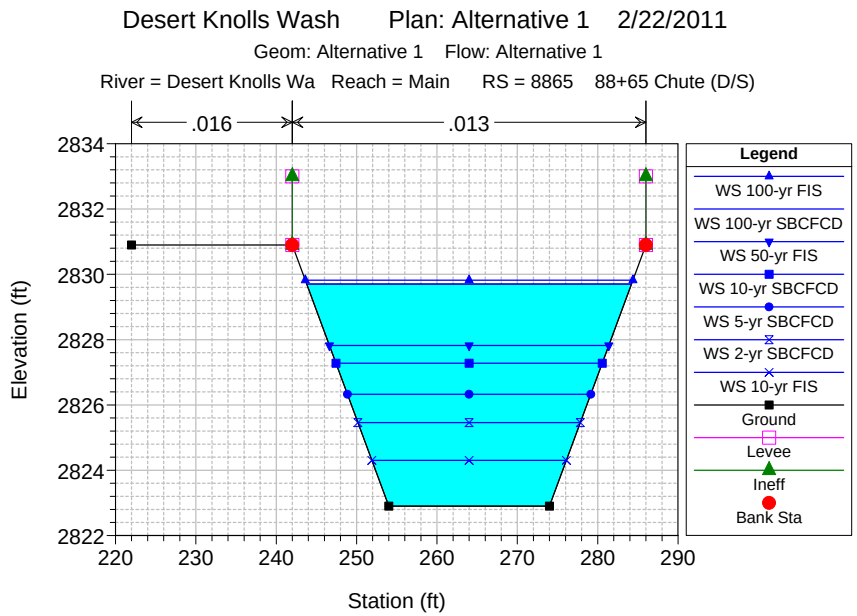

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 9020.399 Culv Mondamon Road
.035
.013
.035
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
Ground
Levee
Ineff
Bank Sta

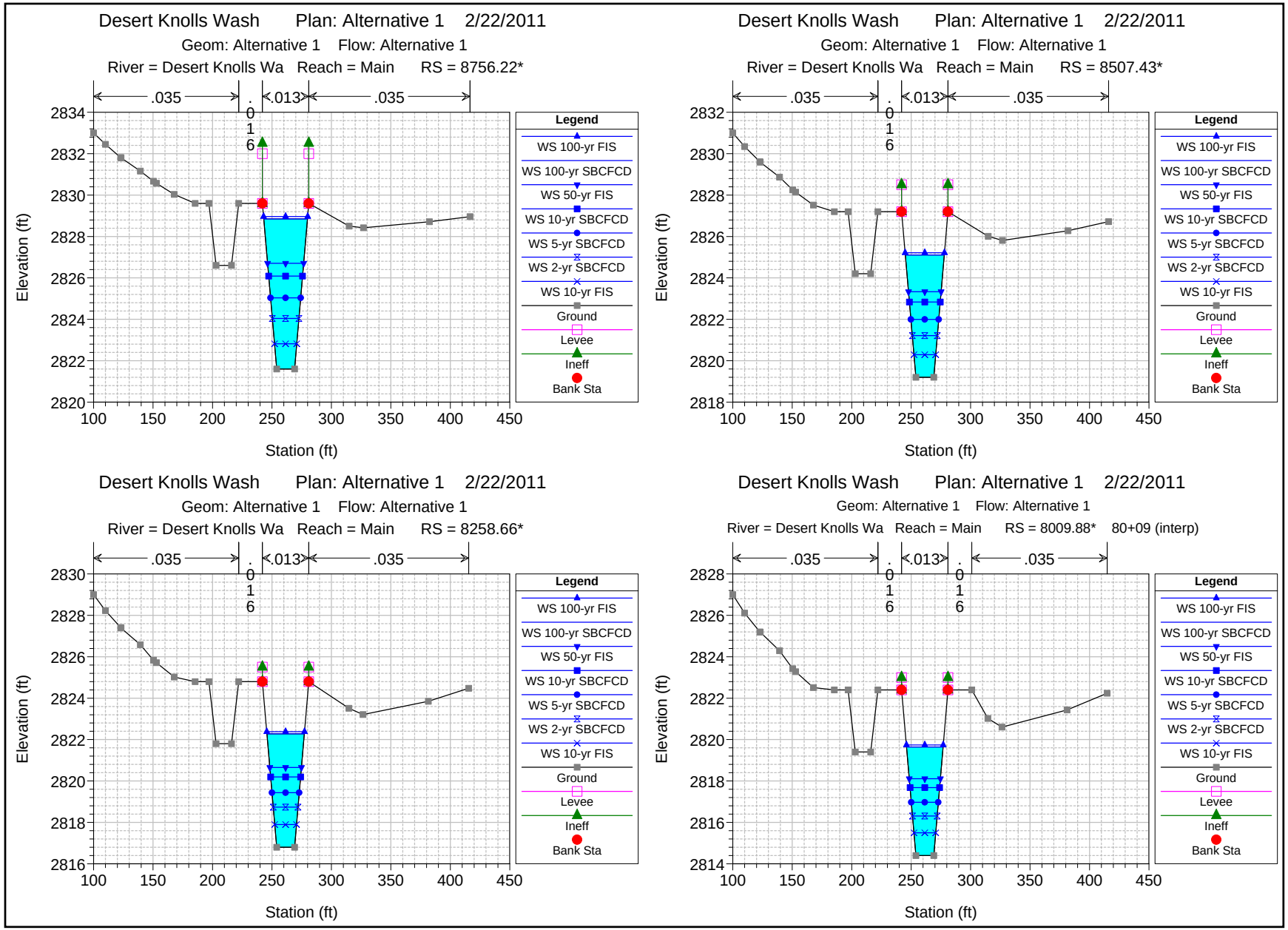

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 9005 Section 90+05 (d/s face of Mondamon Rd.)
.035
.013
.035
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

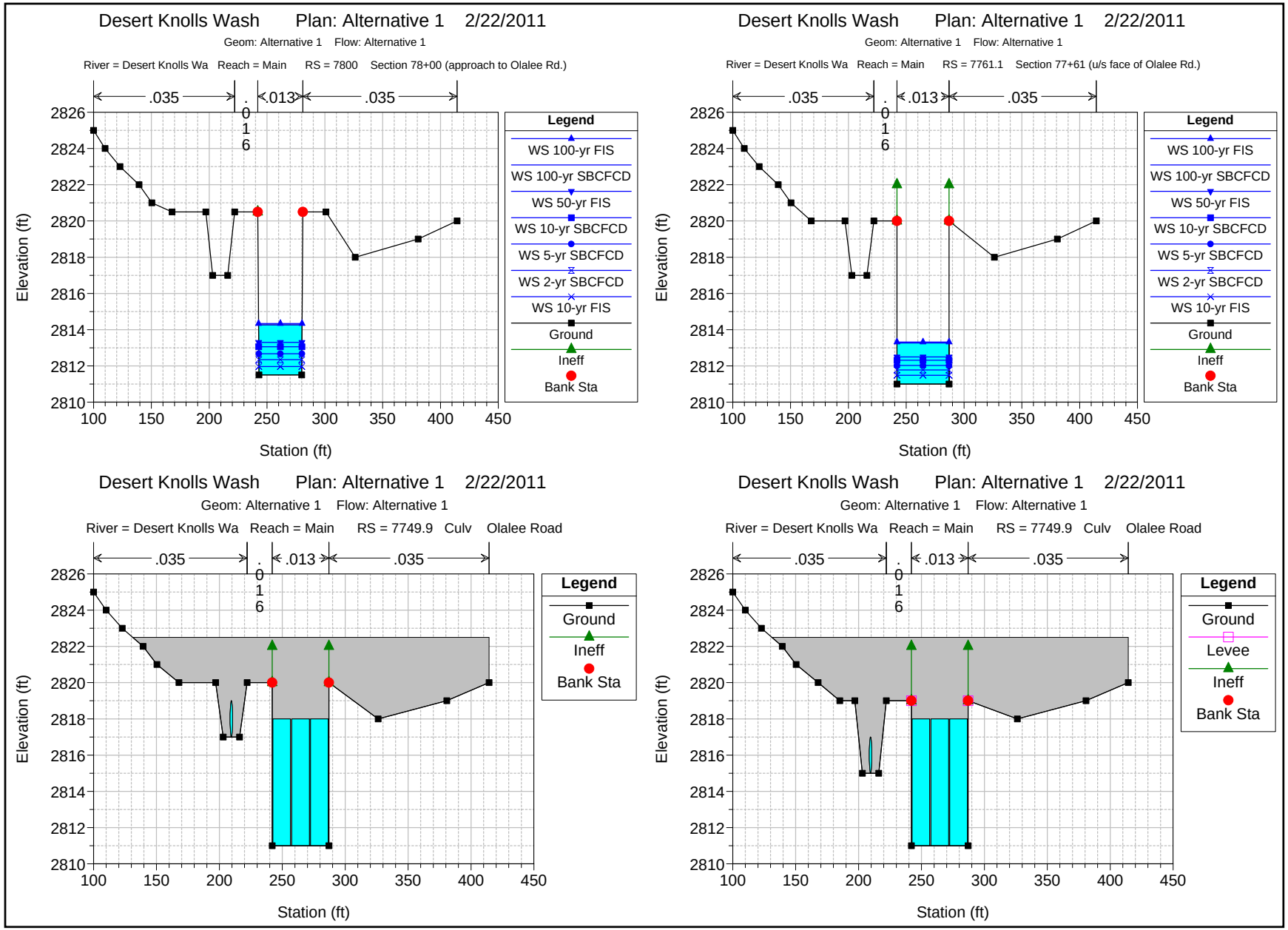

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 8885 88+65 Chute (D/S)
.016
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

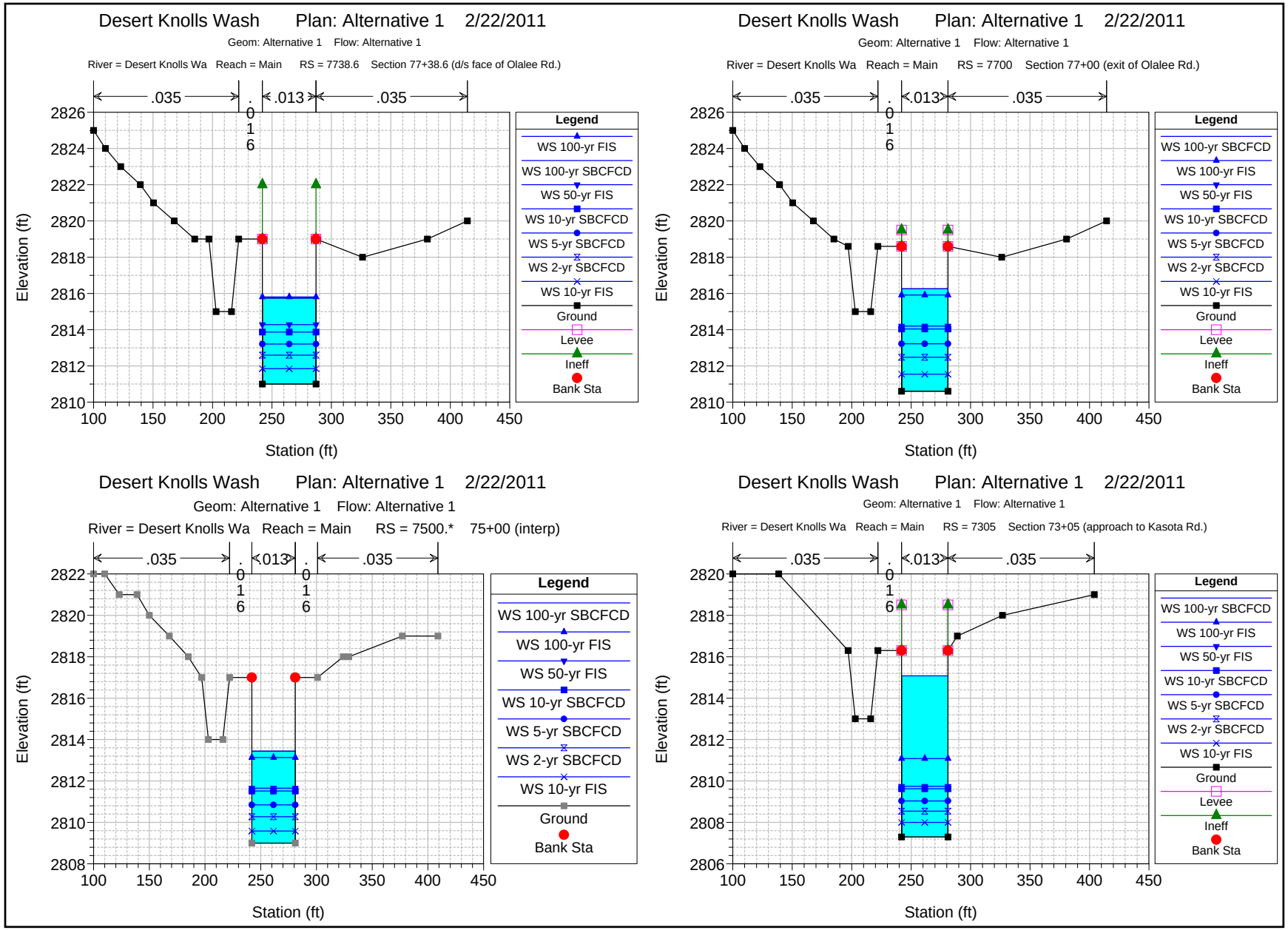

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 8877 88+73 Chute (sag)
.016
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

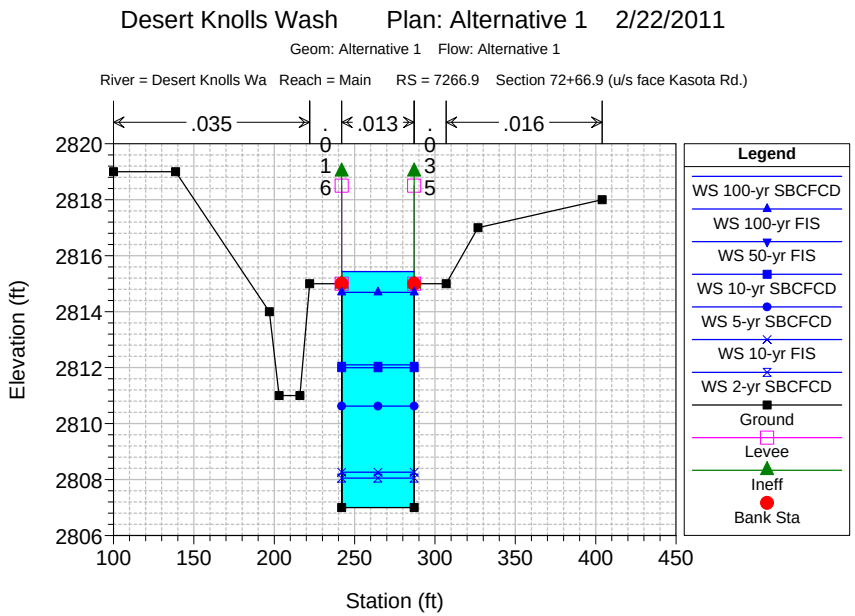

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 8873 88+73 Chute (sag)
.016
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

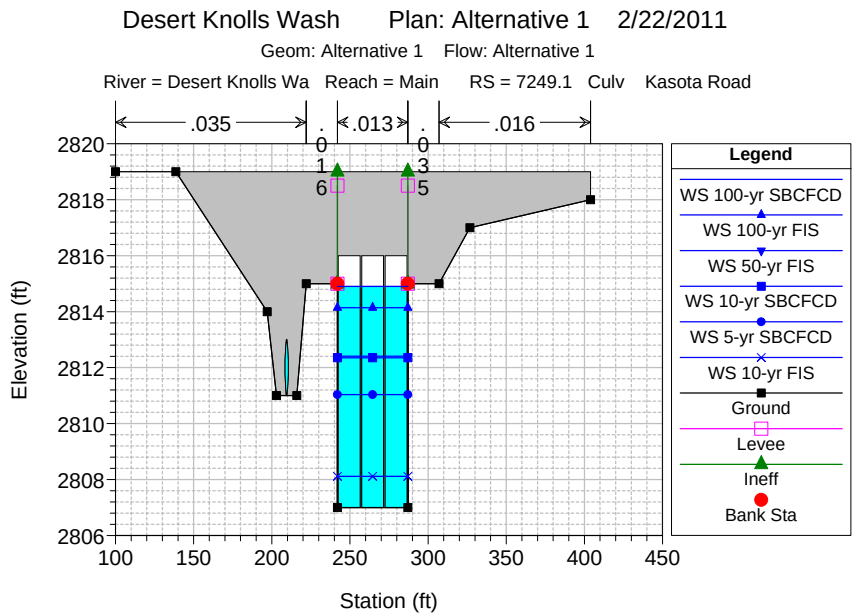

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 8865 88+65 Chute (D/S)
.016
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

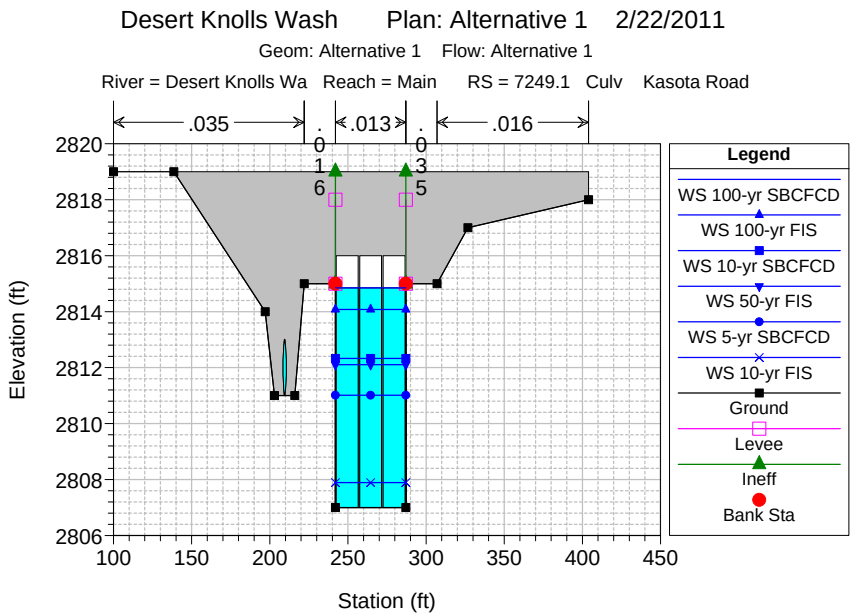

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 8756.22*
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 8507.43*
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 8258.66*
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 8009.88* 80+09 (interp)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

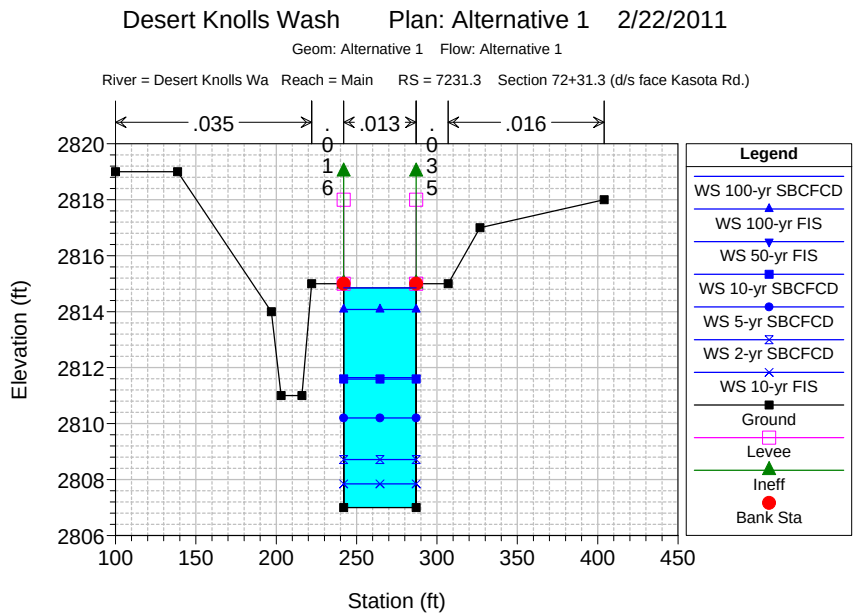

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7800 Section 78+00 (approach to Olalee Rd.)
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7761.1 Section 77+61 (u/s face of Olalee Rd.)
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7749.9 Culv Olalee Road
Ground
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7749.9 Culv Olalee Road
Ground
Levee
Ineff
Bank Sta

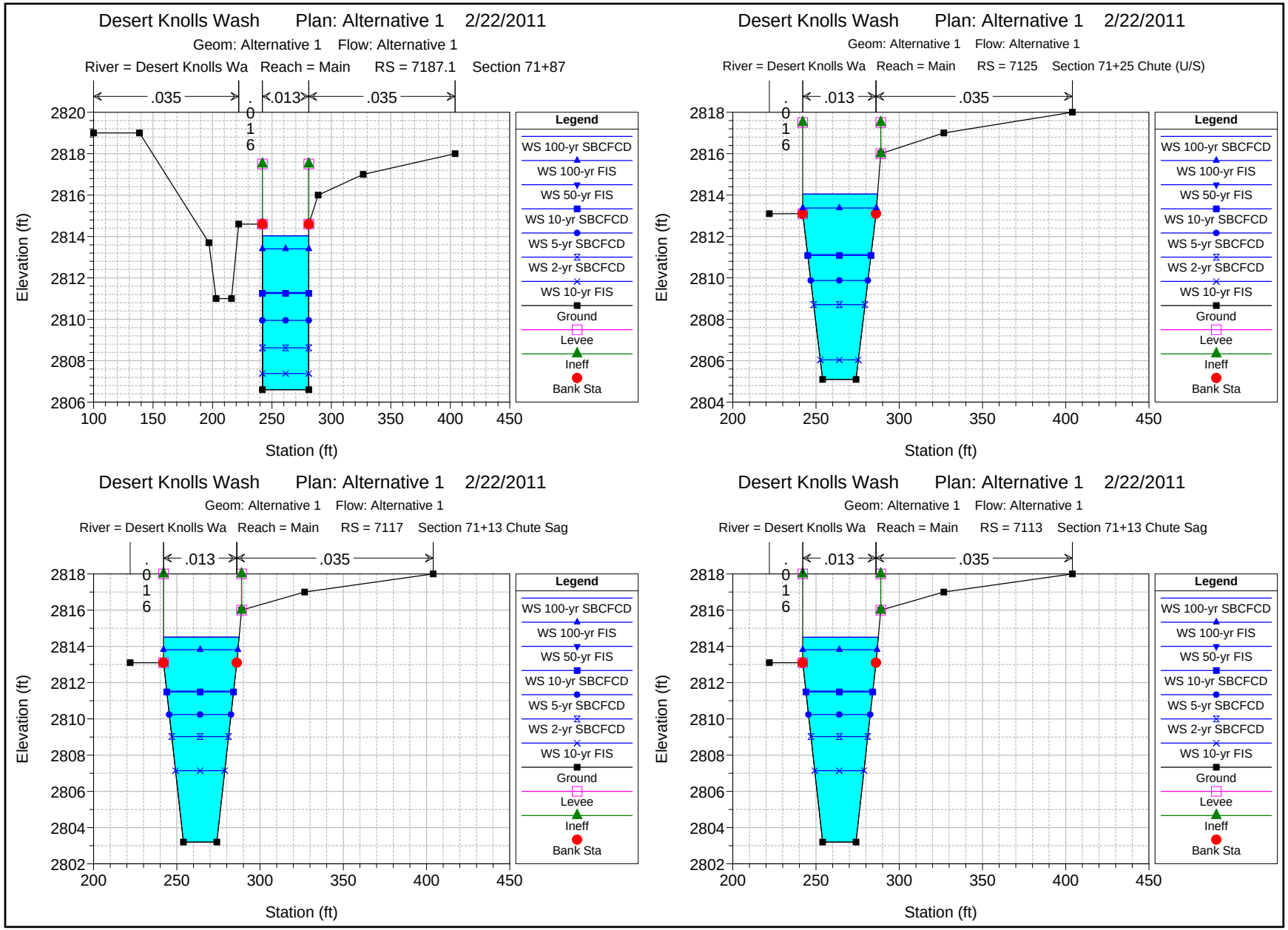

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7738.6 Section 77+38.6 (d/s face of Olalee Rd.)
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7700 Section 77+00 (exit of Olalee Rd.)
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7500.* 75+00 (interp)
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7305 Section 73+05 (approach to Kasota Rd.)
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

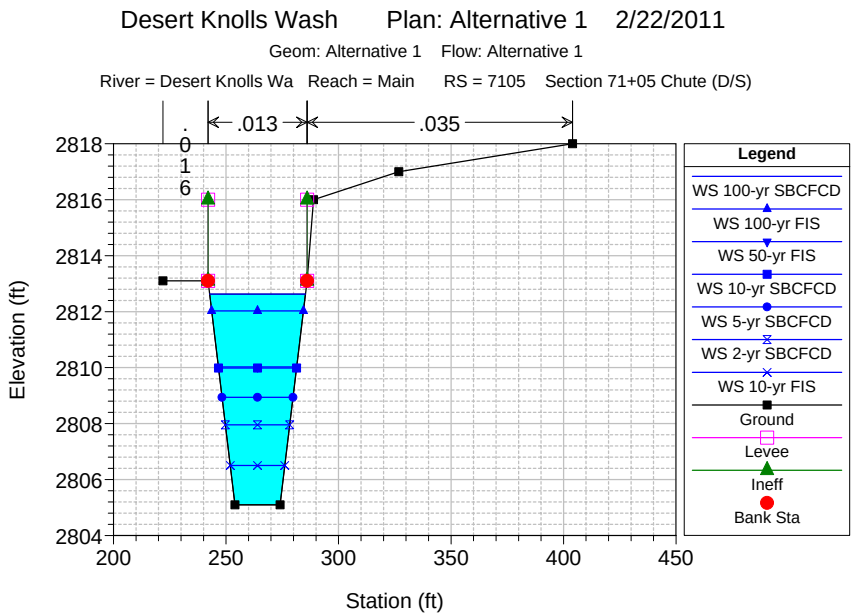

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7266.9 Section 72+66.9 (u/s face Kasota Rd.)
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 10-yr FIS
WS 2-yr SBCFCD
Ground
Levee
Ineff
Bank Sta

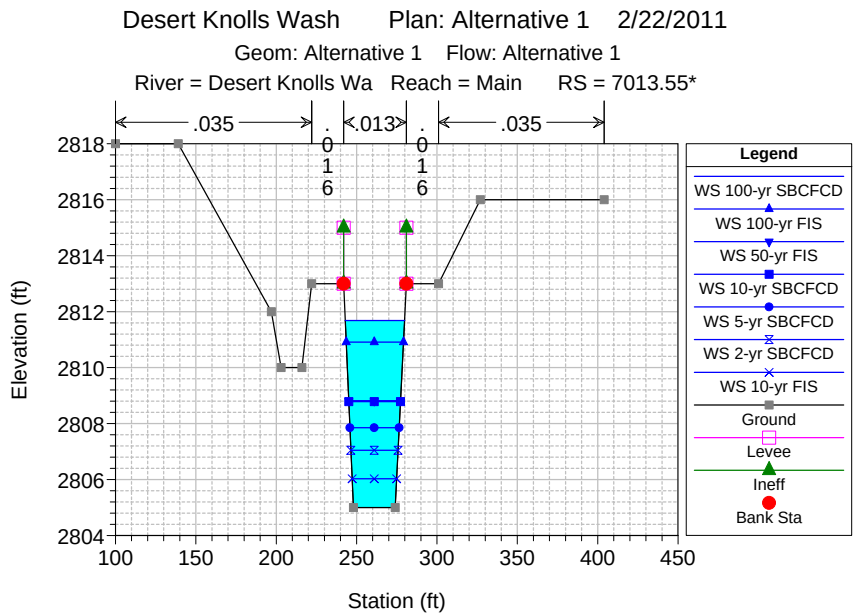

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7249.1 Culv Kasota Road
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

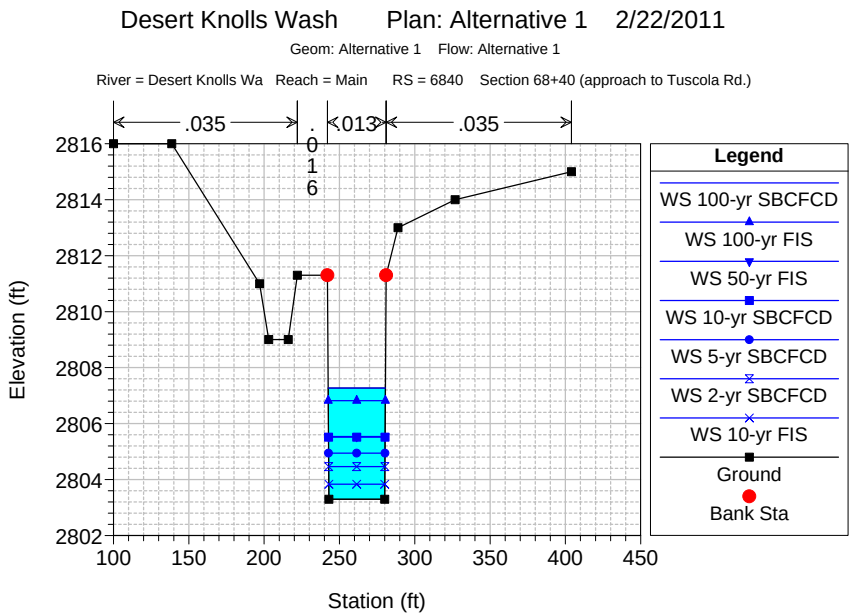

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7249.1 Culv Kasota Road
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

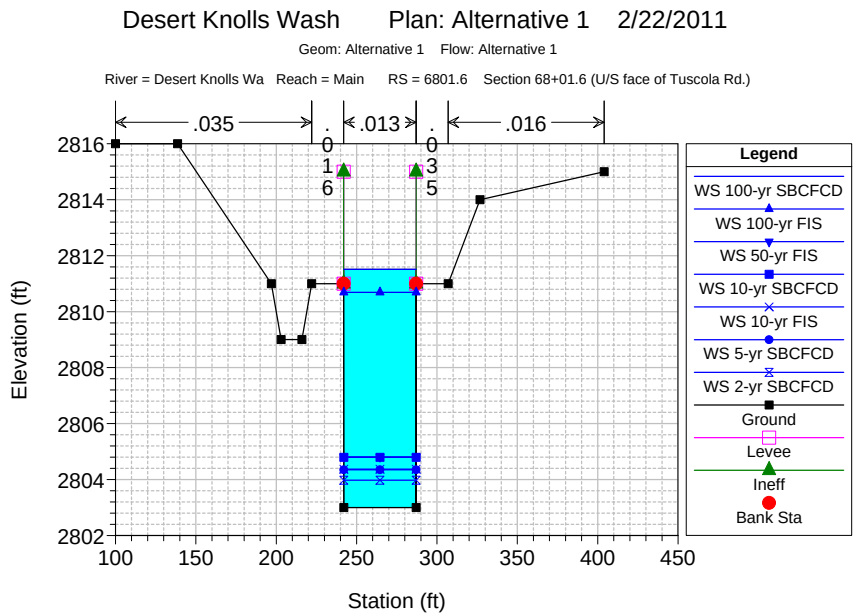

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7231.3 Section 72+31.3 (d/s face Kasota Rd.)
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

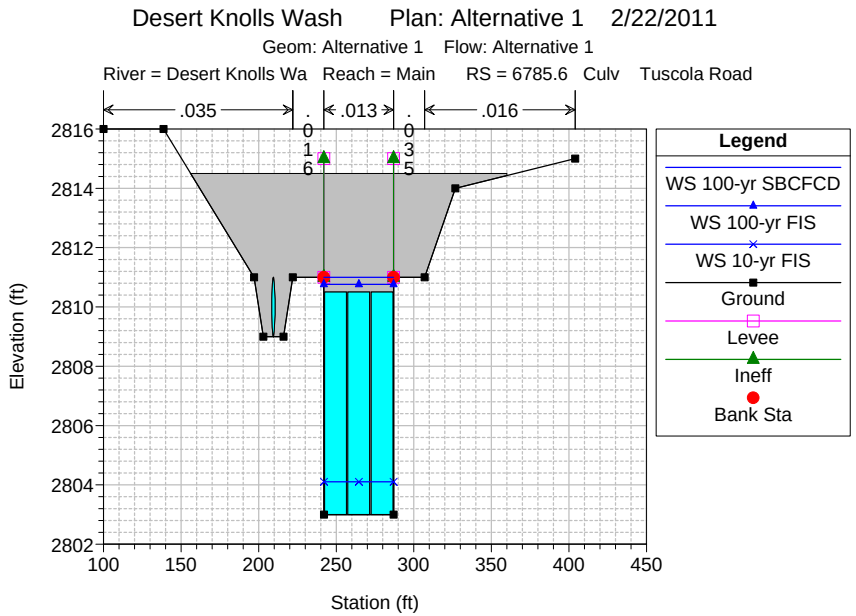

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7187.1 Section 71+87
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7125 Section 71+25 Chute (U/S)
.016
.013
.035
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7117 Section 71+13 Chute Sag
.016
.013
.035
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7113 Section 71+13 Chute Sag
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

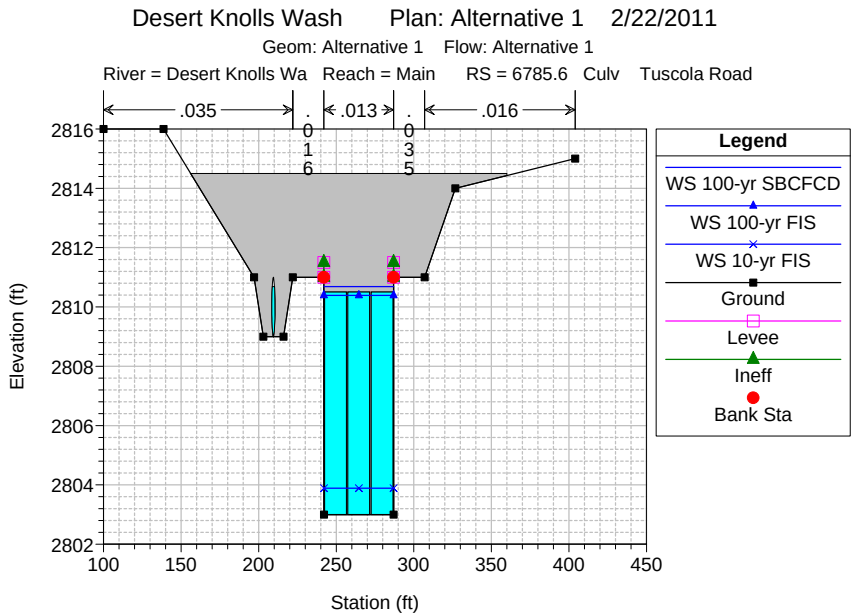

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7105 Section 71+05 Chute (D/S)
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

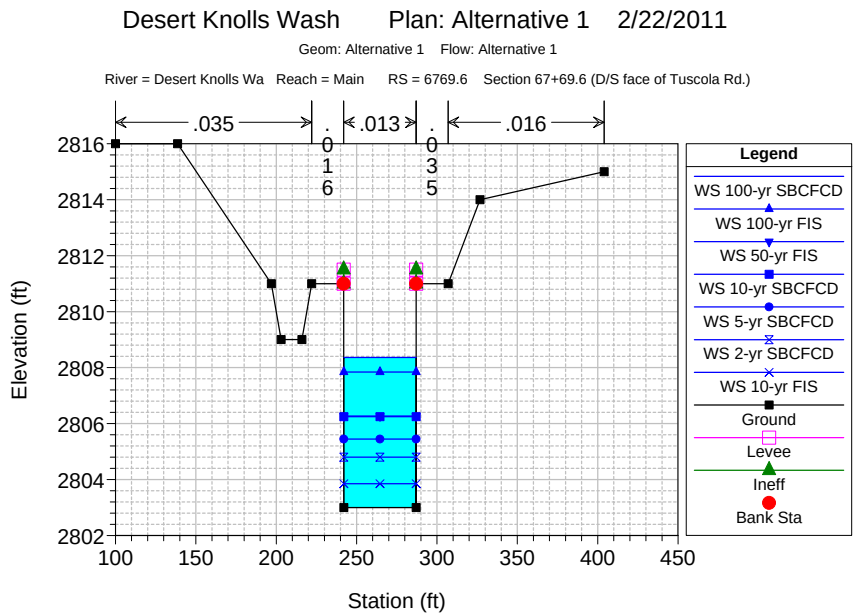

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 7013.55*
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

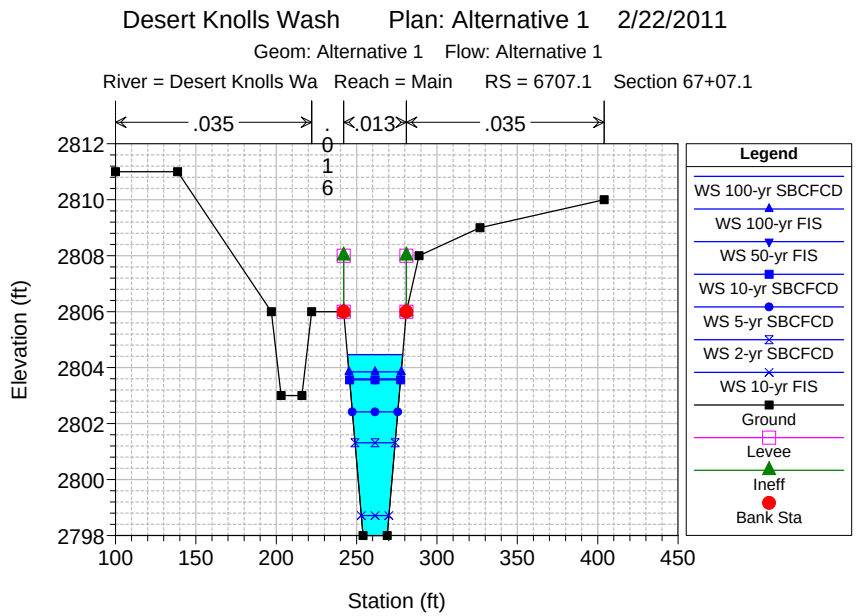

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6840 Section 68+40 (approach to Tuscola Rd.)
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

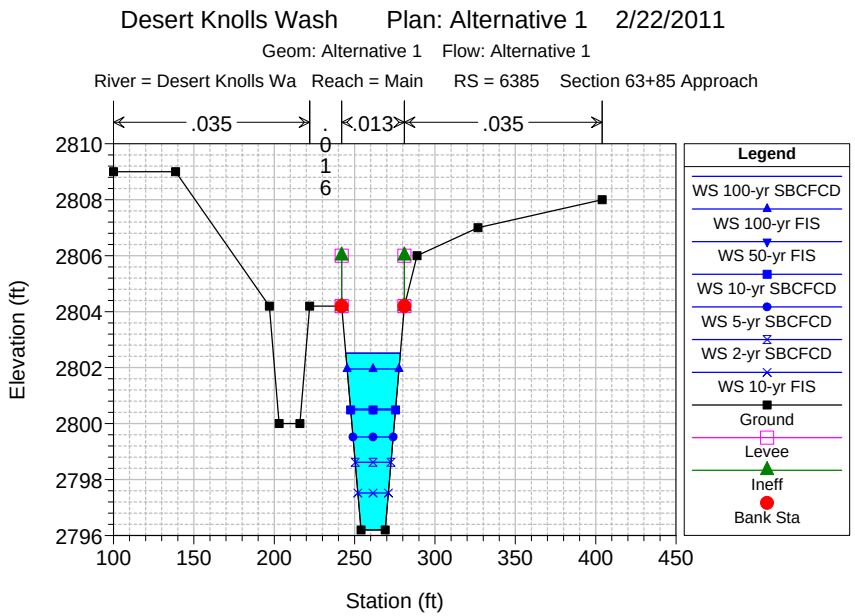

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6801.6 Section 68+01.6 (U/S face of Tuscola Rd.)
.035
.016
.013
.035
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 10-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
Ground
Levee
Ineff
Bank Sta

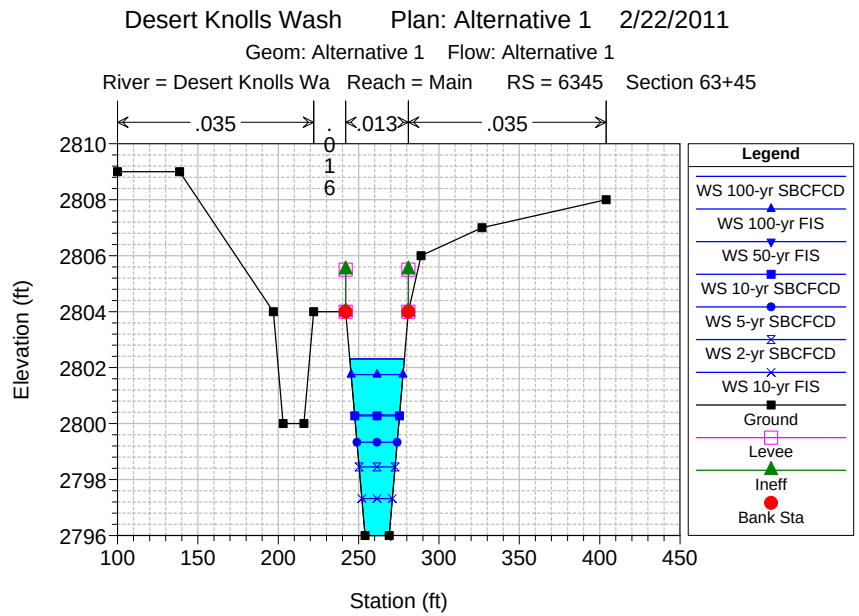

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6785.6 Culv Tuscola Road
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

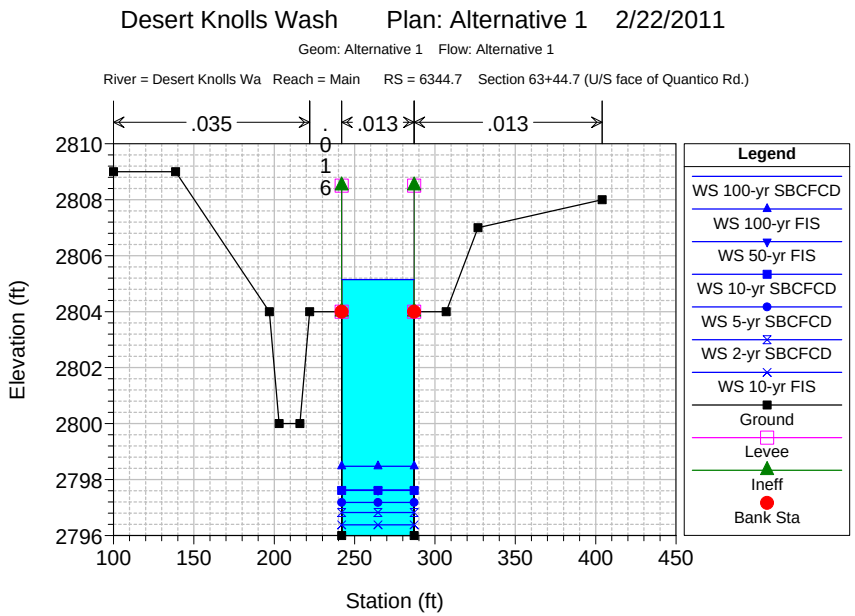

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6785.6 Culv Tuscola Road
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

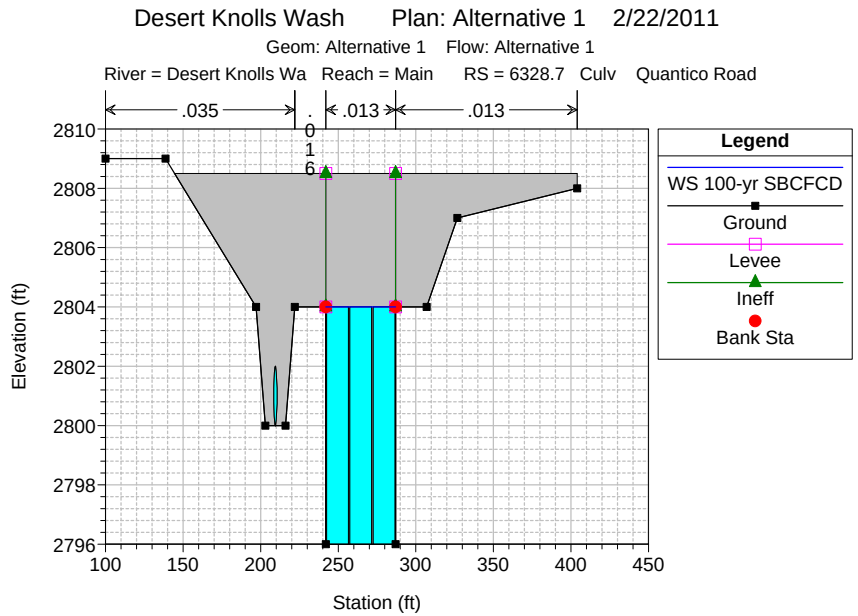

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6769.6 Section 67+69.6 (D/S face of Tuscola Rd.)
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

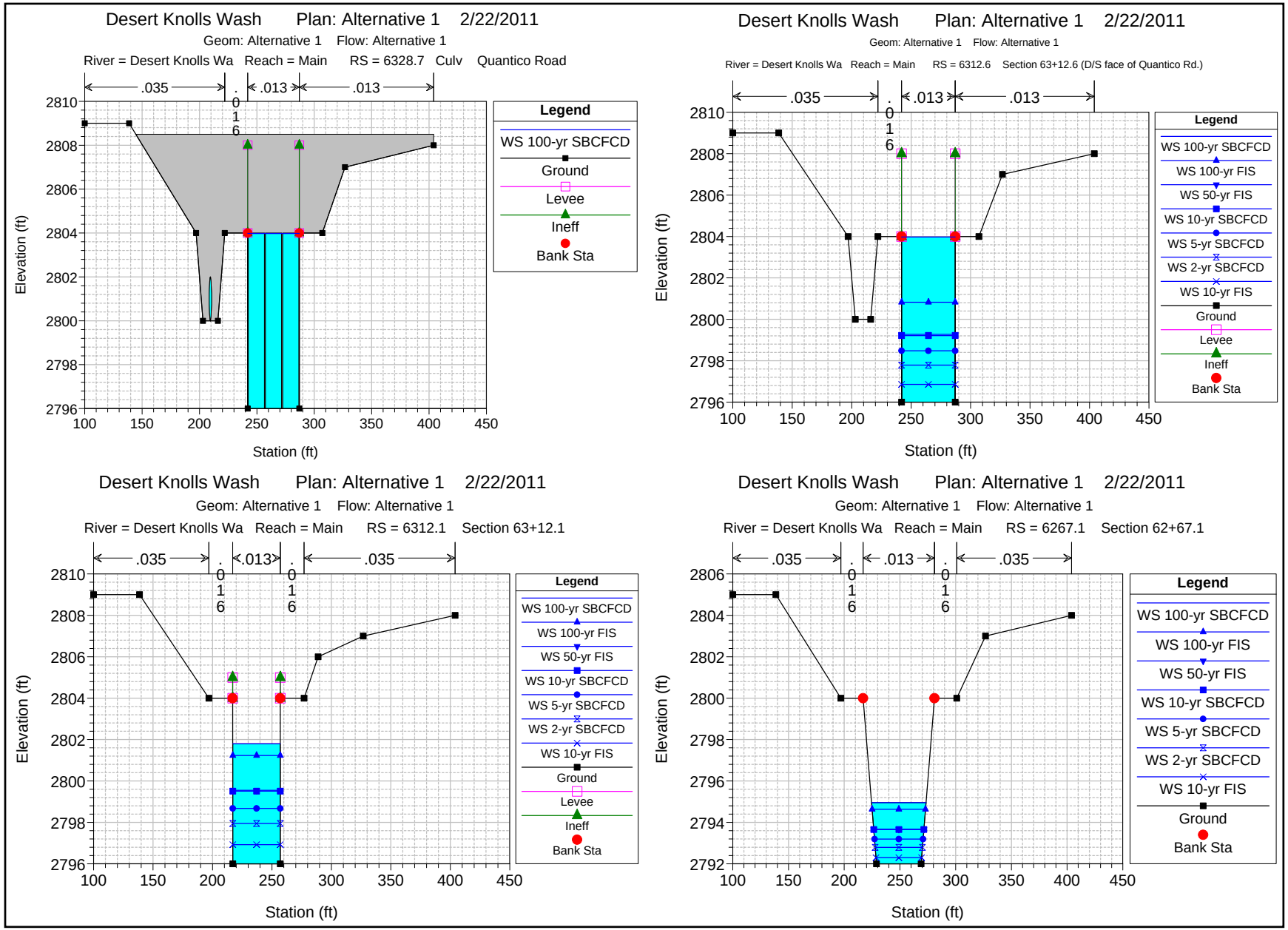

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6707.1 Section 67+07.1
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

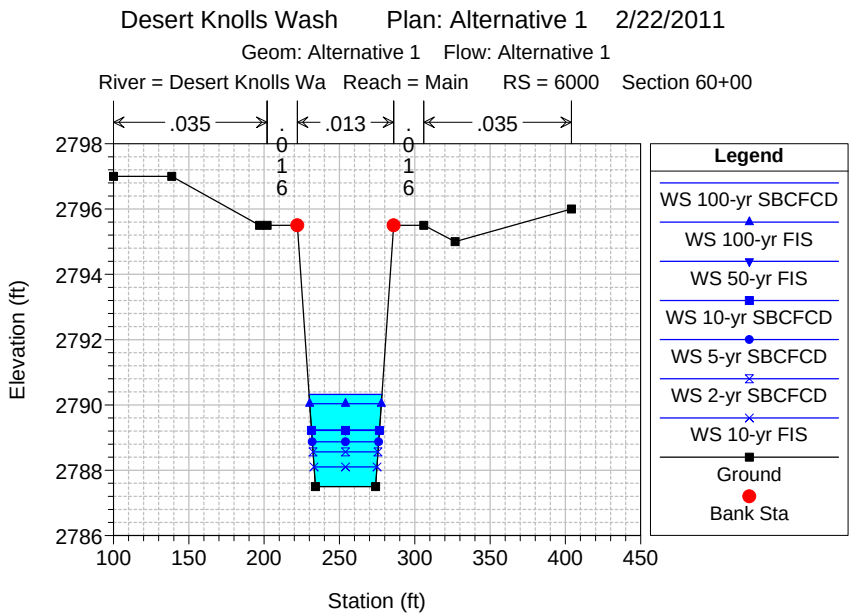

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6385 Section 63+85 Approach
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

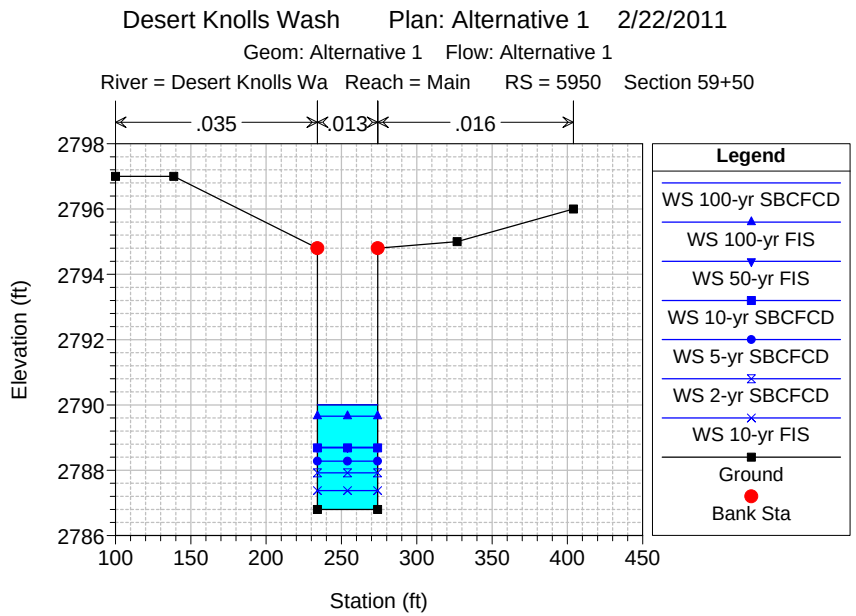

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6345 Section 63+45
.035
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

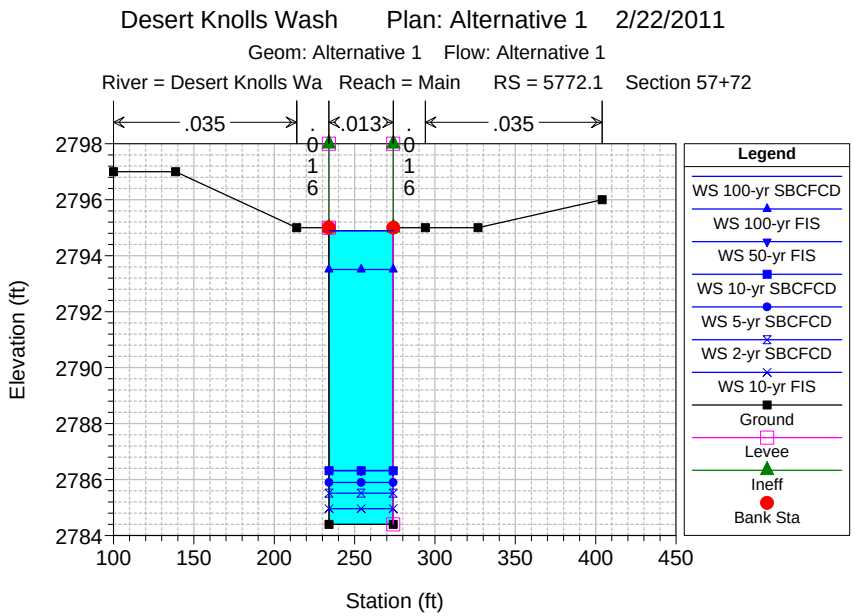

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6344.7 Section 63+44.7 (U/S face of Quantico Rd.)
.035
.016
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

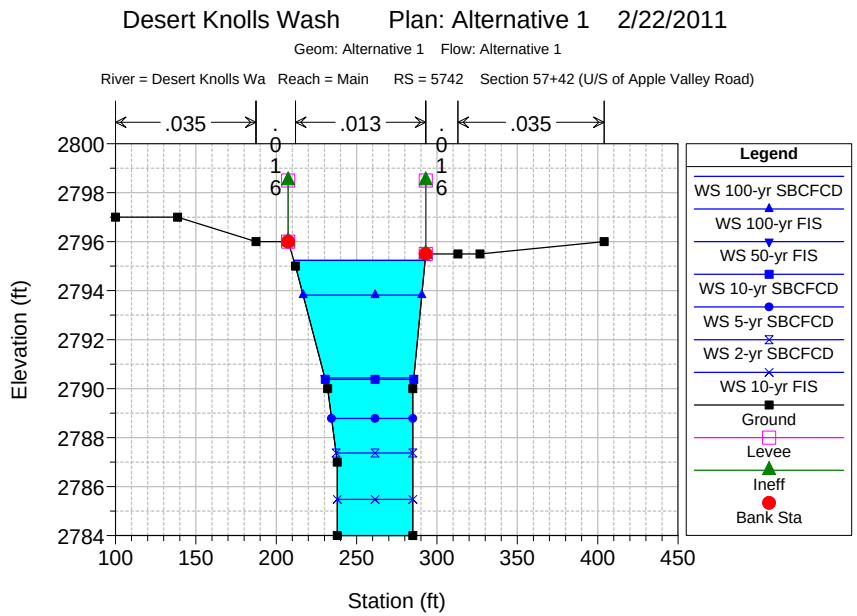

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6328.7 Culv Quantico Road
.035
.016
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
Ground
Levee
Ineff
Bank Sta

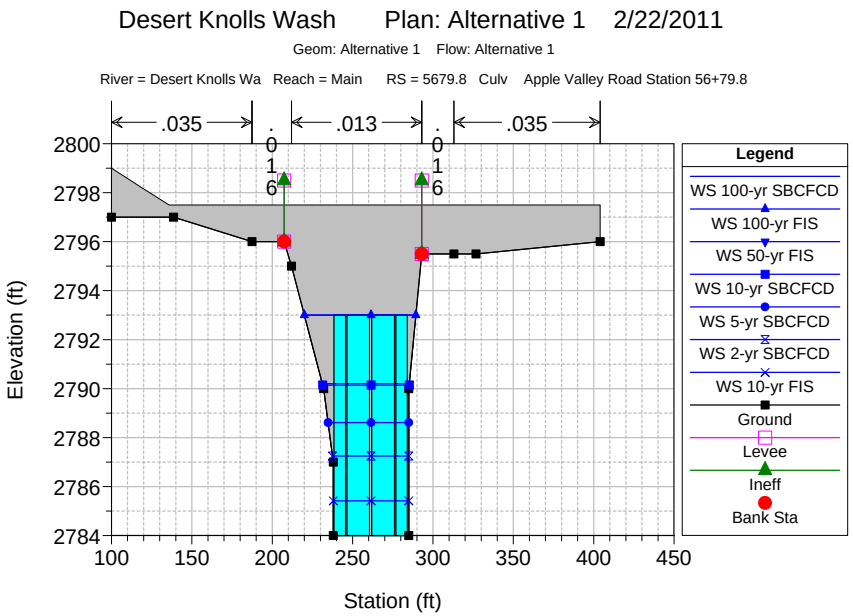

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6328.7 Culv Quantico Road
.035
.016
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6312.6 Section 63+12.6 (D/S face of Quantico Rd.)
.035
.016
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6312.1 Section 63+12.1
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6267.1 Section 62+67.1
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

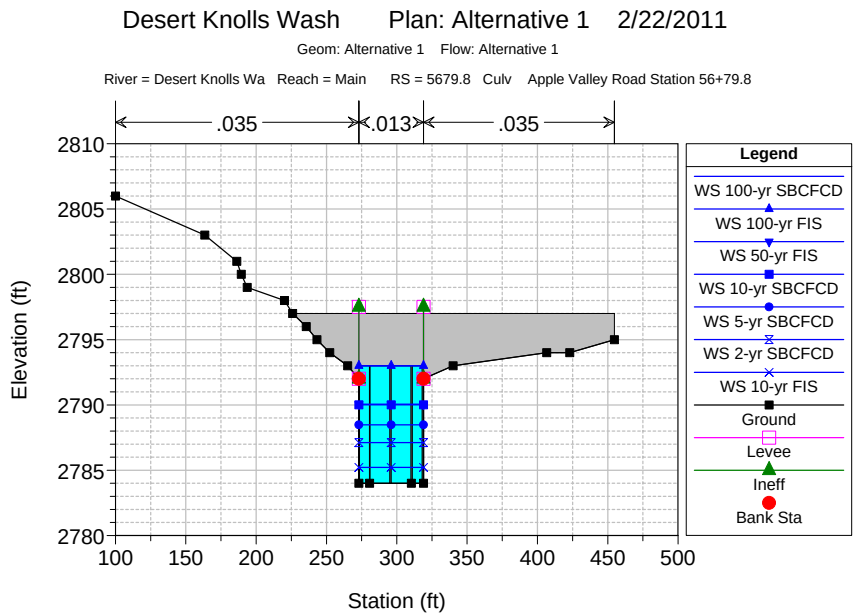

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 6000 Section 60+00
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

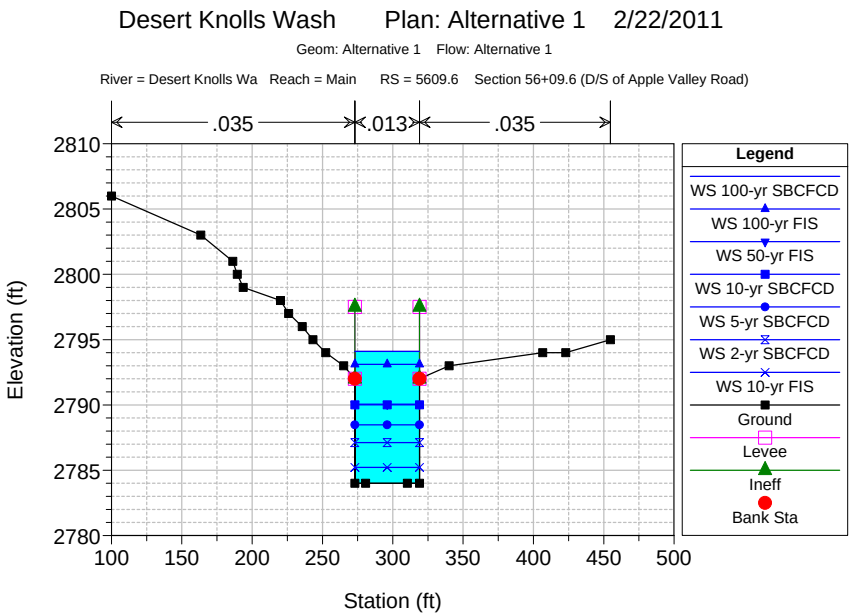

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 5950 Section 59+50
.035
.013
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

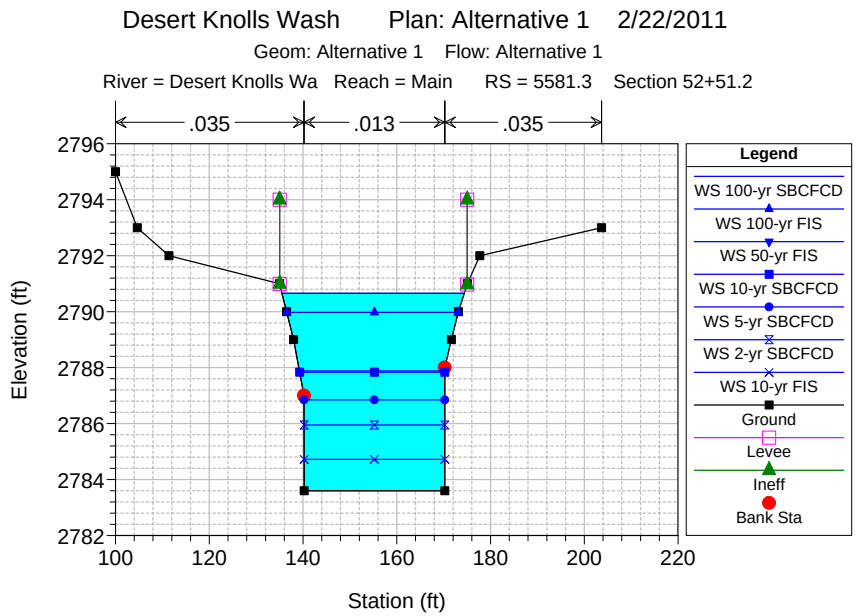

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 5772.1 Section 57+72
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

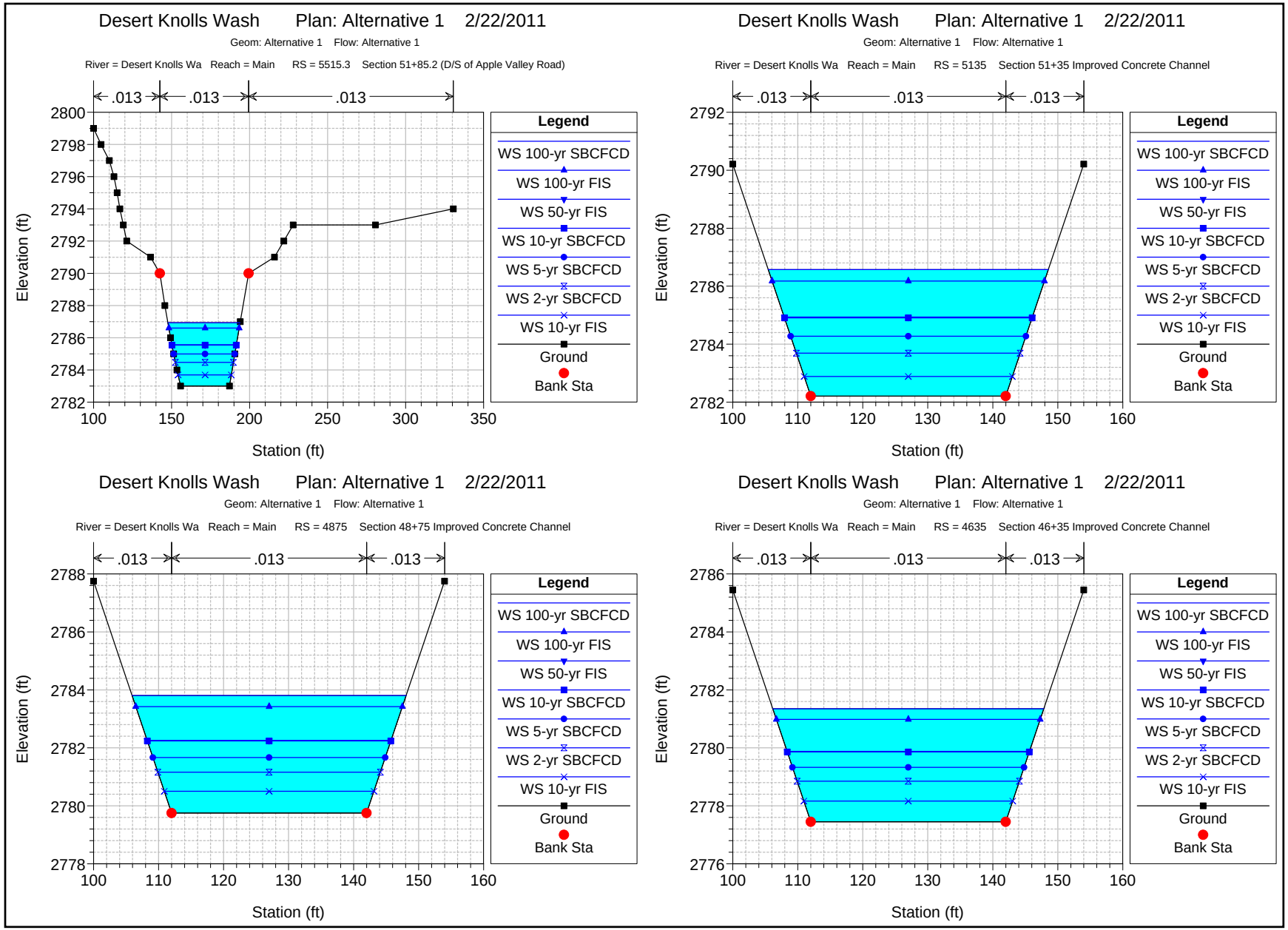

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 5742 Section 57+42 (U/S of Apple Valley Road)
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

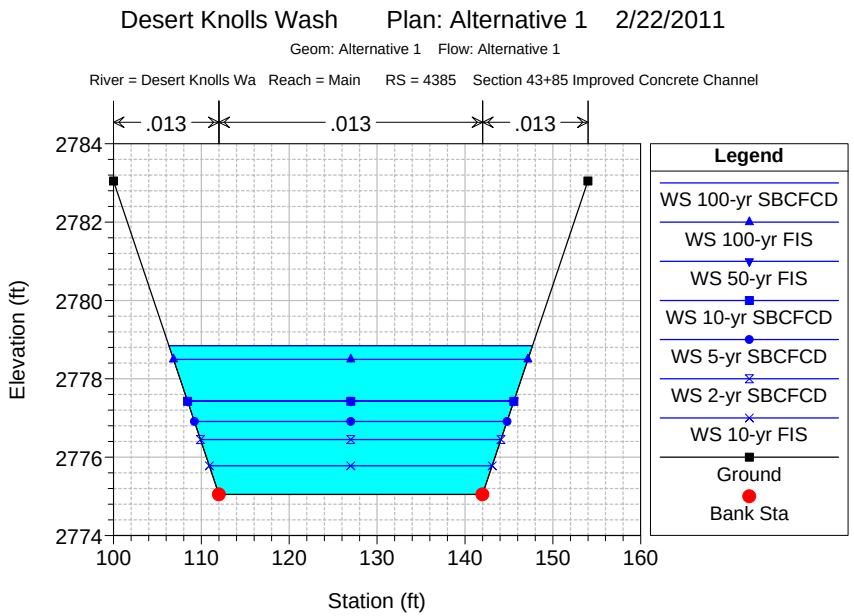

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 5679.8 Culv Apple Valley Road Station 56+79.8
.035
.013
.035
.016
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

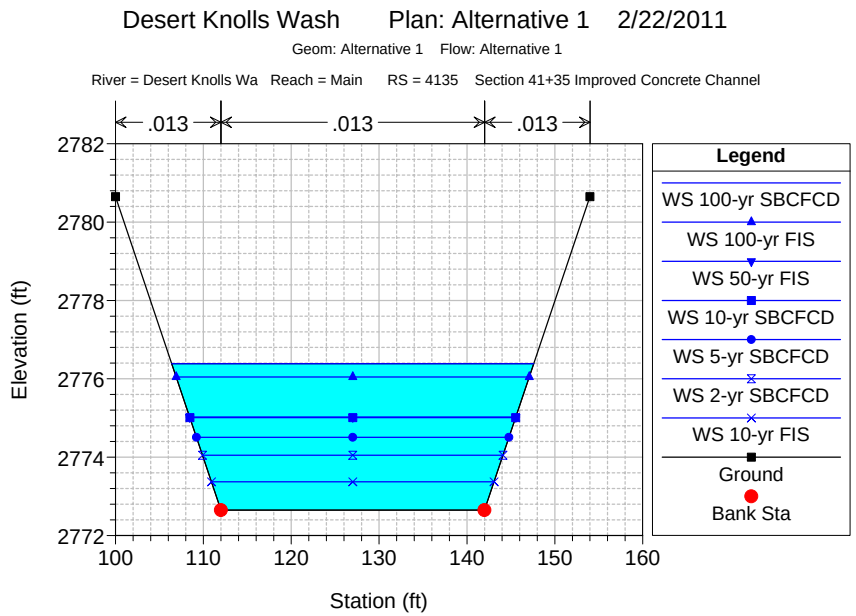

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 5679.8 Culv Apple Valley Road Station 56+79.8
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

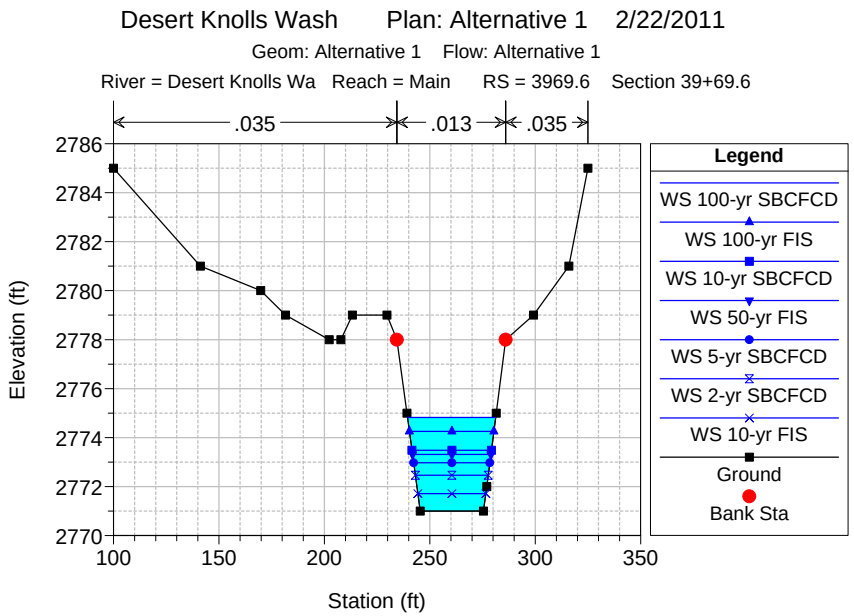

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 5609.6 Section 56+09.6 (D/S of Apple Valley Road)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

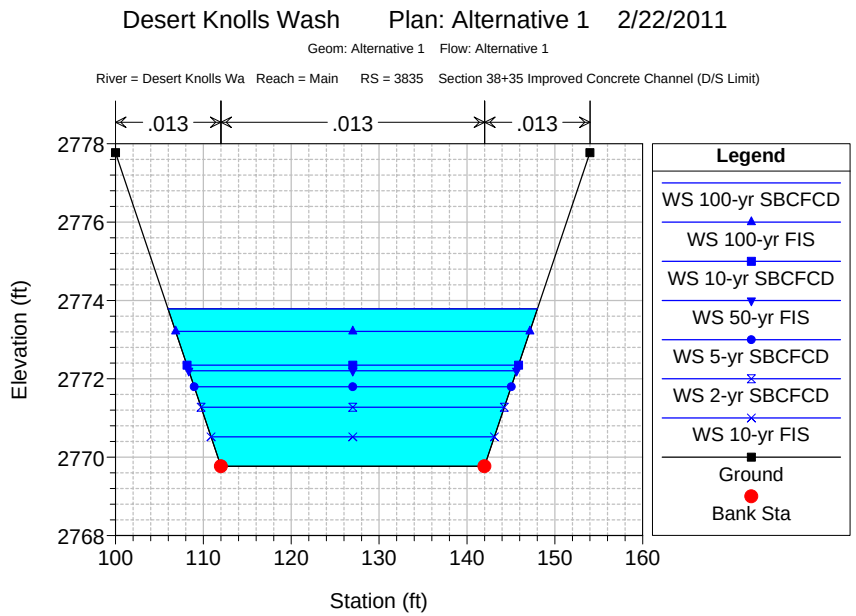

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 5581.3 Section 52+51.2
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

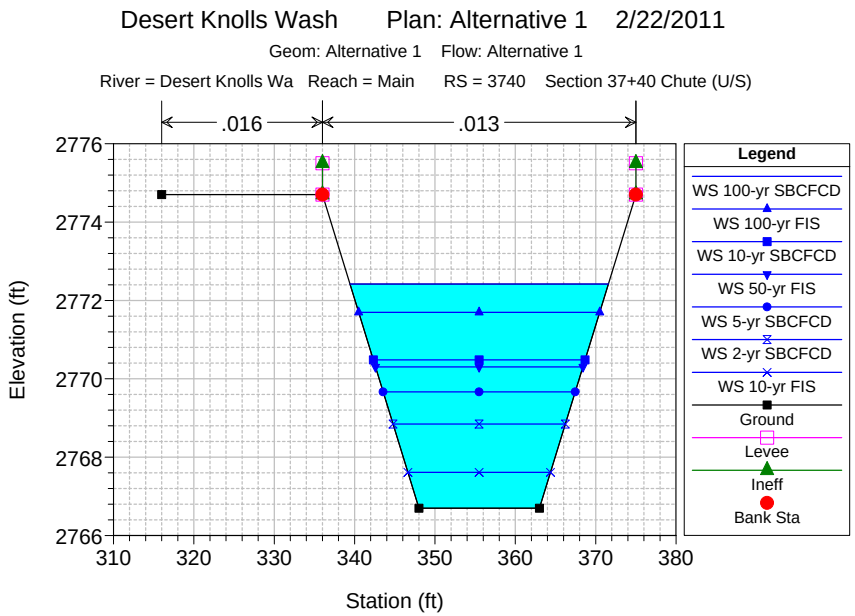

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 5515.3 Section 51+85.2 (D/S of Apple Valley Road)
.013 .013 .013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 5135 Section 51+35 Improved Concrete Channel
.013 .013 .013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 4875 Section 48+75 Improved Concrete Channel
.013 .013 .013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 4635 Section 46+35 Improved Concrete Channel
.013 .013 .013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

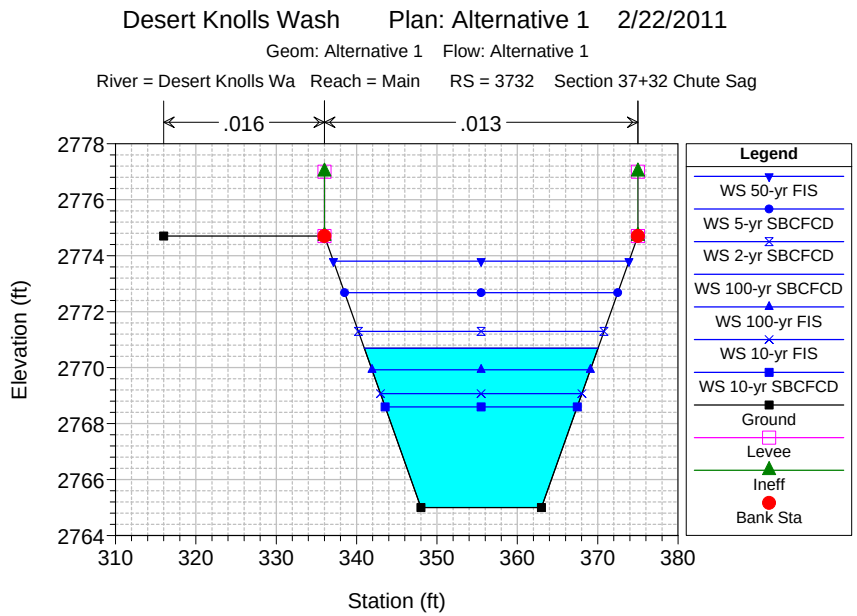

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 4385 Section 43+85 Improved Concrete Channel
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

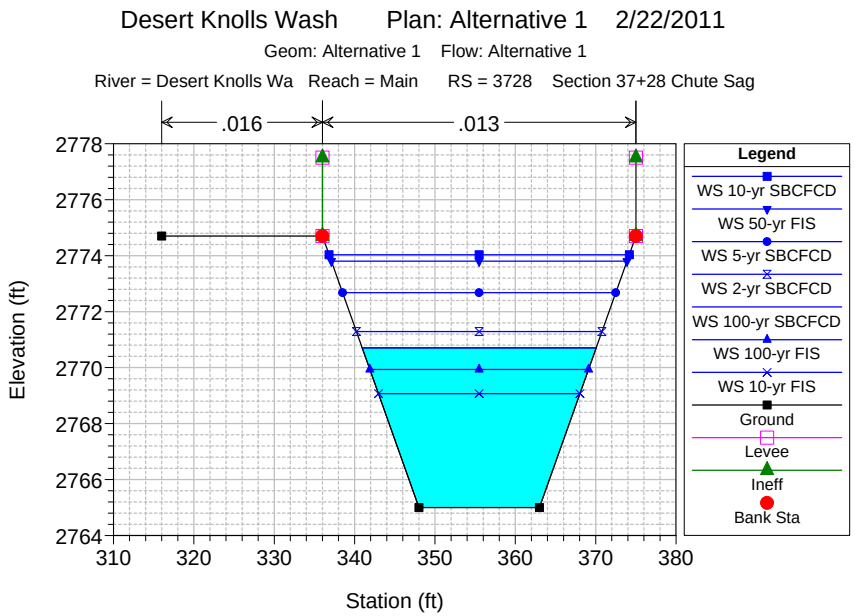

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 4135 Section 41+35 Improved Concrete Channel
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

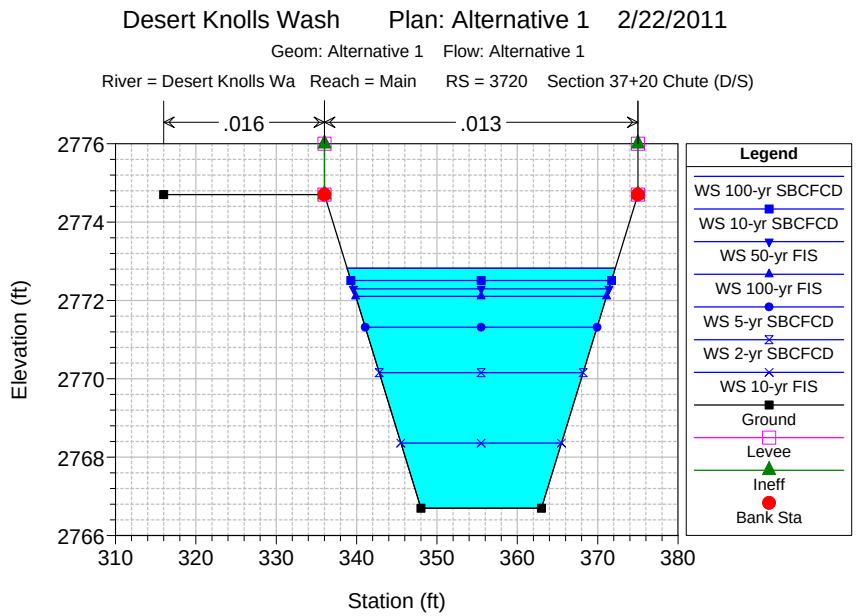

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3969.6 Section 39+69.6
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

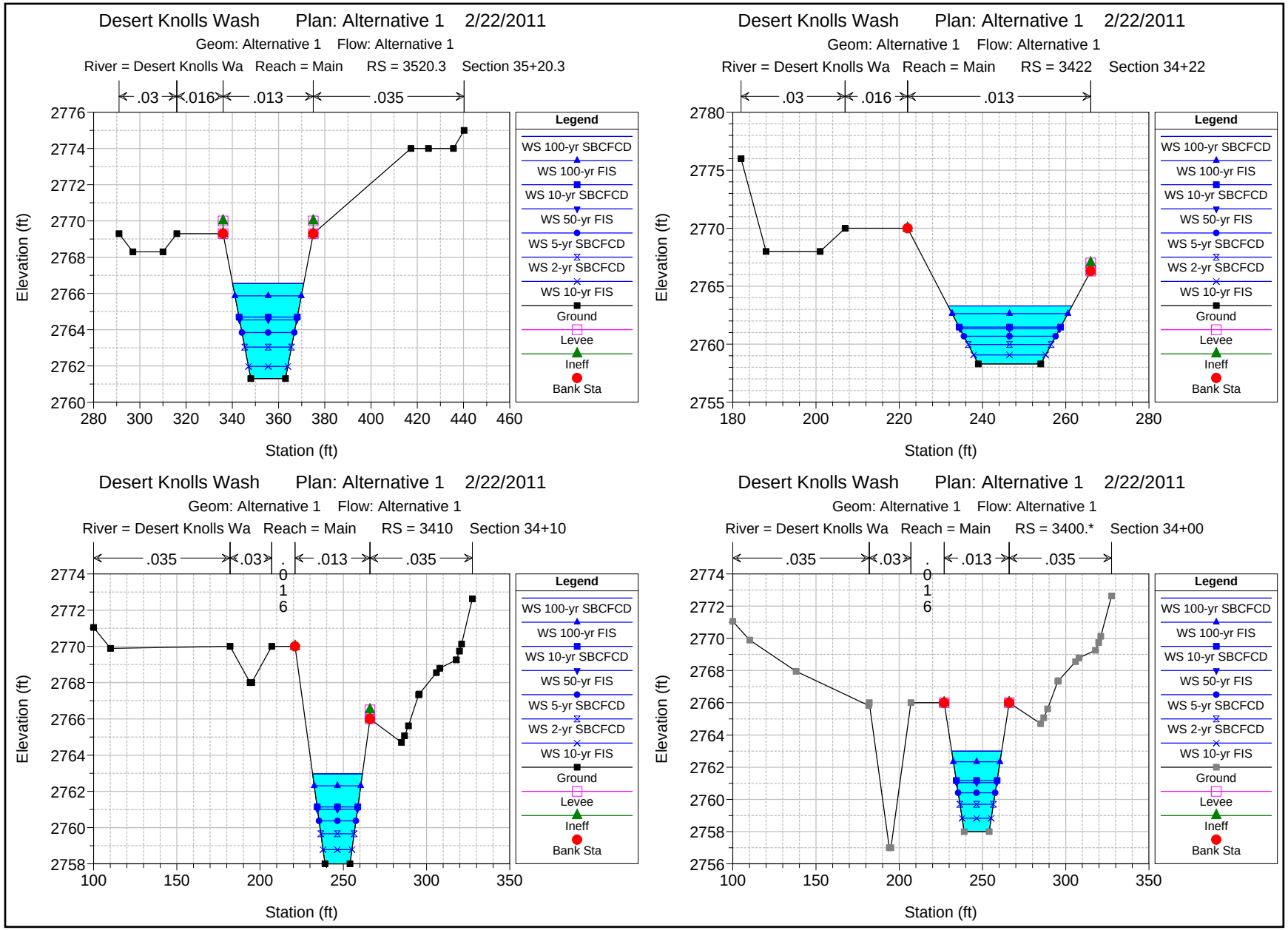

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3835 Section 38+35 Improved Concrete Channel (D/S Limit)
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

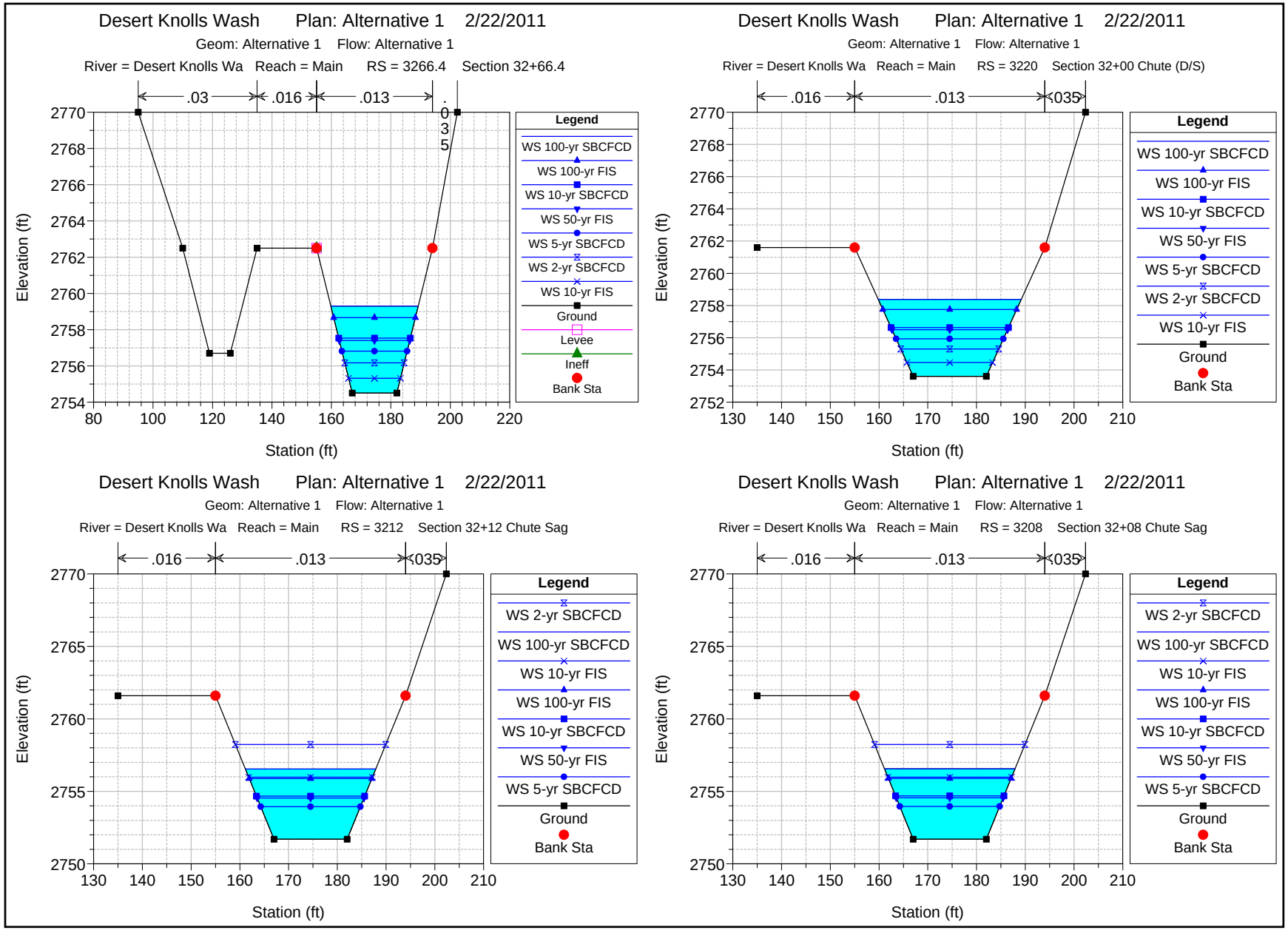

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3740 Section 37+40 Chute (U/S)
.016
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

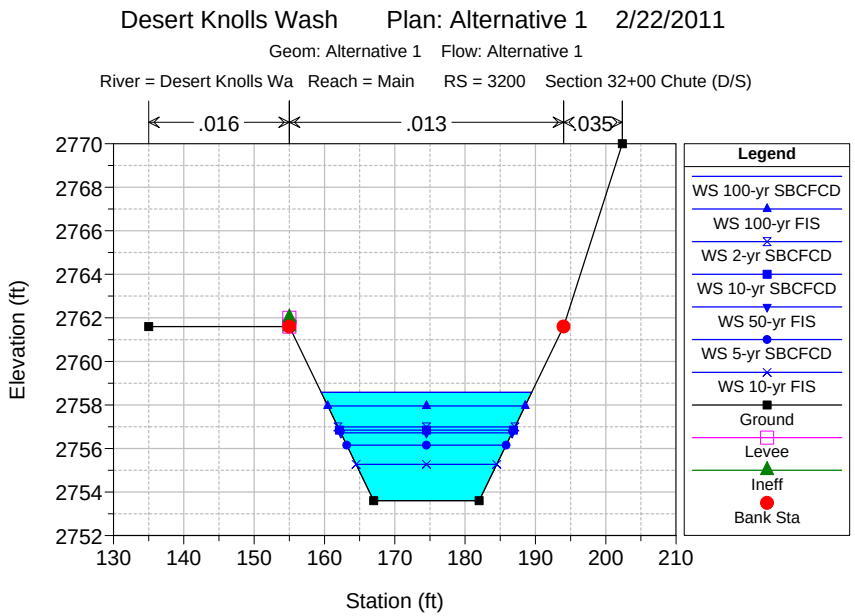

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3732 Section 37+32 Chute Sag
.016
.013
Elevation (ft)
Station (ft)
Legend
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr FIS
WS 10-yr SBCFCD
Ground
Levee
Ineff
Bank Sta

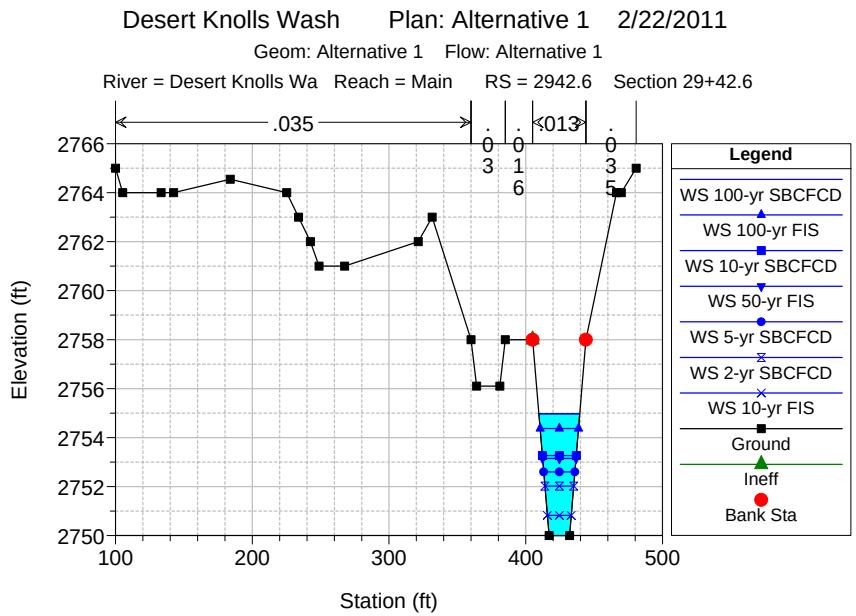

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3728 Section 37+28 Chute Sag
.016
.013
Elevation (ft)
Station (ft)
Legend
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

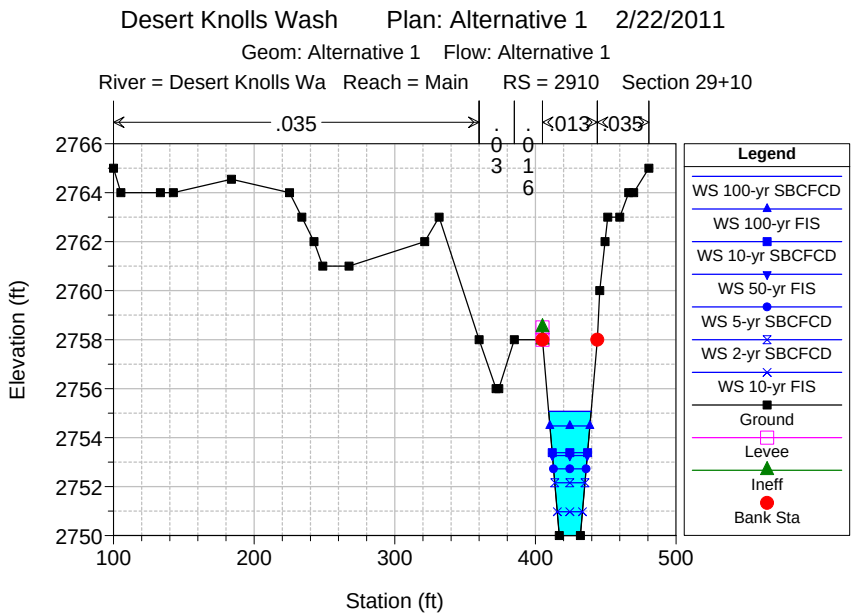

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3720 Section 37+20 Chute (D/S)
.016
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 10-yr SBCFCD
WS 50-yr FIS
WS 100-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

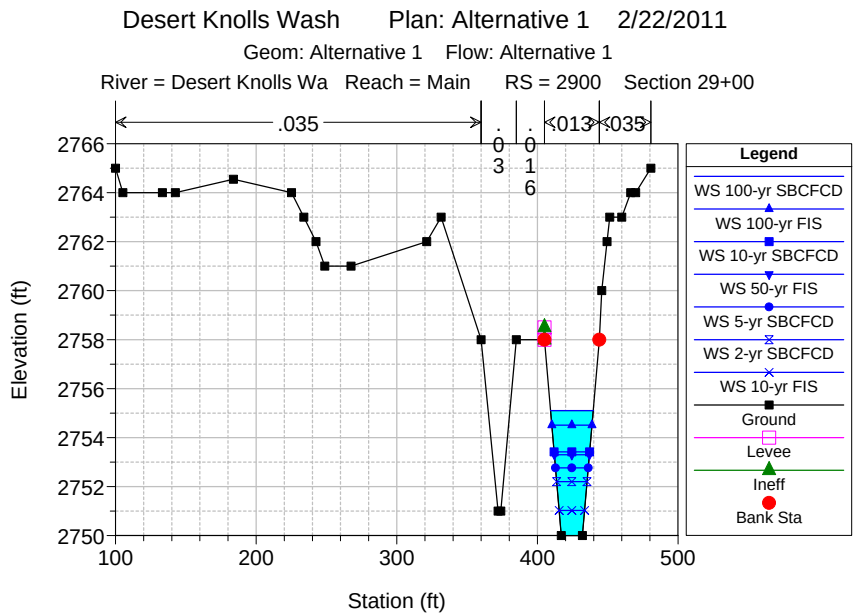

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3520.3 Section 35+20.3
.03 .016 .013 .035
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3422 Section 34+22
.03 .016 .013
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3410 Section 34+10
.035 .03 .016 .013 .035
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3400.* Section 34+00
.035 .03 .016 .013 .035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

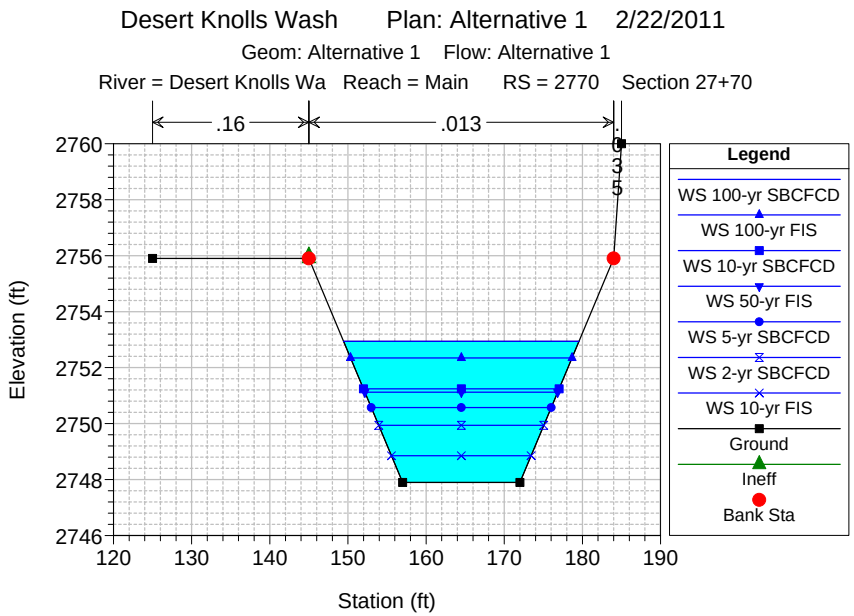

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3266.4 Section 32+66.4
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3220 Section 32+00 Chute (D/S)
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3212 Section 32+12 Chute Sag
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 10-yr FIS
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3208 Section 32+08 Chute Sag
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 10-yr FIS
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
Ground
Bank Sta

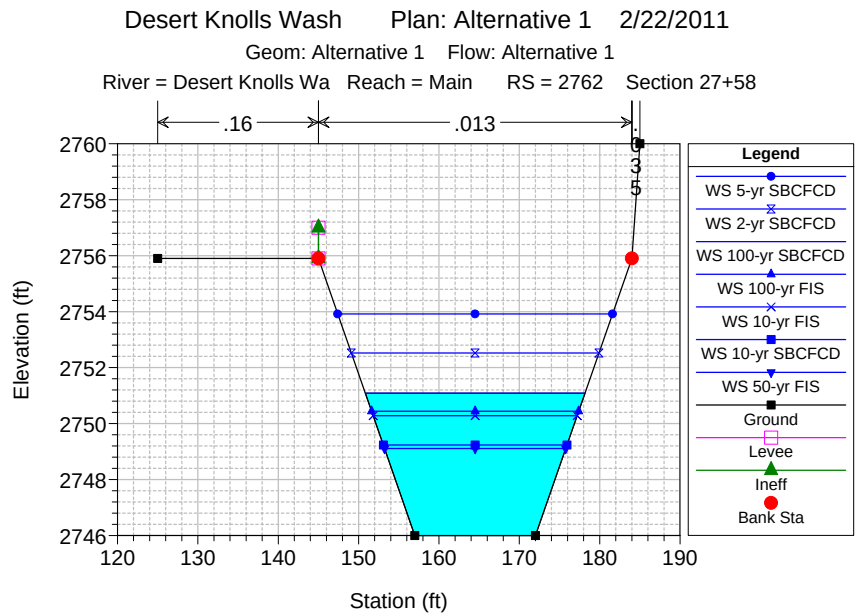

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 3200 Section 32+00 Chute (D/S)
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 2-yr SBCFCD
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

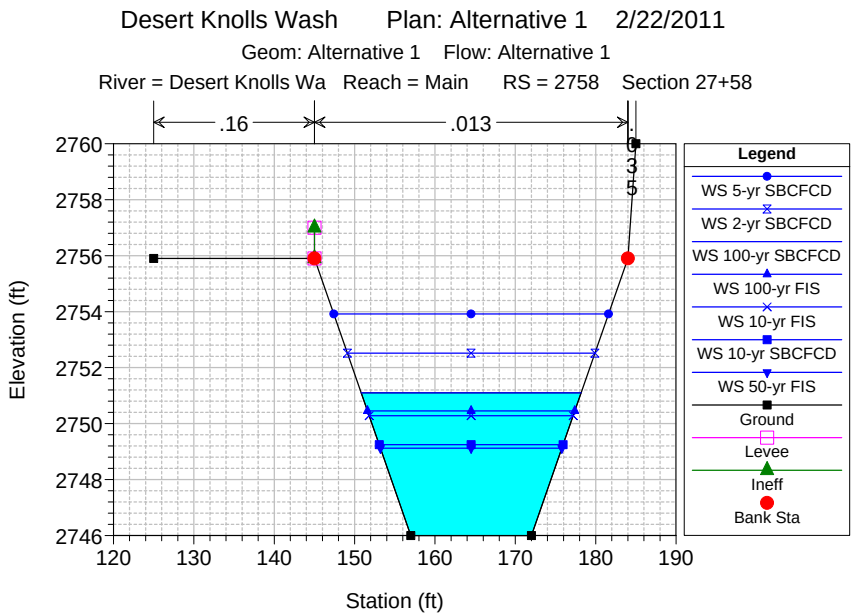

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2942.6 Section 29+42.6
.035
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

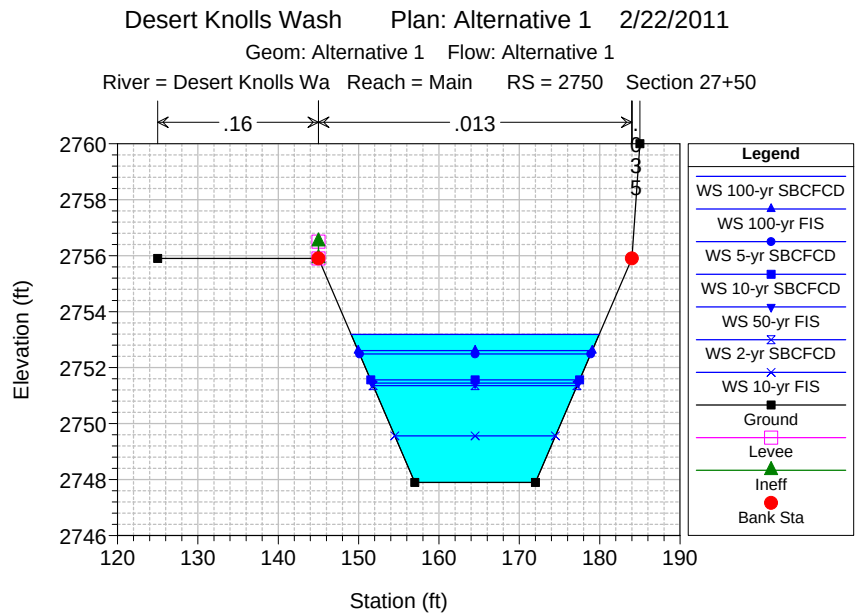

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2910 Section 29+10
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

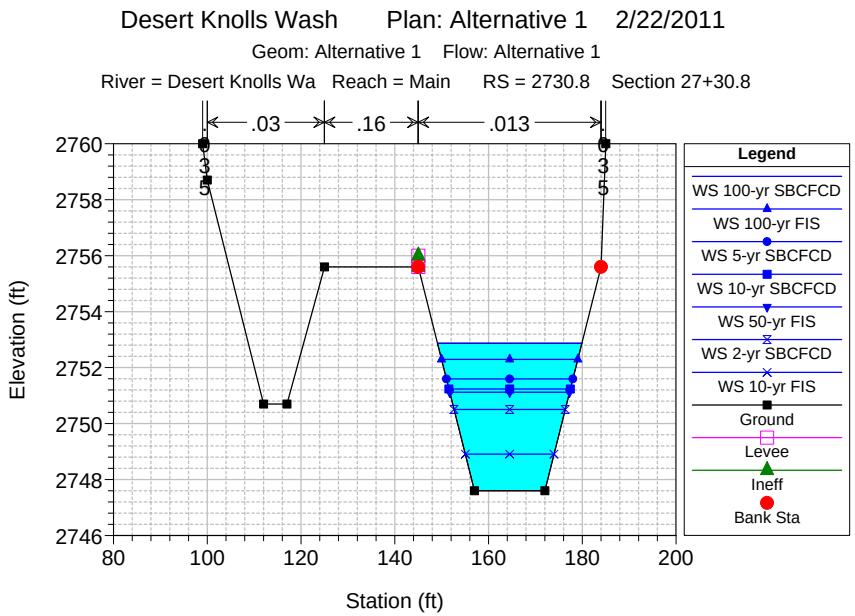

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2900 Section 29+00
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

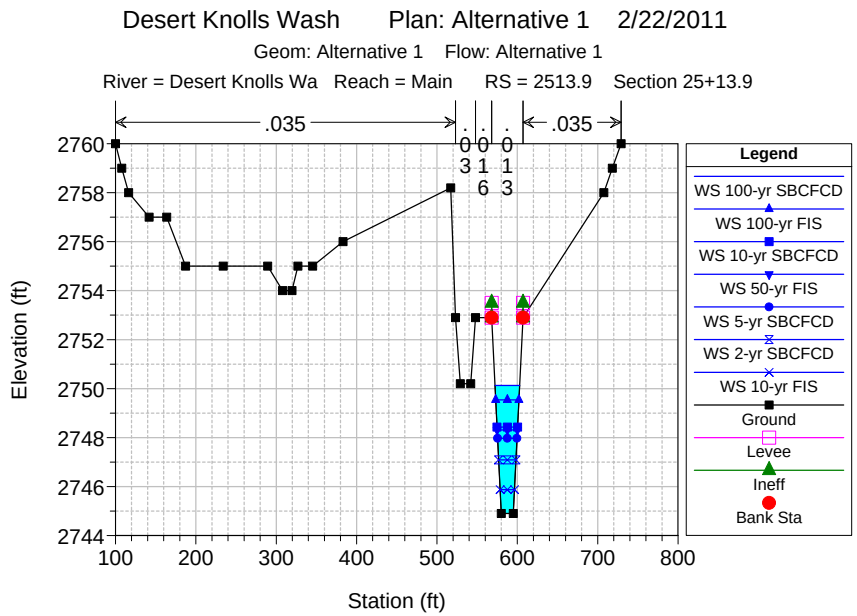

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2770 Section 27+70
.16
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

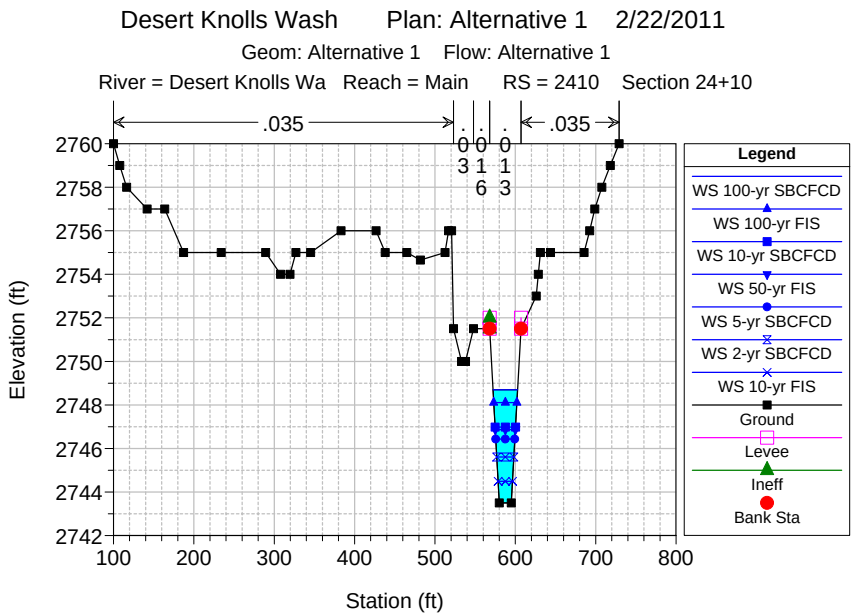

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2762 Section 27+58
.16
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
Ground
Levee
Ineff
Bank Sta

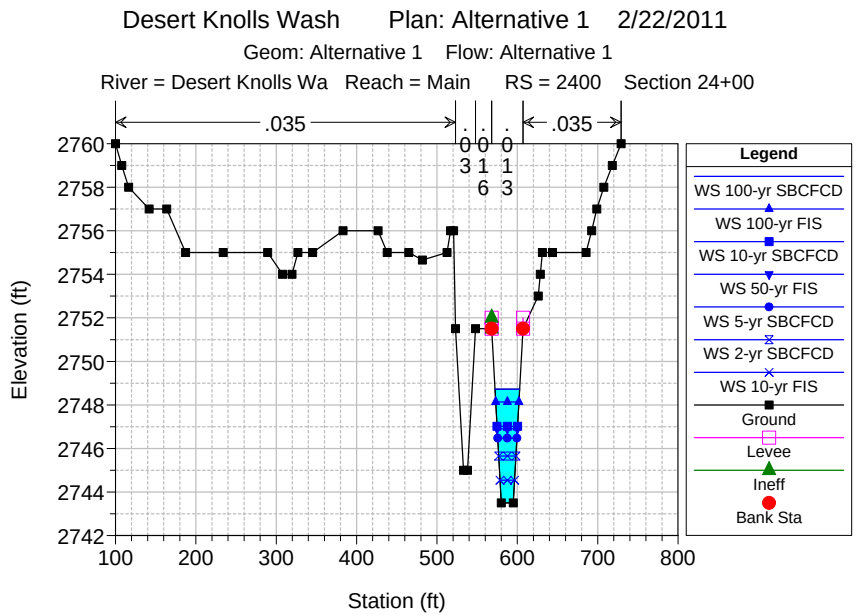

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2758 Section 27+58
.16
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
Ground
Levee
Ineff
Bank Sta

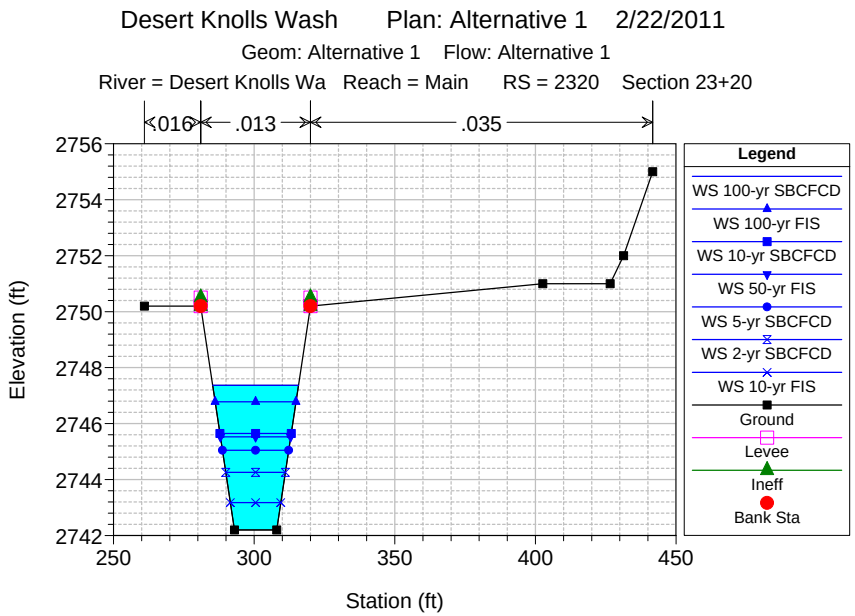

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2750 Section 27+50
.16
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 10-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

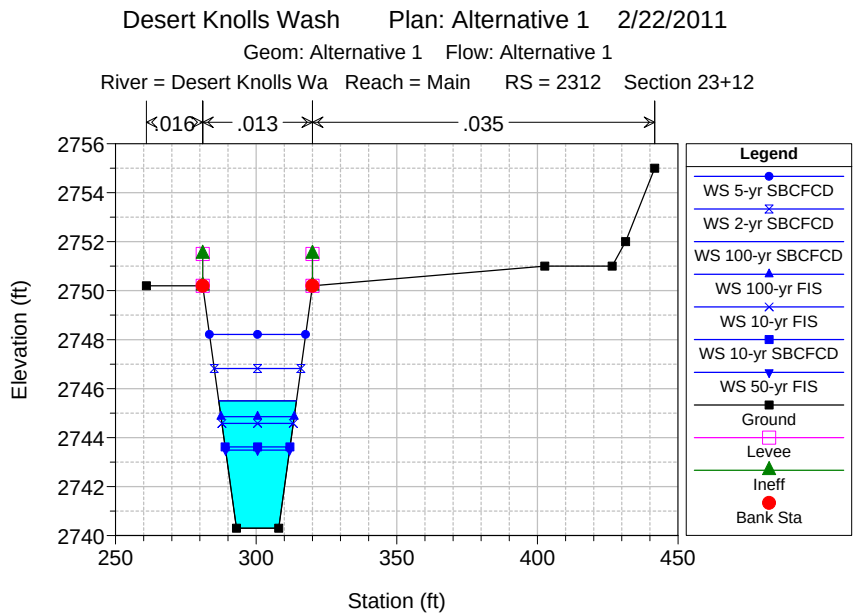

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2730.8 Section 27+30.8
.03
.16
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 10-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

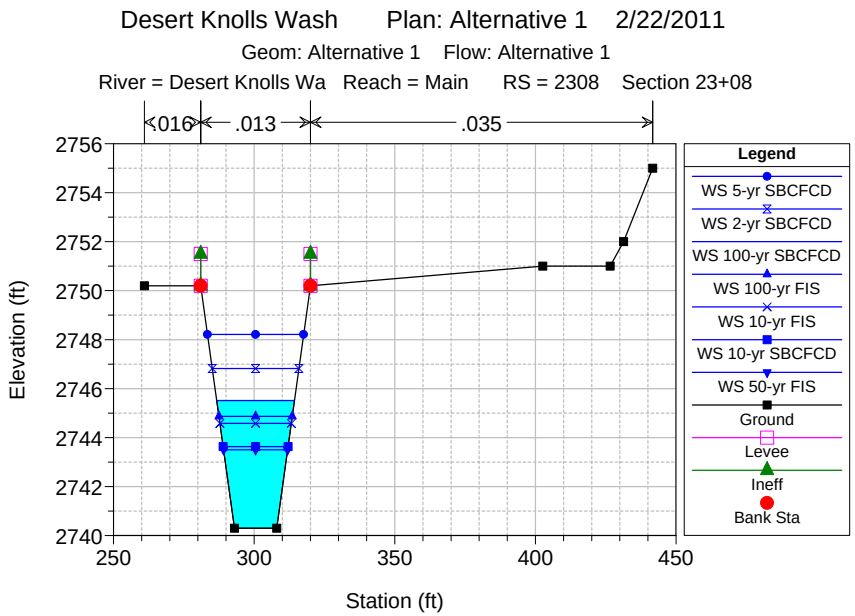

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2513.9 Section 25+13.9
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

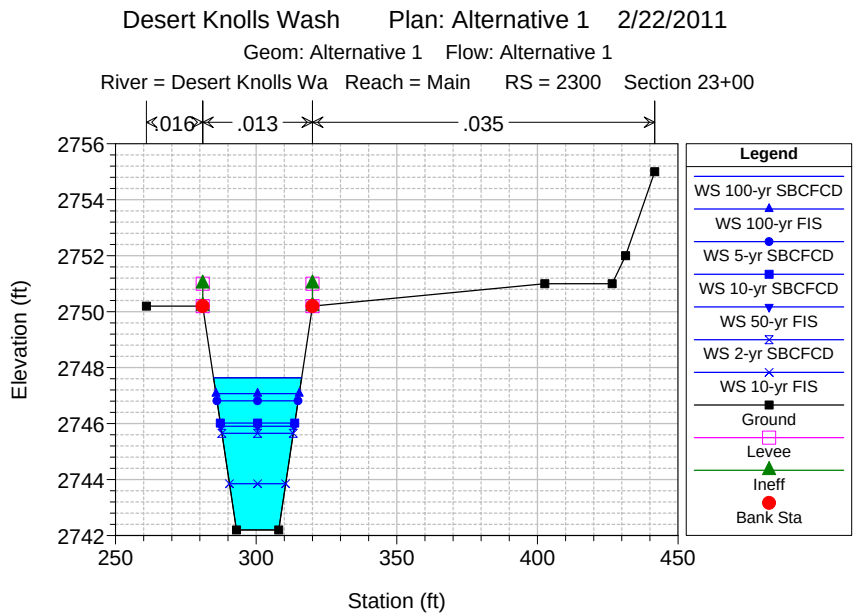

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2410 Section 24+10
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

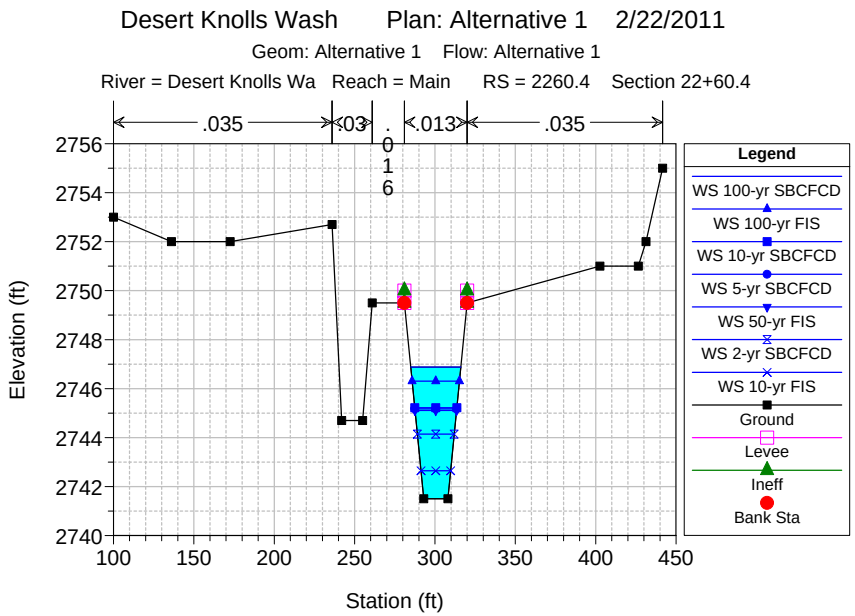

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2400 Section 24+00
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

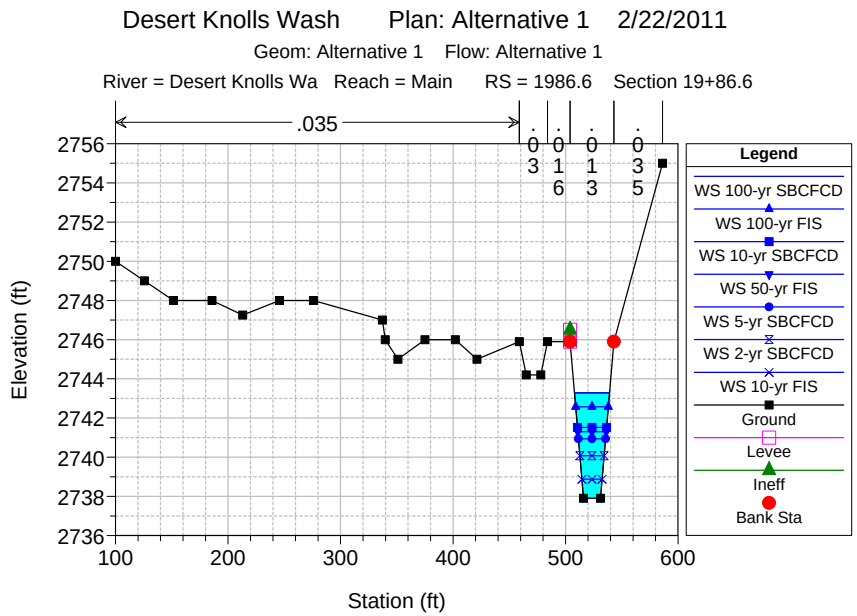

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2320 Section 23+20
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

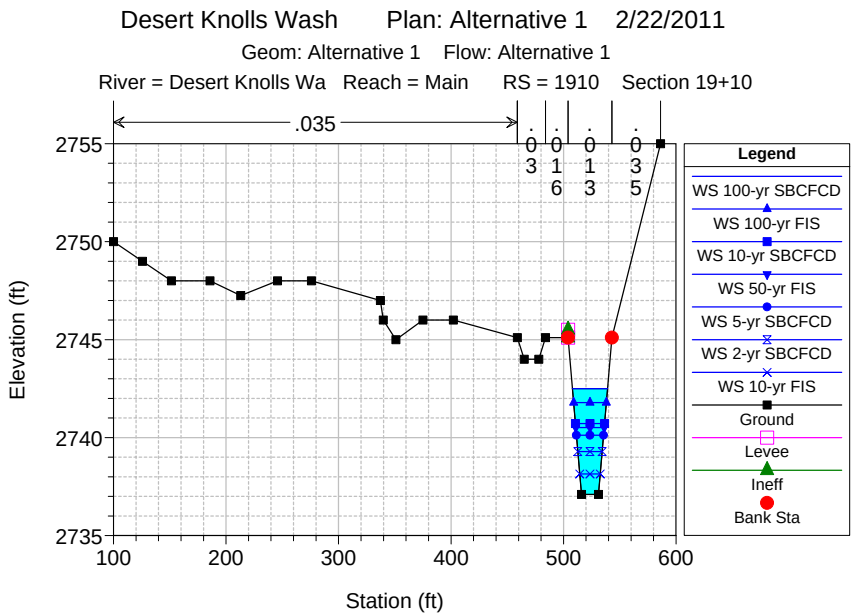

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2312 Section 23+12
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
Ground
Levee
Ineff
Bank Sta

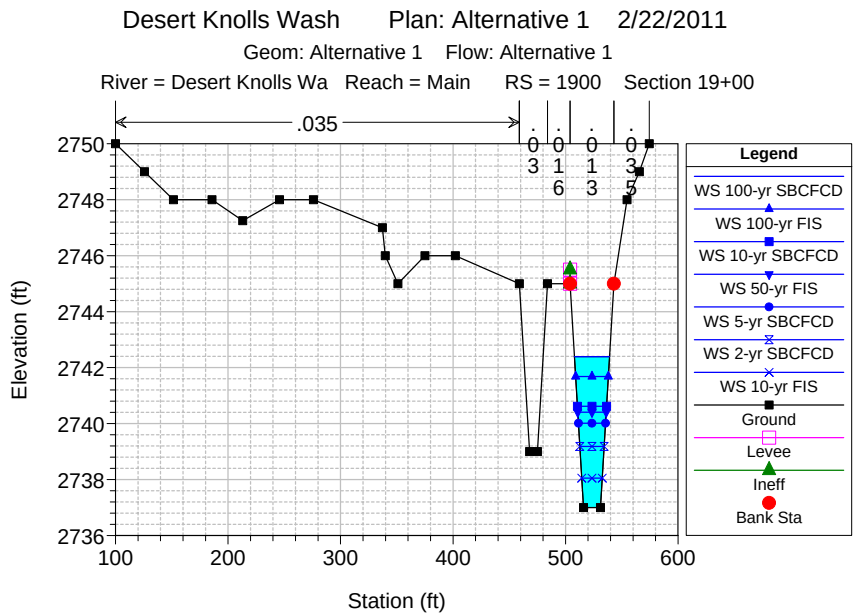

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2308 Section 23+08
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
Ground
Levee
Ineff
Bank Sta

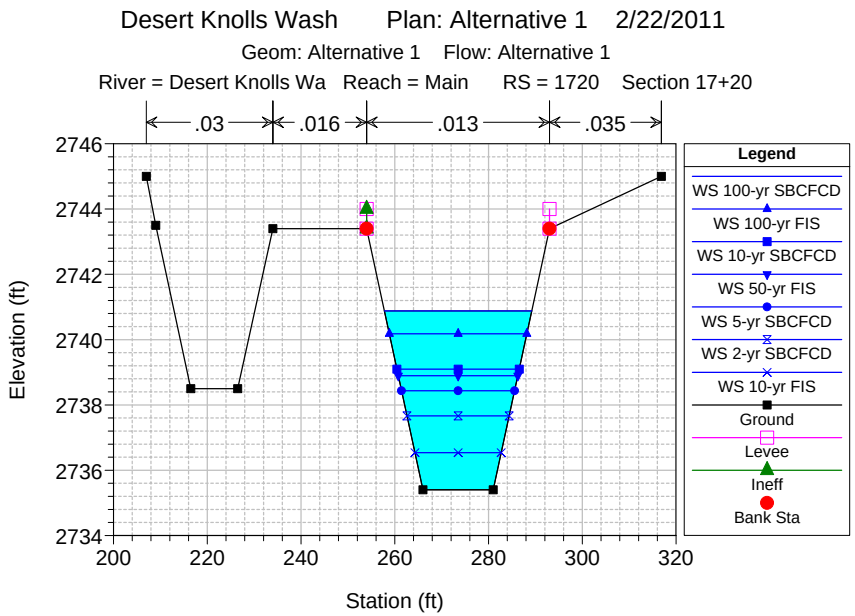

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2300 Section 23+00
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 10-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

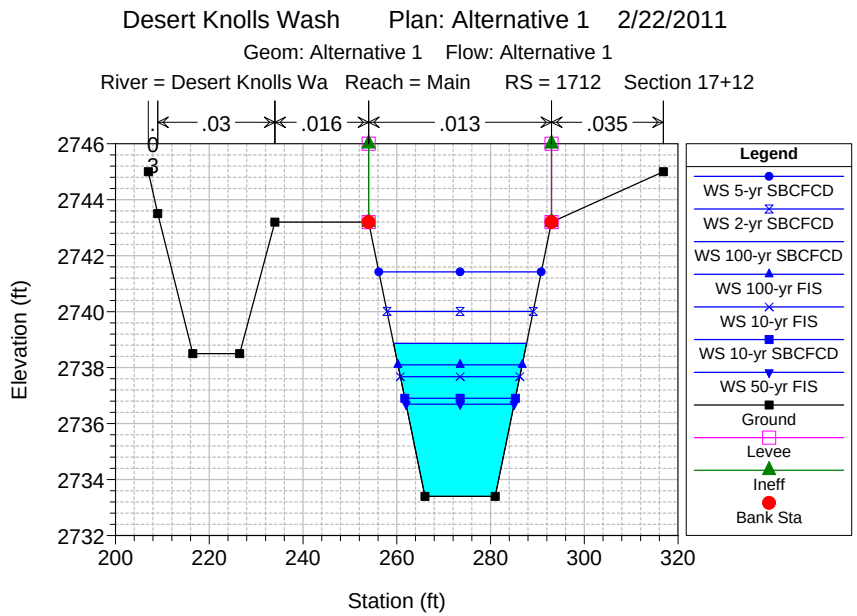

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 2260.4 Section 22+60.4
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

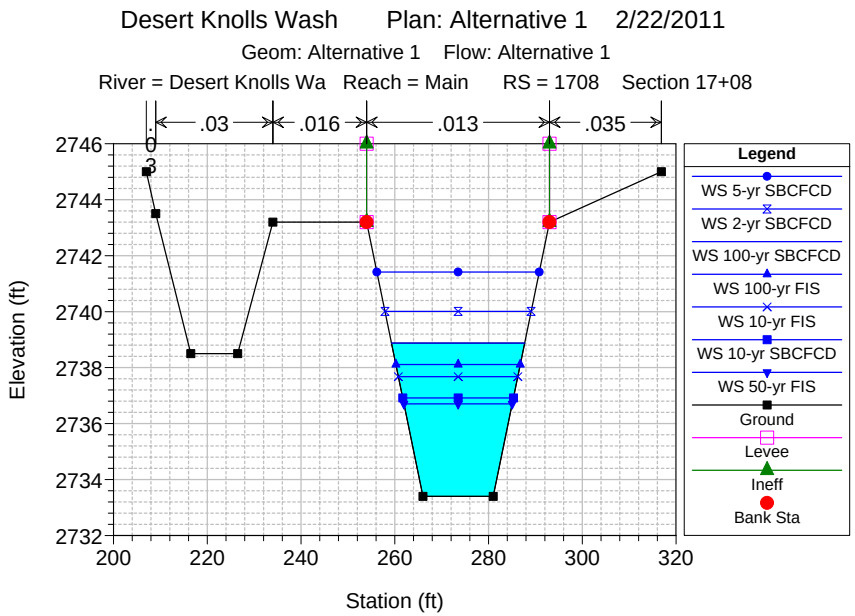

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 1986.6 Section 19+86.6
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

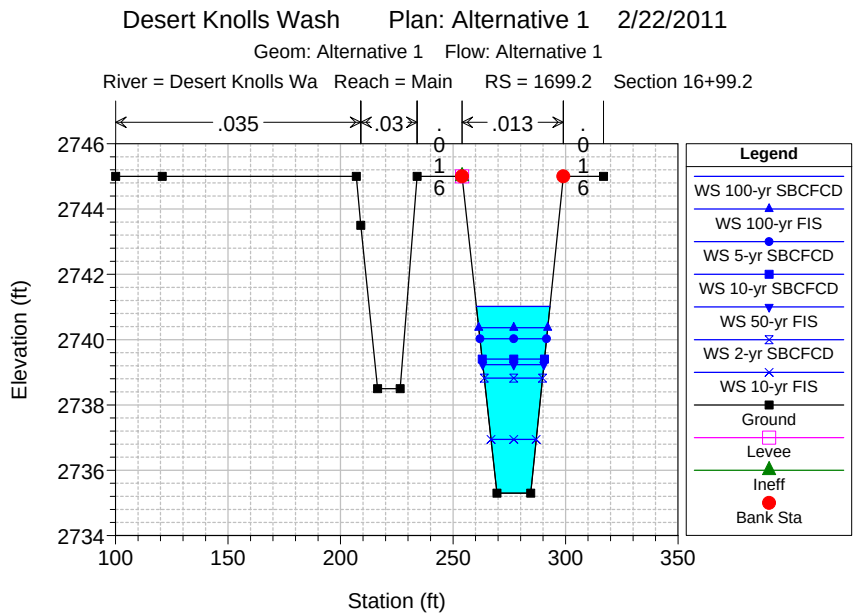

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 1910 Section 19+10
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

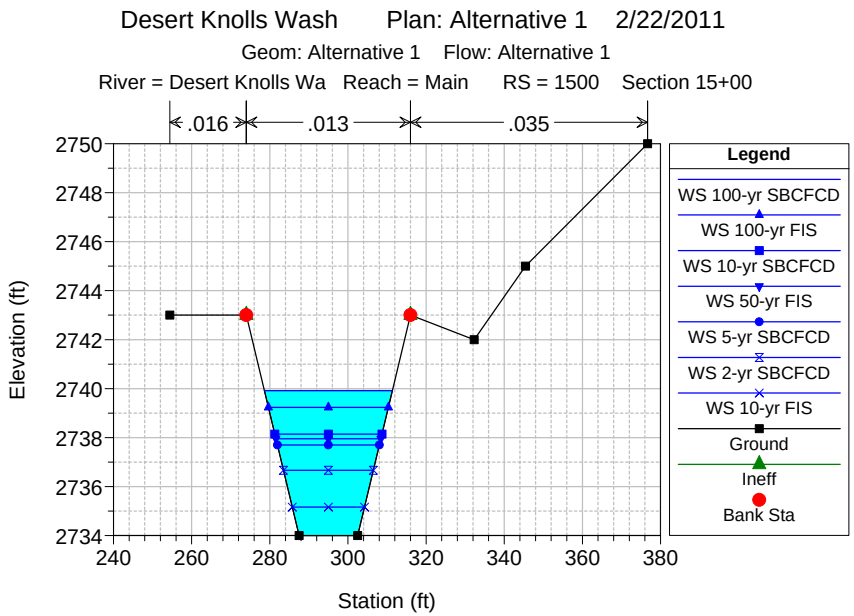

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 1900 Section 19+00
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

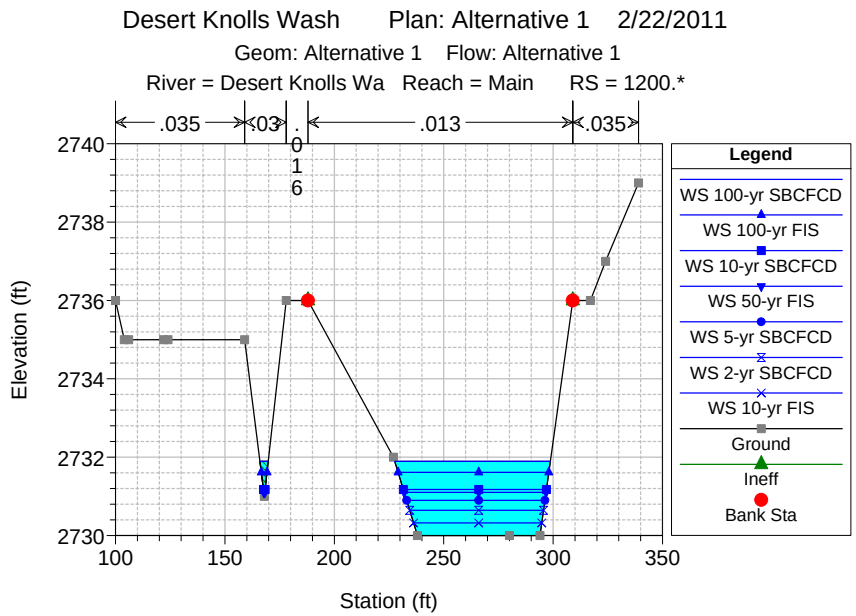

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 1720 Section 17+20
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

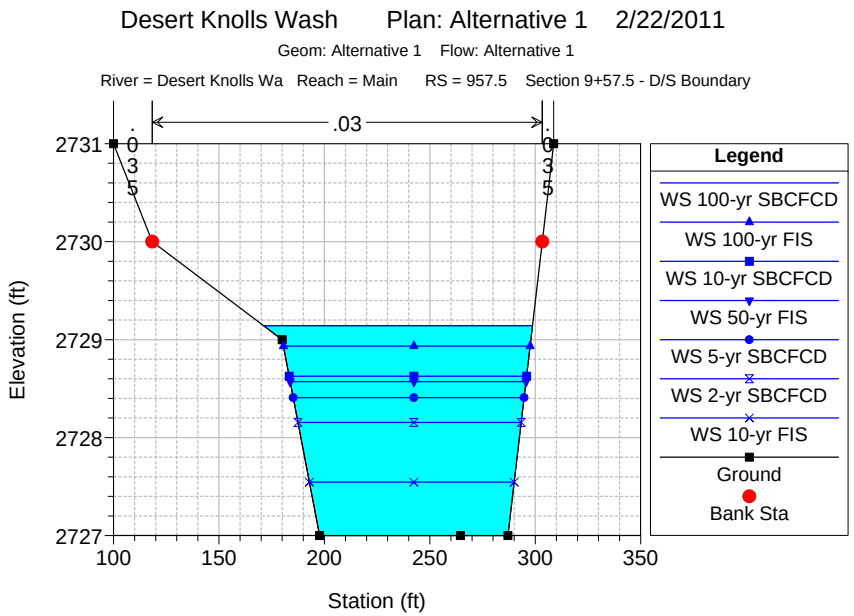

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 1712 Section 17+12
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
Ground
Levee
Ineff
Bank Sta

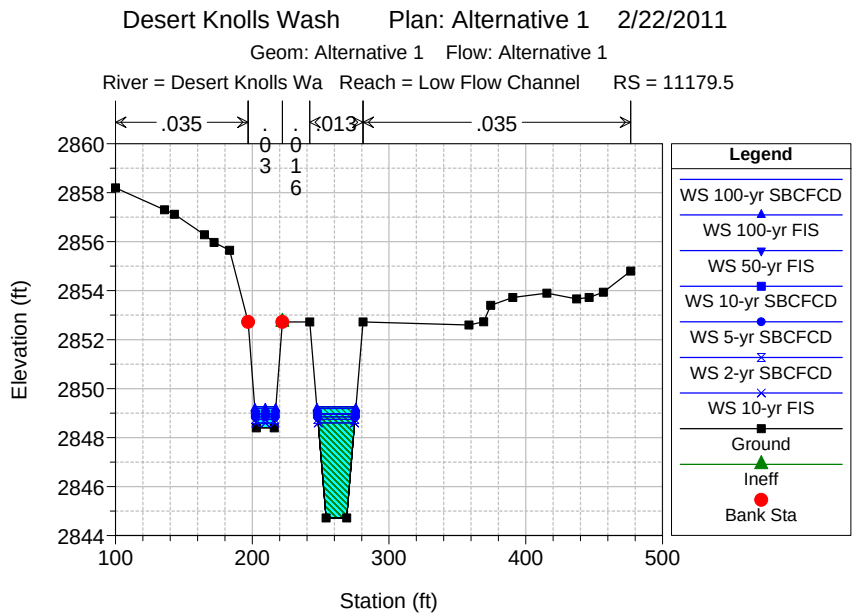

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 1708 Section 17+08
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
Ground
Levee
Ineff
Bank Sta

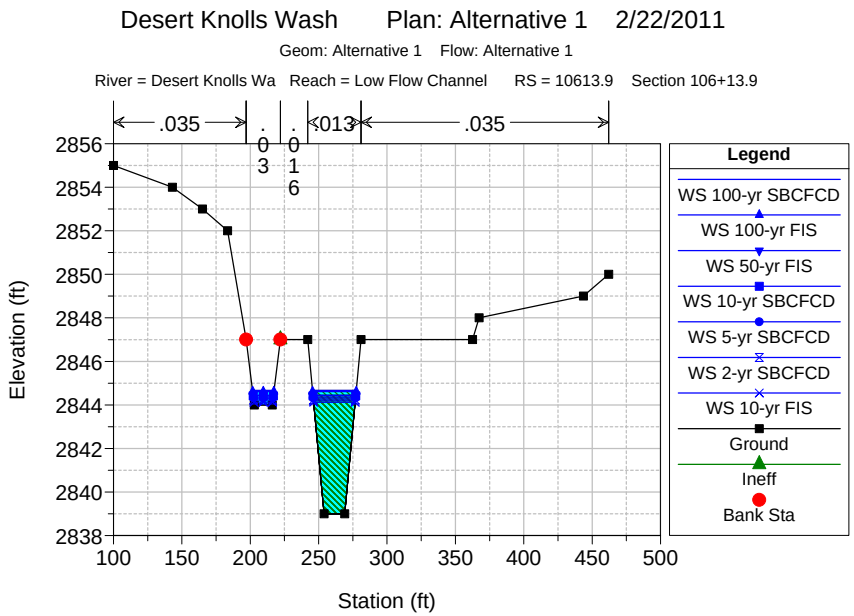

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 1699.2 Section 16+99.2
.035
.03
.016
.013
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 10-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

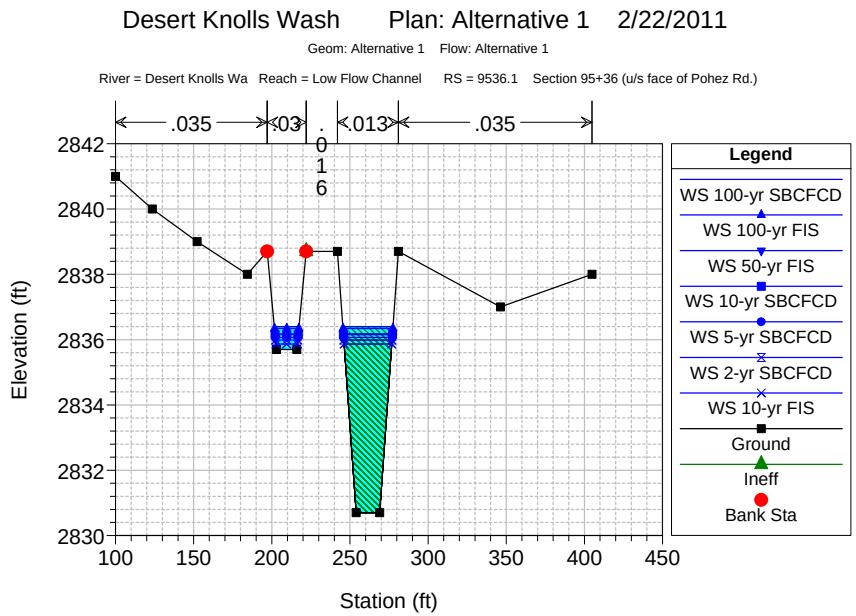

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 1500 Section 15+00
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

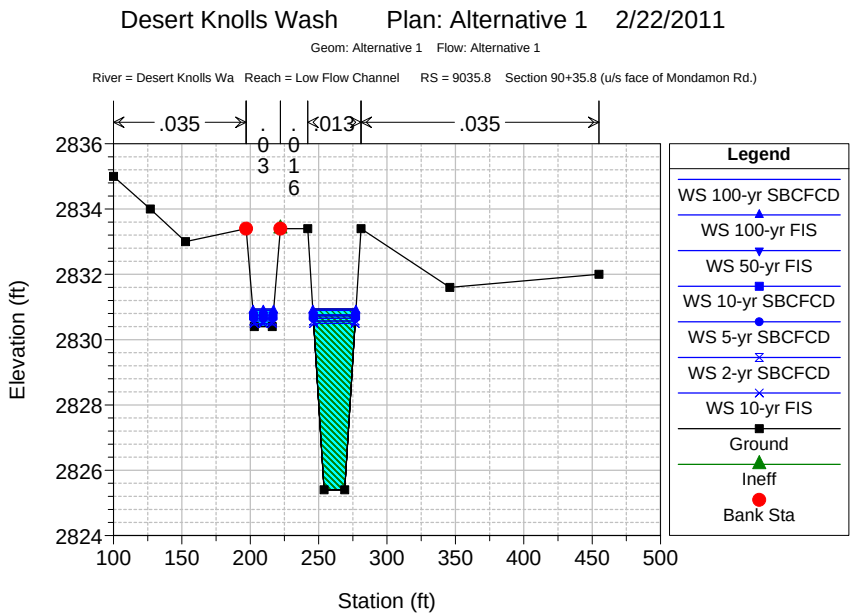

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 1200.*
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

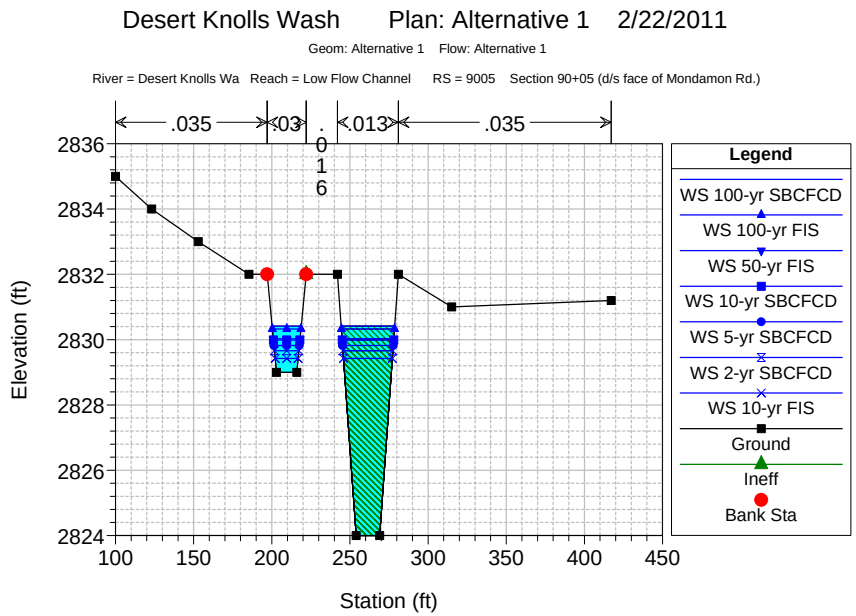

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Main RS = 957.5 Section 9+57.5 - D/S Boundary
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

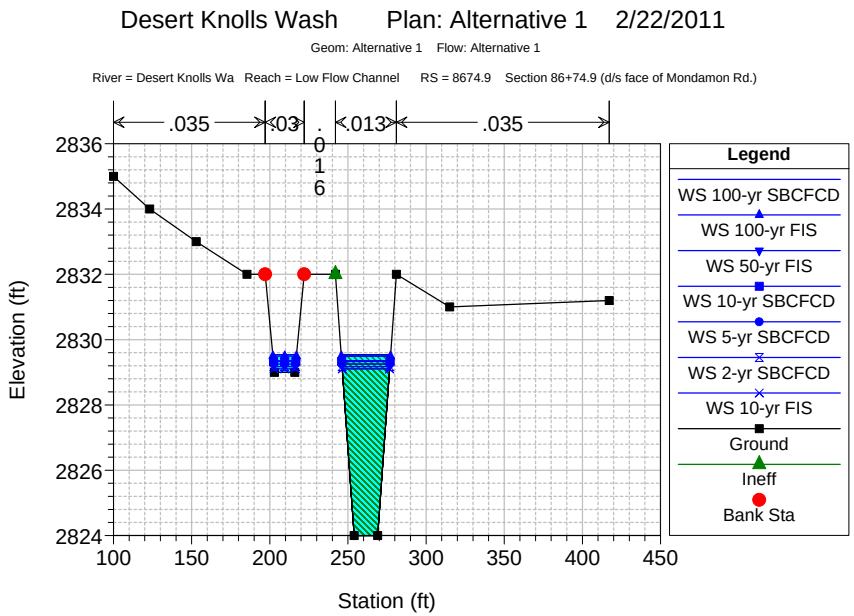

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 11179.5
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

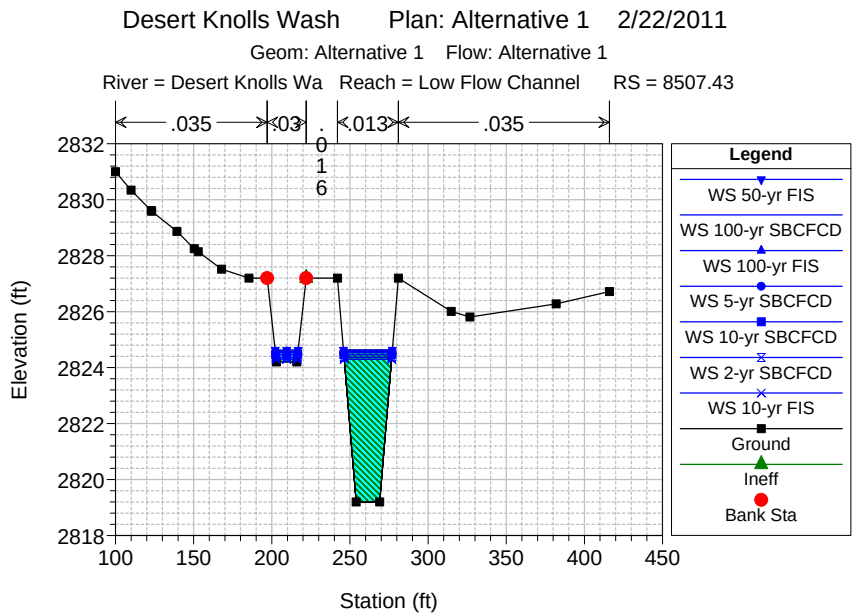

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 10613.9 Section 106+13.9
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

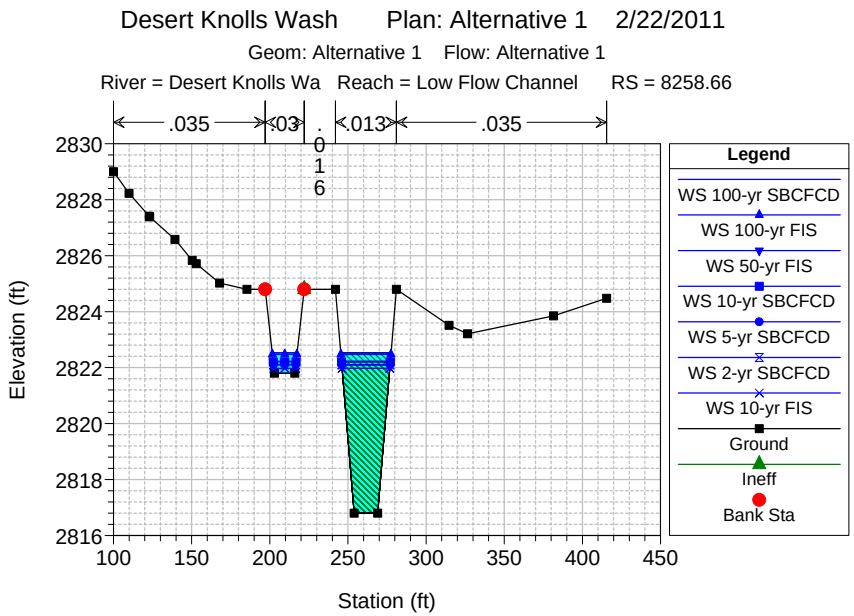

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 9536.1 Section 95+36 (u/s face of Pohez Rd.)
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

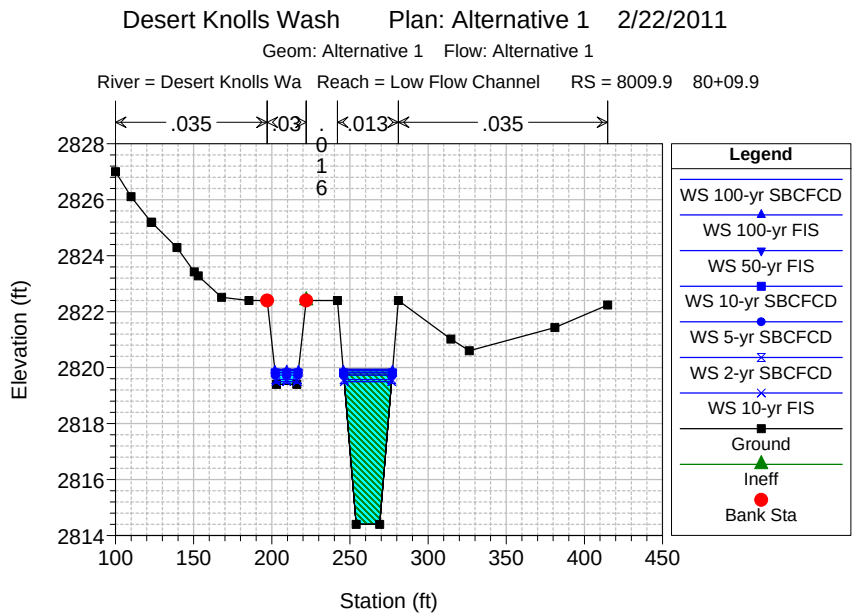

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 9035.8 Section 90+35.8 (u/s face of Mondamon Rd.)
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

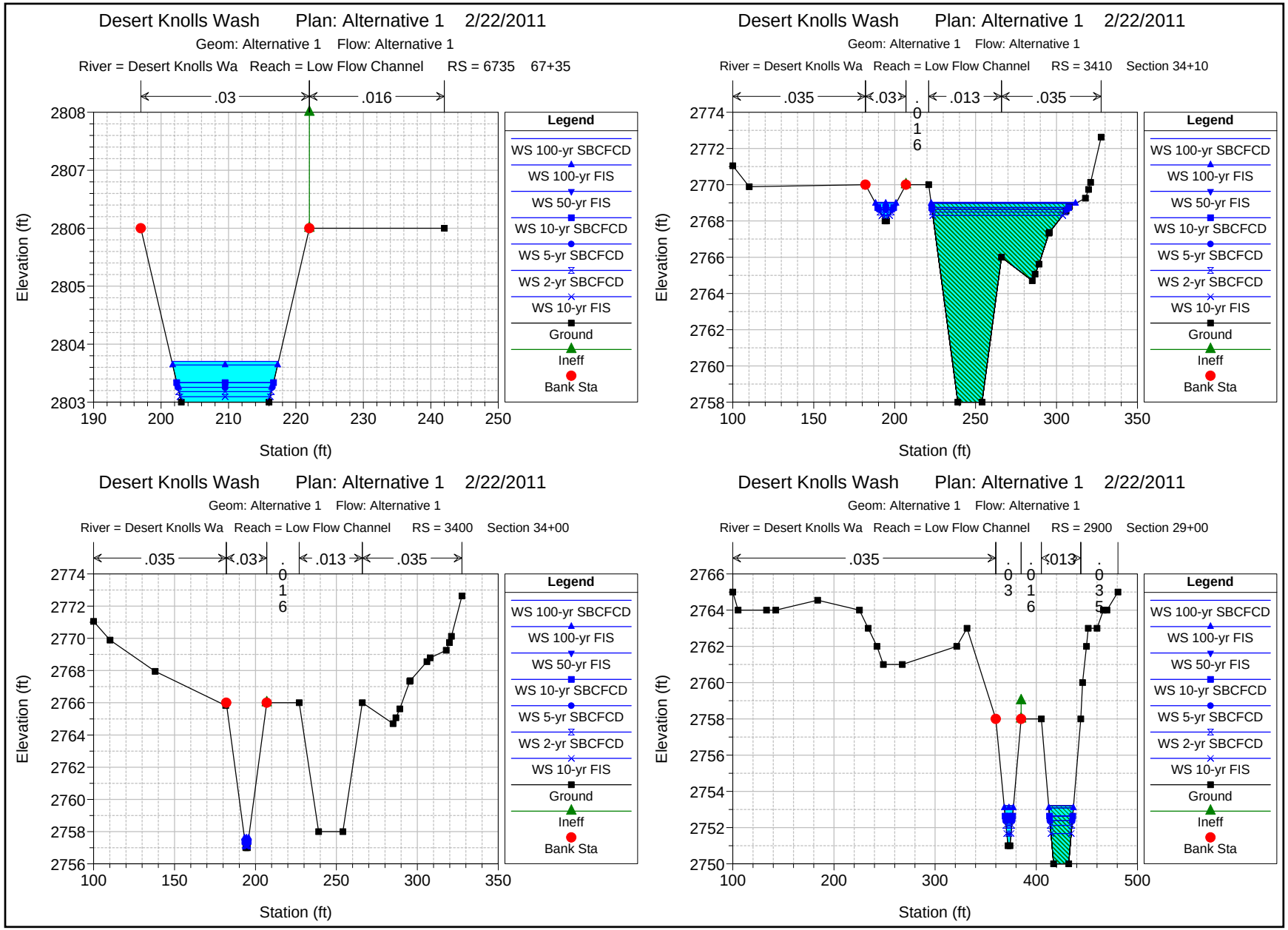

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 9005 Section 90+05 (d/s face of Mondamon Rd.)
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

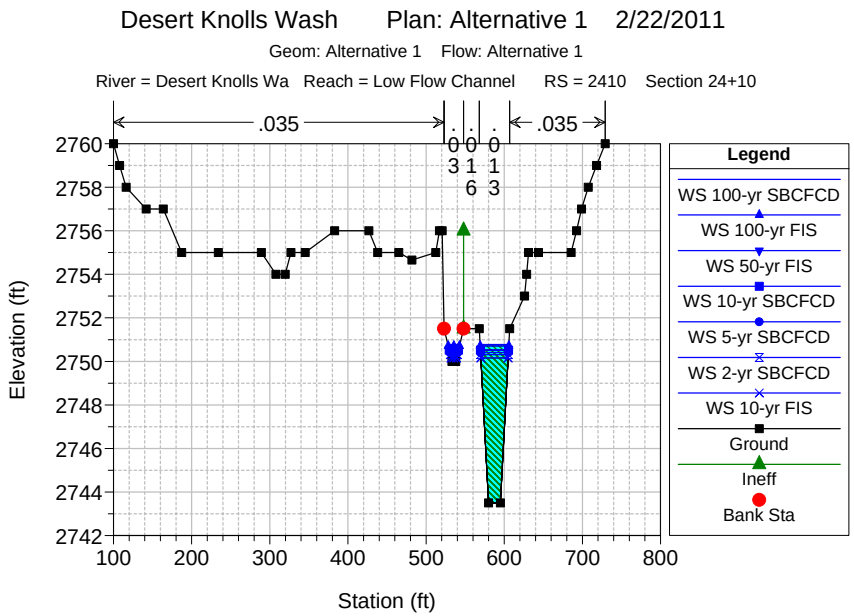

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 8674.9 Section 86+74.9 (d/s face of Mondamon Rd.)
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

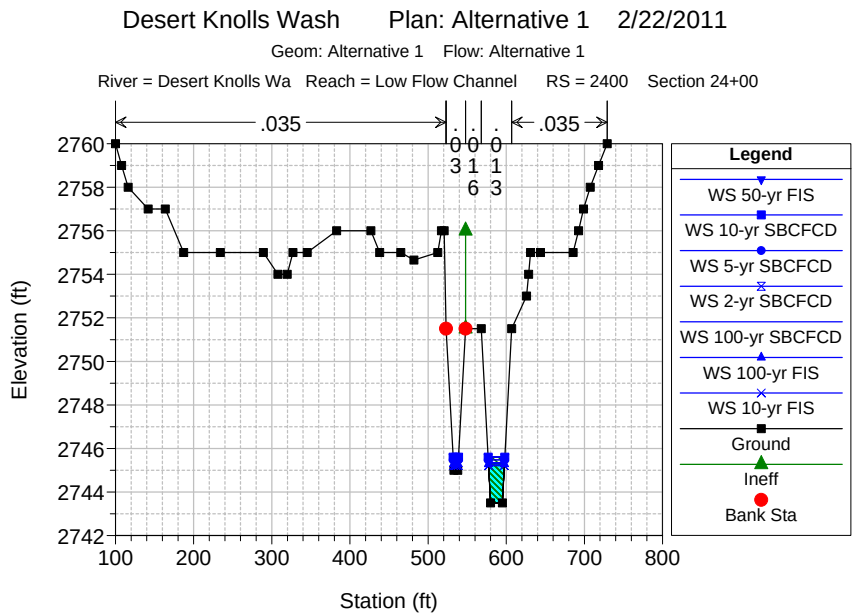

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 8507.43
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 50-yr FIS
WS 100-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 10-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

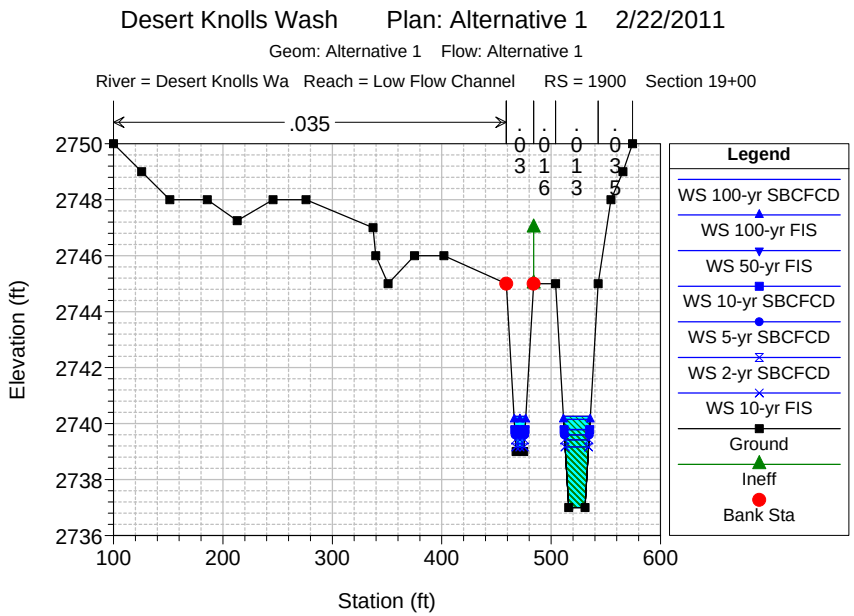

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 8258.66
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

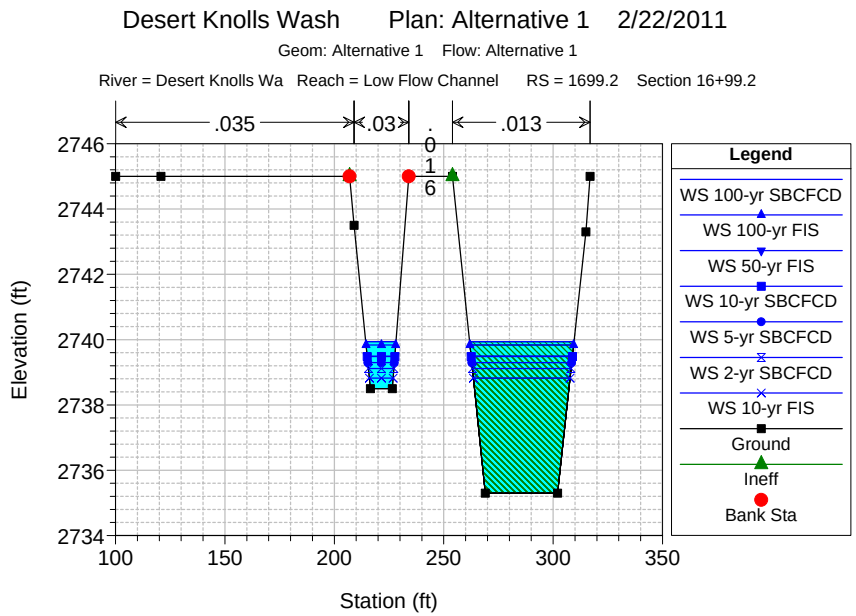

Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 8009.9 80+09.9
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 6735 67+35
.03
.016
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 3410 Section 34+10
.035
.03
.016
.013
.035
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 3400 Section 34+00
.035
.03
.016
.013
.035
Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 2900 Section 29+00
.035
.03
.016
.013
.035
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 2410 Section 24+10
.035
.035
.03
.016
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 2400 Section 24+00
.035
.035
.03
.016
.013
Elevation (ft)
Station (ft)
Legend
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr FIS
Ground
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 1900 Section 19+00
.035
.03
.016
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta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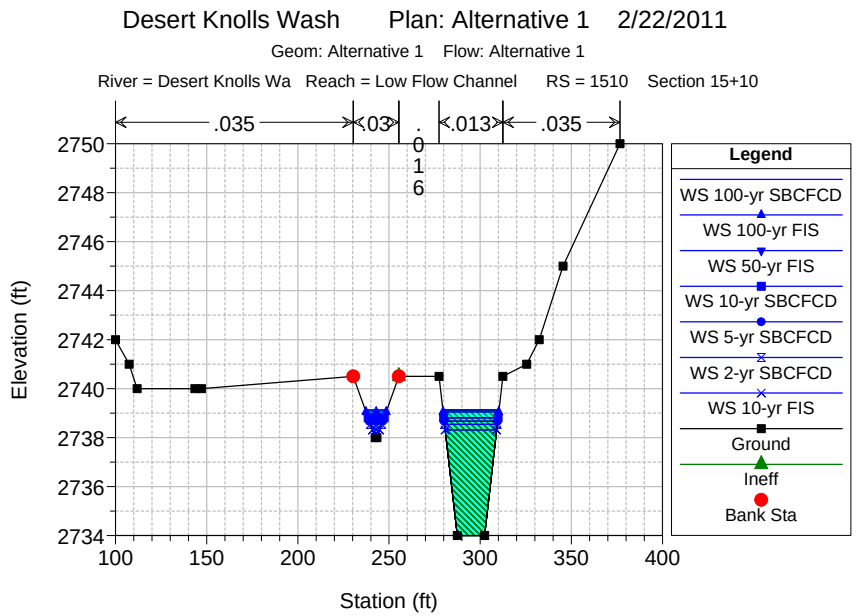
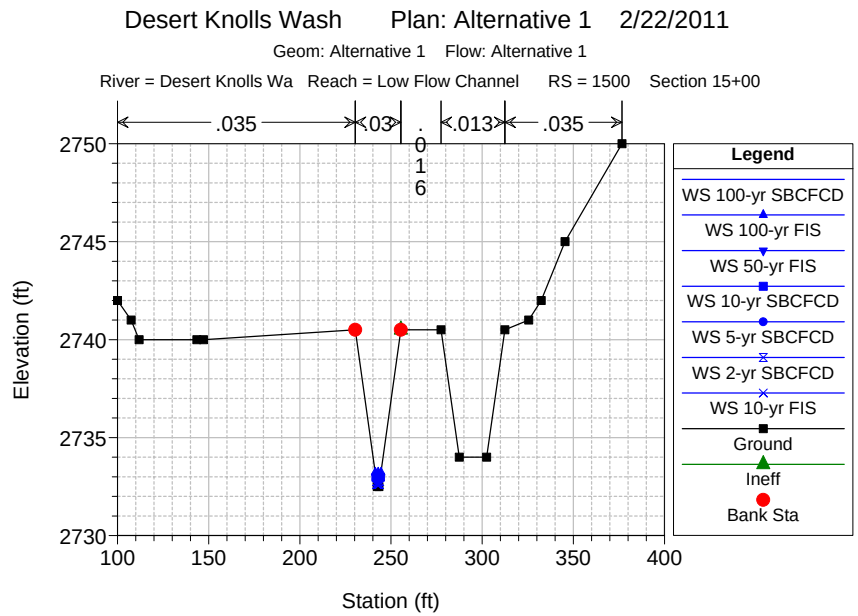
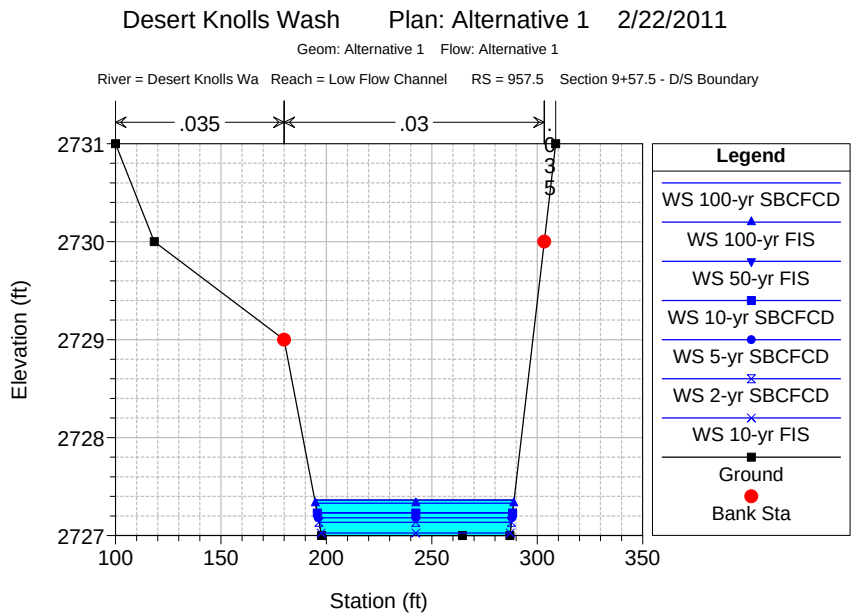
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 1699.2 Section 16+99.2
.035
.03
.016
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 1510 Section 15+10
.035
.03
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 1500 Section 15+00
.035
.03
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 1 2/22/2011
Geom: Alternative 1 Flow: Alternative 1
River = Desert Knolls Wa Reach = Low Flow Channel RS = 957.5 Section 9+57.5 - D/S Boundary
.035
.03
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

```
                    HEC-RAS Version 4.1.0 Jan 2010
                     U.S. Army Corps of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California


          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
          X     X  X        X    X       X   X     X  X    X
          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
          X     X  X        X    X       X   X    X    X        X
          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
```

PROJECT DATA
Project Title: Desert Knolls Wash
Project File : DesertKnollsWash.prj
Run Date and Time: 2/22/2011 11:46:02 AM

Project in English units

Project Description:
Desert Knolls Wash Hydraulic and Sediment Transport Analysis (2010)
San
Bernardino County, California

Stations 41+65 - 102+28 (upstream limit) =
NGV29
Stations 9+57 --> 39+70 = NGVD29

PLAN DATA

Plan Title: Alternative 1
Plan File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.p03

Geometry Title: Alternative 1
Geometry File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.g04

Flow Title : Alternative 1
Flow File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.f04

Plan Summary Information:

Number of:	Cross Sections	= 131	Multiple Openings	=	0
	Culverts	= 8	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	9

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance

Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Alternative 1
Flow File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.f04

Flow Data (cfs)

River	Reach	RS	100-yr SBCFCD	100-yr FIS	50-yr FIS	10-yr FIS	10-yr SBCFCD	5-yr SBCFCD	2-yr SBCFCD
Desert Knolls	WaMain	12028.1	1730	700	500	100	810	550	340
Desert Knolls	WaMain	11462.4*	1960	1700	1000	150	920	620	380
Desert Knolls	WaMain	10613.9	2590	2700	1500	200	1220	820	500
Desert Knolls	WaMain	9515.1	2620	2700	1500	200	1230	830	510
Desert Knolls	WaMain	7738.6	2970	2700	1500	200	1400	930	570
Desert Knolls	WaMain	7231.3	3150	2700	1500	200	1480	990	610
Desert Knolls	WaMain	5609.6	3150	2700	1500	200	1480	990	610
Desert Knolls	WaMain	3969.6	3380	2700	1500	200	1600	1070	650
Desert Knolls	WaMain	1986.6	3480	2700	1500	200	1650	1120	680
Desert Knolls	WaMain	957.5	3480	2700	1500	200	1650	1120	680
Desert Knolls	WaLow Flow Channel	11179.5	30.7	26.7	15.7	2.4	14.4	9.7	6
Desert Knolls	WaLow Flow Channel	9536.1	30.7	26.7	15.7	2.4	14.4	9.7	6
Desert Knolls	WaLow Flow Channel	8258.66	30.7	26.7	15.7	2.4	14.4	9.7	6
Desert Knolls	WaLow Flow Channel	6735	31.1	26.7	14.8	2	14.6	9.8	6
Desert Knolls	WaLow Flow Channel	3400	31.8	27.3	15.2	2	15	10	6.2
Desert Knolls	WaLow Flow Channel	1500	31.8	27.3	15.2	2	15	10	6.2

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Desert Knolls	WaMain	100-yr SBCFCD	Critical	Known WS = 2728
Desert Knolls	WaMain	100-yr FIS	Critical	Known WS = 2728
Desert Knolls	WaMain	50-yr FIS	Critical	Normal S = 0.015
Desert Knolls	WaMain	10-yr FIS	Critical	Normal S = 0.015
Desert Knolls	WaLow Flow Channel	100-yr SBCFCD	Critical	Normal S = 0.0015
Desert Knolls	WaLow Flow Channel	100-yr FIS	Critical	Normal S = 0.0015
Desert Knolls	WaLow Flow Channel	50-yr FIS	Critical	Normal S = 0.0015
Desert Knolls	WaLow Flow Channel	10-yr FIS	Critical	Normal S = 0.0015

GEOMETRY DATA

Geometry Title: Alternative 1
Geometry File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.g04

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 12028.1

INPUT
Description: Section 120+28 (D/S face Tao Road)
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-39	2861.3	-19	2861.3	-7	2853.3	269	2853.3	281	2861.3
301	2861.3	367.14	2861	402.82	2862	430.5	2862	454.73	2861
464.89	2861	498.72	2862						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
-39	.016	-19	.013	281	.016	301	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-19	281	282.84	282.84	282.84	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-39	-19	2862	T
281	498.72	2862	T

Left Levee Station= -19 Elevation= 2862
Right Levee Station= 281 Elevation= 2862

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2859.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.013	
W.S. Elev (ft)	2858.99	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2854.37	Flow Area (sq ft)		1617.41	
E.G. Slope (ft/ft)	0.000009	Area (sq ft)		1617.41	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	293.05	Top Width (ft)		293.05	
Vel Total (ft/s)	1.07	Avg. Vel. (ft/s)		1.07	
Max Chl Dpth (ft)	5.68	Hydr. Depth (ft)		5.52	
Conv. Total (cfs)	572893.7	Conv. (cfs)		572893.7	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		296.50	
Min Ch El (ft)	2853.30	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	498.72	-19.00	281.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.35	45.09	0.34
C & E Loss (ft)	0.15	Cum SA (acres)	0.20	10.31	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2856.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2856.29	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2853.89	Flow Area (sq ft)		839.83	
E.G. Slope (ft/ft)	0.000013	Area (sq ft)		839.83	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	284.98	Top Width (ft)		284.98	
Vel Total (ft/s)	0.83	Avg. Vel. (ft/s)		0.83	
Max Chl Dpth (ft)	2.99	Hydr. Depth (ft)		2.95	
Conv. Total (cfs)	196481.9	Conv. (cfs)		196481.9	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		286.80	
Min Ch El (ft)	2853.30	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	498.72	-19.00	281.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.28	39.55	0.27
C & E Loss (ft)	0.05	Cum SA (acres)	0.17	10.08	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2854.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.013	
W.S. Elev (ft)	2854.75	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2853.77	Flow Area (sq ft)		404.16	
E.G. Slope (ft/ft)	0.000072	Area (sq ft)		404.16	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	280.36	Top Width (ft)		280.36	
Vel Total (ft/s)	1.24	Avg. Vel. (ft/s)		1.24	
Max Chl Dpth (ft)	1.45	Hydr. Depth (ft)		1.44	
Conv. Total (cfs)	58829.3	Conv. (cfs)		58829.3	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		281.24	

Min Ch El (ft)	2853.30	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	498.72	-19.00	281.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.13	25.23	0.13
C & E Loss (ft)	0.09	Cum SA (acres)	0.11	9.23	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2853.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2853.46	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2853.46	Flow Area (sq ft)		45.05	
E.G. Slope (ft/ft)	0.004239	Area (sq ft)		45.05	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	276.49	Top Width (ft)		276.49	
Vel Total (ft/s)	2.22	Avg. Vel. (ft/s)		2.22	
Max Chl Dpth (ft)	0.16	Hydr. Depth (ft)		0.16	
Conv. Total (cfs)	1535.8	Conv. (cfs)		1535.8	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		276.59	
Min Ch El (ft)	2853.30	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	498.72	-19.00	281.00
Frctn Loss (ft)	0.93	Cum Volume (acre-ft)	0.01	5.83	0.01
C & E Loss (ft)	0.04	Cum SA (acres)	0.03	7.67	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2856.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.013	
W.S. Elev (ft)	2856.09	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2853.94	Flow Area (sq ft)		781.94	
E.G. Slope (ft/ft)	0.000021	Area (sq ft)		781.94	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	284.37	Top Width (ft)		284.37	
Vel Total (ft/s)	1.04	Avg. Vel. (ft/s)		1.04	
Max Chl Dpth (ft)	2.79	Hydr. Depth (ft)		2.75	
Conv. Total (cfs)	174728.2	Conv. (cfs)		174728.2	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		286.06	
Min Ch El (ft)	2853.30	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	498.72	-19.00	281.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	25.29	0.13
C & E Loss (ft)	0.11	Cum SA (acres)	0.11	9.16	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2855.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.013	
W.S. Elev (ft)	2854.99	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2853.79	Flow Area (sq ft)		469.95	

E.G. Slope (ft/ft)	0.000053	Area (sq ft)		469.95		
Q Total (cfs)	550.00	Flow (cfs)		550.00		
Top Width (ft)	281.06	Top Width (ft)		281.06		
Vel Total (ft/s)	1.17	Avg. Vel. (ft/s)		1.17		
Max Chl Dpth (ft)	1.69	Hydr. Depth (ft)		1.67		
Conv. Total (cfs)	75490.2	Conv. (cfs)		75490.2		
Length Wtd. (ft)	282.84	Wetted Per. (ft)		282.08		
Min Ch El (ft)	2853.30	Shear (lb/sq ft)		0.01		
Alpha	1.00	Stream Power (lb/ft s)	498.72	-19.00	281.00	
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.08	19.10	0.08	
C & E Loss (ft)	0.09	Cum SA (acres)	0.08	8.76	0.08	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2854.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2853.99	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2853.67	Flow Area (sq ft)		191.68	
E.G. Slope (ft/ft)	0.000396	Area (sq ft)		191.68	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	278.08	Top Width (ft)		278.08	
Vel Total (ft/s)	1.77	Avg. Vel. (ft/s)		1.77	
Max Chl Dpth (ft)	0.69	Hydr. Depth (ft)		0.69	
Conv. Total (cfs)	17079.4	Conv. (cfs)		17079.4	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		278.49	
Min Ch El (ft)	2853.30	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	498.72	-19.00	281.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.04	12.91	0.04
C & E Loss (ft)	0.07	Cum SA (acres)	0.06	8.31	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11745.2*

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2861.4	135.8	2860.43	143.02	2860.24	165.01	2859.56	172.11	2859.32
183.37	2859.31	197	2858.44	203	2852.8	216	2852.8	222	2858.44
242	2858.44	254	2850.44	269	2850.44	281	2858.44	301	2858.44
364.24	2858.2	375.79	2858.47	381.31	2858.8	398.72	2859.24	425.47	2859.3
448.88	2858.55	458.7	2858.57	469.91	2858.87	491.39	2859.6		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.016	301	.035
491.39	.035								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	90.2	90.2	90.2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent

```
     100     242  2860.5       T
     281  491.39  2860.5       T
Left Levee      Station=     242      Elevation=  2860.5
Right Levee     Station=     281      Elevation=  2860.5
```

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2858.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.55	Wt. n-Val.		0.013	
W.S. Elev (ft)	2857.29	Reach Len. (ft)	90.20	90.20	90.20
Crit W.S. (ft)	2856.49	Flow Area (sq ft)		173.16	
E.G. Slope (ft/ft)	0.001072	Area (sq ft)		173.16	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	35.55	Top Width (ft)		35.55	
Vel Total (ft/s)	9.99	Avg. Vel. (ft/s)		9.99	
Max Chl Dpth (ft)	6.85	Hydr. Depth (ft)		4.87	
Conv. Total (cfs)	52837.7	Conv. (cfs)		52837.7	
Length Wtd. (ft)	90.20	Wetted Per. (ft)		39.70	
Min Ch El (ft)	2850.44	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)	491.39	242.00	281.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.35	39.27	0.34
C & E Loss (ft)	0.07	Cum SA (acres)	0.20	9.25	0.17

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2856.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.013	
W.S. Elev (ft)	2855.73	Reach Len. (ft)	90.20	90.20	90.20
Crit W.S. (ft)	2854.05	Flow Area (sq ft)		121.19	
E.G. Slope (ft/ft)	0.000470	Area (sq ft)		121.19	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	30.86	Top Width (ft)		30.86	
Vel Total (ft/s)	5.78	Avg. Vel. (ft/s)		5.78	
Max Chl Dpth (ft)	5.29	Hydr. Depth (ft)		3.93	
Conv. Total (cfs)	32287.2	Conv. (cfs)		32287.2	
Length Wtd. (ft)	90.20	Wetted Per. (ft)		34.06	
Min Ch El (ft)	2850.44	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	491.39	242.00	281.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.28	36.43	0.27
C & E Loss (ft)	0.03	Cum SA (acres)	0.17	9.06	0.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2854.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.		0.013	
W.S. Elev (ft)	2853.74	Reach Len. (ft)	90.20	90.20	90.20
Crit W.S. (ft)	2853.39	Flow Area (sq ft)		65.79	
E.G. Slope (ft/ft)	0.001341	Area (sq ft)		65.79	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	24.90	Top Width (ft)		24.90	
Vel Total (ft/s)	7.60	Avg. Vel. (ft/s)		7.60	
Max Chl Dpth (ft)	3.30	Hydr. Depth (ft)		2.64	
Conv. Total (cfs)	13654.4	Conv. (cfs)		13654.4	
Length Wtd. (ft)	90.20	Wetted Per. (ft)		26.89	
Min Ch El (ft)	2850.44	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	491.39	242.00	281.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.13	23.70	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	8.24	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2852.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.		0.013	
W.S. Elev (ft)	2851.30	Reach Len. (ft)	90.20	90.20	90.20
Crit W.S. (ft)	2851.51	Flow Area (sq ft)		13.93	
E.G. Slope (ft/ft)	0.005592	Area (sq ft)		13.93	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	17.57	Top Width (ft)		17.57	
Vel Total (ft/s)	7.18	Avg. Vel. (ft/s)		7.18	
Max Chl Dpth (ft)	0.86	Hydr. Depth (ft)		0.79	
Conv. Total (cfs)	1337.3	Conv. (cfs)		1337.3	
Length Wtd. (ft)	90.20	Wetted Per. (ft)		18.08	
Min Ch El (ft)	2850.44	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)	491.39	242.00	281.00
Frctn Loss (ft)	1.37	Cum Volume (acre-ft)	0.01	5.64	0.01
C & E Loss (ft)	0.07	Cum SA (acres)	0.03	6.71	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2855.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.013	
W.S. Elev (ft)	2854.87	Reach Len. (ft)	90.20	90.20	90.20
Crit W.S. (ft)	2854.37	Flow Area (sq ft)		96.00	
E.G. Slope (ft/ft)	0.001206	Area (sq ft)		96.00	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	28.30	Top Width (ft)		28.30	
Vel Total (ft/s)	8.44	Avg. Vel. (ft/s)		8.44	
Max Chl Dpth (ft)	4.43	Hydr. Depth (ft)		3.39	
Conv. Total (cfs)	23320.4	Conv. (cfs)		23320.4	
Length Wtd. (ft)	90.20	Wetted Per. (ft)		30.99	
Min Ch El (ft)	2850.44	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	491.39	242.00	281.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.13	22.44	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	8.15	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2854.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.93	Wt. n-Val.		0.013	
W.S. Elev (ft)	2853.94	Reach Len. (ft)	90.20	90.20	90.20
Crit W.S. (ft)	2853.55	Flow Area (sq ft)		70.92	
E.G. Slope (ft/ft)	0.001310	Area (sq ft)		70.92	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	25.51	Top Width (ft)		25.51	
Vel Total (ft/s)	7.76	Avg. Vel. (ft/s)		7.76	
Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)		2.78	
Conv. Total (cfs)	15197.7	Conv. (cfs)		15197.7	
Length Wtd. (ft)	90.20	Wetted Per. (ft)		27.63	
Min Ch El (ft)	2850.44	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	491.39	242.00	281.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.08	17.35	0.08
C & E Loss (ft)	0.07	Cum SA (acres)	0.08	7.76	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2853.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.77	Wt. n-Val.		0.013	
W.S. Elev (ft)	2853.01	Reach Len. (ft)	90.20	90.20	90.20
Crit W.S. (ft)	2852.75	Flow Area (sq ft)		48.43	
E.G. Slope (ft/ft)	0.001501	Area (sq ft)		48.43	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	22.71	Top Width (ft)		22.71	
Vel Total (ft/s)	7.02	Avg. Vel. (ft/s)		7.02	
Max Chl Dpth (ft)	2.57	Hydr. Depth (ft)		2.13	
Conv. Total (cfs)	8774.8	Conv. (cfs)		8774.8	
Length Wtd. (ft)	90.20	Wetted Per. (ft)		24.26	
Min Ch El (ft)	2850.44	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	491.39	242.00	281.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.04	12.13	0.04
C & E Loss (ft)	0.07	Cum SA (acres)	0.06	7.34	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11655

INPUT
Description: 116+35 Chute (U/S)
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
222	2858.1	242	2858.1	254	2850.1	269	2850.1	281	2858.1
301	2858.1	364.24	2858.2	375.79	2858.47	381.31	2858.8	398.72	2859.24

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
222	.016	242	.013	281	.016	301	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	8	8	8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
222	242	2861	T
281	398.72	2861	T

Left Levee Station= 242 Elevation= 2861
Right Levee Station= 281 Elevation= 2861

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2858.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.31	Wt. n-Val.		0.013	
W.S. Elev (ft)	2857.37	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2856.15	Flow Area (sq ft)		188.24	
E.G. Slope (ft/ft)	0.000853	Area (sq ft)		188.24	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	36.80	Top Width (ft)		36.80	
Vel Total (ft/s)	9.19	Avg. Vel. (ft/s)		9.19	
Max Chl Dpth (ft)	7.27	Hydr. Depth (ft)		5.11	
Conv. Total (cfs)	59240.1	Conv. (cfs)		59240.1	

Length Wtd. (ft)	8.00	Wetted Per. (ft)		41.20	
Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.35	38.90	0.34
C & E Loss (ft)	0.18	Cum SA (acres)	0.20	9.17	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2856.18	Element			
Vel Head (ft)	0.43	Wt. n-Val.		0.013	
W.S. Elev (ft)	2855.75	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2853.70	Flow Area (sq ft)		132.54	
E.G. Slope (ft/ft)	0.000367	Area (sq ft)		132.54	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	31.94	Top Width (ft)		31.94	
Vel Total (ft/s)	5.28	Avg. Vel. (ft/s)		5.28	
Max Chl Dpth (ft)	5.65	Hydr. Depth (ft)		4.15	
Conv. Total (cfs)	36557.0	Conv. (cfs)		36557.0	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		35.36	
Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.28	36.17	0.27
C & E Loss (ft)	0.06	Cum SA (acres)	0.17	8.99	0.15

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2854.47	Element			
Vel Head (ft)	0.67	Wt. n-Val.		0.013	
W.S. Elev (ft)	2853.80	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2853.04	Flow Area (sq ft)		75.96	
E.G. Slope (ft/ft)	0.000890	Area (sq ft)		75.96	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	26.09	Top Width (ft)		26.09	
Vel Total (ft/s)	6.58	Avg. Vel. (ft/s)		6.58	
Max Chl Dpth (ft)	3.70	Hydr. Depth (ft)		2.91	
Conv. Total (cfs)	16756.1	Conv. (cfs)		16756.1	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		28.33	
Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	23.56	0.13
C & E Loss (ft)	0.13	Cum SA (acres)	0.11	8.19	0.10

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2851.78	Element			
Vel Head (ft)	0.26	Wt. n-Val.		0.013	
W.S. Elev (ft)	2851.52	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2851.17	Flow Area (sq ft)		24.26	
E.G. Slope (ft/ft)	0.001013	Area (sq ft)		24.26	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	19.25	Top Width (ft)		19.25	
Vel Total (ft/s)	4.12	Avg. Vel. (ft/s)		4.12	

Max Chl Dpth (ft)	1.42	Hydr. Depth (ft)		1.26	
Conv. Total (cfs)	3142.1	Conv. (cfs)		3142.1	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		20.11	
Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	5.60	0.01
C & E Loss (ft)	0.07	Cum SA (acres)	0.03	6.67	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2855.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.88	Wt. n-Val.		0.013	
W.S. Elev (ft)	2854.94	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2854.03	Flow Area (sq ft)		107.79	
E.G. Slope (ft/ft)	0.000872	Area (sq ft)		107.79	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	29.53	Top Width (ft)		29.53	
Vel Total (ft/s)	7.51	Avg. Vel. (ft/s)		7.51	
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)		3.65	
Conv. Total (cfs)	27425.2	Conv. (cfs)		27425.2	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		32.46	
Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	22.22	0.13
C & E Loss (ft)	0.15	Cum SA (acres)	0.11	8.09	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2854.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.71	Wt. n-Val.		0.013	
W.S. Elev (ft)	2854.00	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2853.21	Flow Area (sq ft)		81.37	
E.G. Slope (ft/ft)	0.000886	Area (sq ft)		81.37	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	26.71	Top Width (ft)		26.71	
Vel Total (ft/s)	6.76	Avg. Vel. (ft/s)		6.76	
Max Chl Dpth (ft)	3.90	Hydr. Depth (ft)		3.05	
Conv. Total (cfs)	18473.4	Conv. (cfs)		18473.4	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		29.07	
Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	17.19	0.08
C & E Loss (ft)	0.14	Cum SA (acres)	0.08	7.71	0.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2853.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.		0.013	
W.S. Elev (ft)	2853.06	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2852.41	Flow Area (sq ft)		57.56	
E.G. Slope (ft/ft)	0.000910	Area (sq ft)		57.56	

Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	23.88	Top Width (ft)		23.88	
Vel Total (ft/s)	5.91	Avg. Vel. (ft/s)		5.91	
Max Chl Dpth (ft)	2.96	Hydr. Depth (ft)		2.41	
Conv. Total (cfs)	11269.4	Conv. (cfs)		11269.4	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		25.67	
Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	12.02	0.04
C & E Loss (ft)	0.12	Cum SA (acres)	0.06	7.29	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11647

INPUT
Description: 116+43 Chute (sag)
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
222	2858.1	242	2858.1	254	2848.2	269	2848.2	281	2858.1
301	2858.1	364.24	2858.2	375.79	2858.47	381.31	2858.8	398.72	2859.24

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
222	.016	242	.013	281	.016	301	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	4	4	4	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
222	242	2861	T
281	398.72	2861	T

Left Levee Station= 242 Elevation= 2861
Right Levee Station= 281 Elevation= 2861

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2858.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.72	Wt. n-Val.		0.013	
W.S. Elev (ft)	2857.78	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2854.44	Flow Area (sq ft)		254.86	
E.G. Slope (ft/ft)	0.000350	Area (sq ft)		254.86	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	38.22	Top Width (ft)		38.22	
Vel Total (ft/s)	6.79	Avg. Vel. (ft/s)		6.79	
Max Chl Dpth (ft)	9.58	Hydr. Depth (ft)		6.67	
Conv. Total (cfs)	92420.8	Conv. (cfs)		92420.8	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		45.10	
Min Ch El (ft)	2848.20	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.35	38.86	0.34
C & E Loss (ft)	0.00	Cum SA (acres)	0.20	9.16	0.17

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2856.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.013	
W.S. Elev (ft)	2855.90	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2851.89	Flow Area (sq ft)		187.26	
E.G. Slope (ft/ft)	0.000133	Area (sq ft)		187.26	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	33.66	Top Width (ft)		33.66	
Vel Total (ft/s)	3.74	Avg. Vel. (ft/s)		3.74	
Max Chl Dpth (ft)	7.70	Hydr. Depth (ft)		5.56	
Conv. Total (cfs)	60721.2	Conv. (cfs)		60721.2	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		39.19	
Min Ch El (ft)	2848.20	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.28	36.14	0.27
C & E Loss (ft)	0.00	Cum SA (acres)	0.17	8.99	0.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2854.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2854.11	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2851.20	Flow Area (sq ft)		130.89	
E.G. Slope (ft/ft)	0.000182	Area (sq ft)		130.89	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	29.32	Top Width (ft)		29.32	
Vel Total (ft/s)	3.82	Avg. Vel. (ft/s)		3.82	
Max Chl Dpth (ft)	5.91	Hydr. Depth (ft)		4.46	
Conv. Total (cfs)	37067.3	Conv. (cfs)		37067.3	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		33.56	
Min Ch El (ft)	2848.20	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	23.54	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	8.18	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2851.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.013	
W.S. Elev (ft)	2851.67	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2849.28	Flow Area (sq ft)		66.74	
E.G. Slope (ft/ft)	0.000049	Area (sq ft)		66.74	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	23.42	Top Width (ft)		23.42	
Vel Total (ft/s)	1.50	Avg. Vel. (ft/s)		1.50	
Max Chl Dpth (ft)	3.47	Hydr. Depth (ft)		2.85	
Conv. Total (cfs)	14332.0	Conv. (cfs)		14332.0	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		25.92	
Min Ch El (ft)	2848.20	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	5.59	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	6.67	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2855.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.013	
W.S. Elev (ft)	2855.30	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2852.22	Flow Area (sq ft)		167.55	
E.G. Slope (ft/ft)	0.000241	Area (sq ft)		167.55	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	32.21	Top Width (ft)		32.21	
Vel Total (ft/s)	4.83	Avg. Vel. (ft/s)		4.83	
Max Chl Dpth (ft)	7.10	Hydr. Depth (ft)		5.20	
Conv. Total (cfs)	52130.2	Conv. (cfs)		52130.2	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		37.31	
Min Ch El (ft)	2848.20	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	22.20	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	8.08	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2854.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.013	
W.S. Elev (ft)	2854.32	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2851.38	Flow Area (sq ft)		137.23	
E.G. Slope (ft/ft)	0.000193	Area (sq ft)		137.23	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	29.84	Top Width (ft)		29.84	
Vel Total (ft/s)	4.01	Avg. Vel. (ft/s)		4.01	
Max Chl Dpth (ft)	6.12	Hydr. Depth (ft)		4.60	
Conv. Total (cfs)	39580.1	Conv. (cfs)		39580.1	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		34.24	
Min Ch El (ft)	2848.20	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	17.17	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	7.70	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2853.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.013	
W.S. Elev (ft)	2853.33	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2850.57	Flow Area (sq ft)		108.89	
E.G. Slope (ft/ft)	0.000141	Area (sq ft)		108.89	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	27.44	Top Width (ft)		27.44	
Vel Total (ft/s)	3.12	Avg. Vel. (ft/s)		3.12	
Max Chl Dpth (ft)	5.13	Hydr. Depth (ft)		3.97	
Conv. Total (cfs)	28682.8	Conv. (cfs)		28682.8	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		31.13	
Min Ch El (ft)	2848.20	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	12.01	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	7.29	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

```
LATERAL STRUCTURE


RIVER: Desert Knolls Wa
REACH: Main               RS: 11645

INPUT
Description: 116+45 Chute #5
Lateral structure position     = Left overbank
Distance from Upstream XS =
Deck/Roadway Width        =      20
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =        4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2858.1       4  2858.1      12  2858.1   184.6 2855.58

Weir crest shape                           = Broad Crested


Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                       411     .013     .013        0                   .5                1
Upstream   Elevation =  2848.2
           Centerline Station =  2
Downstream Elevation =  2846
           Centerline Station =  2

LATERAL STRUCTURE OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2858.49    Weir Sta US (ft)
  W.S. US. (ft)                2857.78    Weir Sta DS (ft)
  E.G. DS (ft)                 2857.55    Min El Weir Flow (ft)        2855.58
  W.S. DS (ft)                 2852.42    Wr Top Wdth (ft)
  Q US (cfs)                   1730.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          30.74    Weir Avg Depth (ft)
  Q DS (cfs)                   1960.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  1.78    Weir Coef (ft^1/2)             0.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             30.74
  Q Culv (cfs)                   30.74    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              411.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2848.20
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2846.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2856.11    Weir Sta US (ft)
  W.S. US. (ft)                2855.90    Weir Sta DS (ft)
  E.G. DS (ft)                 2855.74    Min El Weir Flow (ft)        2855.58
  W.S. DS (ft)                 2853.58    Wr Top Wdth (ft)
  Q US (cfs)                    700.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          27.67    Weir Avg Depth (ft)
```

Q DS (cfs)	1700.00	Weir Flow Area (sq ft)	
Perc Q Leaving	3.95	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	27.67
Q Culv (cfs)	27.67	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	411.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2848.20
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2846.00
Breach Flow Area (sq ft)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

LATERAL STRUCTURE OUTPUT Profile #50-yr FIS Culv Group: Culvert #1

E.G. US. (ft)	2854.33	Weir Sta US (ft)	
W.S. US. (ft)	2854.11	Weir Sta DS (ft)	
E.G. DS (ft)	2853.75	Min El Weir Flow (ft)	2855.58
W.S. DS (ft)	2851.66	Wr Top Wdth (ft)	
Q US (cfs)	500.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	24.42	Weir Avg Depth (ft)	
Q DS (cfs)	1000.00	Weir Flow Area (sq ft)	
Perc Q Leaving	4.88	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	24.42
Q Culv (cfs)	24.42	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	411.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2848.20
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2846.00
Breach Flow Area (sq ft)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

LATERAL STRUCTURE OUTPUT Profile #10-yr FIS Culv Group: Culvert #1

E.G. US. (ft)	2851.71	Weir Sta US (ft)	
W.S. US. (ft)	2851.67	Weir Sta DS (ft)	
E.G. DS (ft)	2850.44	Min El Weir Flow (ft)	2855.58
W.S. DS (ft)	2848.39	Wr Top Wdth (ft)	
Q US (cfs)	100.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	19.54	Weir Avg Depth (ft)	
Q DS (cfs)	150.00	Weir Flow Area (sq ft)	
Perc Q Leaving	19.54	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	19.54
Q Culv (cfs)	19.54	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	411.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2848.20
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2846.00
Breach Flow Area (sq ft)			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

LATERAL STRUCTURE OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

E.G. US. (ft)	2855.66	Weir Sta US (ft)	
W.S. US. (ft)	2855.30	Weir Sta DS (ft)	
E.G. DS (ft)	2854.67	Min El Weir Flow (ft)	2855.58
W.S. DS (ft)	2850.47	Wr Top Wdth (ft)	
Q US (cfs)	810.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	26.66	Weir Avg Depth (ft)	
Q DS (cfs)	920.00	Weir Flow Area (sq ft)	
Perc Q Leaving	3.29	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	26.66
Q Culv (cfs)	26.66	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	411.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2848.20
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2846.00
Breach Flow Area (sq ft)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

LATERAL STRUCTURE OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

E.G. US. (ft)	2854.57	Weir Sta US (ft)	
W.S. US. (ft)	2854.32	Weir Sta DS (ft)	
E.G. DS (ft)	2853.54	Min El Weir Flow (ft)	2855.58
W.S. DS (ft)	2849.75	Wr Top Wdth (ft)	
Q US (cfs)	550.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	24.88	Weir Avg Depth (ft)	
Q DS (cfs)	620.00	Weir Flow Area (sq ft)	
Perc Q Leaving	4.52	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	24.88
Q Culv (cfs)	24.88	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	411.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2848.20
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2846.00
Breach Flow Area (sq ft)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
 This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.

LATERAL STRUCTURE OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #1

E.G. US. (ft)	2853.48	Weir Sta US (ft)	
W.S. US. (ft)	2853.33	Weir Sta DS (ft)	
E.G. DS (ft)	2852.40	Min El Weir Flow (ft)	2855.58
W.S. DS (ft)	2849.09	Wr Top Wdth (ft)	
Q US (cfs)	340.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	22.94	Weir Avg Depth (ft)	
Q DS (cfs)	380.00	Weir Flow Area (sq ft)	
Perc Q Leaving	6.75	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	22.94
Q Culv (cfs)	22.94	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	411.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2848.20

```
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2846.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate the
         need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 11643

INPUT
Description: 116+43 Chute (sag)
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     222  2858.1     242  2858.1     254  2848.2     269  2848.2     281  2858.1
     301  2858.1  364.24  2858.2  375.79 2858.47  381.31  2858.8  398.72 2859.24

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     222    .016     242    .013     281    .016     301    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     281                8       8       8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     222     242    2861       T
     281  398.72    2861       T
Left Levee      Station=     242      Elevation=    2861
Right Levee     Station=     281      Elevation=    2861

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2858.49    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.72    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2857.78    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2854.44    Flow Area (sq ft)                    254.78
  E.G. Slope (ft/ft)      0.000351    Area (sq ft)                         254.78
  Q Total (cfs)            1730.00    Flow (cfs)                          1730.00
  Top Width (ft)             38.21    Top Width (ft)                        38.21
  Vel Total (ft/s)            6.79    Avg. Vel. (ft/s)                       6.79
  Max Chl Dpth (ft)           9.58    Hydr. Depth (ft)                       6.67
  Conv. Total (cfs)        92379.5    Conv. (cfs)                         92379.5
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      45.09
  Min Ch El (ft)           2848.20    Shear (lb/sq ft)                       0.12
  Alpha                       1.00    Stream Power (lb/ft s)    398.72     242.00     281.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.35      38.83       0.34
  C & E Loss (ft)             0.15    Cum SA (acres)              0.20       9.16       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2856.11    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.22    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2855.90    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2851.89    Flow Area (sq ft)                    187.24
  E.G. Slope (ft/ft)      0.000133    Area (sq ft)                         187.24
```

Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	33.66	Top Width (ft)		33.66	
Vel Total (ft/s)	3.74	Avg. Vel. (ft/s)		3.74	
Max Chl Dpth (ft)	7.70	Hydr. Depth (ft)		5.56	
Conv. Total (cfs)	60713.9	Conv. (cfs)		60713.9	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		39.19	
Min Ch El (ft)	2848.20	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.28	36.12	0.27
C & E Loss (ft)	0.02	Cum SA (acres)	0.17	8.98	0.15

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2854.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2854.11	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2851.20	Flow Area (sq ft)		130.86	
E.G. Slope (ft/ft)	0.000182	Area (sq ft)		130.86	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	29.32	Top Width (ft)		29.32	
Vel Total (ft/s)	3.82	Avg. Vel. (ft/s)		3.82	
Max Chl Dpth (ft)	5.91	Hydr. Depth (ft)		4.46	
Conv. Total (cfs)	37056.0	Conv. (cfs)		37056.0	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		33.56	
Min Ch El (ft)	2848.20	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	23.53	0.13
C & E Loss (ft)	0.10	Cum SA (acres)	0.11	8.18	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2851.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.013	
W.S. Elev (ft)	2851.67	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2849.28	Flow Area (sq ft)		66.74	
E.G. Slope (ft/ft)	0.000049	Area (sq ft)		66.74	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	23.42	Top Width (ft)		23.42	
Vel Total (ft/s)	1.50	Avg. Vel. (ft/s)		1.50	
Max Chl Dpth (ft)	3.47	Hydr. Depth (ft)		2.85	
Conv. Total (cfs)	14330.2	Conv. (cfs)		14330.2	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		25.92	
Min Ch El (ft)	2848.20	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	5.59	0.01
C & E Loss (ft)	0.05	Cum SA (acres)	0.03	6.67	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2855.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.013	
W.S. Elev (ft)	2855.30	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2852.22	Flow Area (sq ft)		167.51	
E.G. Slope (ft/ft)	0.000242	Area (sq ft)		167.51	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	32.21	Top Width (ft)		32.21	
Vel Total (ft/s)	4.84	Avg. Vel. (ft/s)		4.84	
Max Chl Dpth (ft)	7.10	Hydr. Depth (ft)		5.20	
Conv. Total (cfs)	52113.4	Conv. (cfs)		52113.4	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		37.30	
Min Ch El (ft)	2848.20	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	22.18	0.13
C & E Loss (ft)	0.12	Cum SA (acres)	0.11	8.08	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2854.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.013	
W.S. Elev (ft)	2854.32	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2851.38	Flow Area (sq ft)		137.20	
E.G. Slope (ft/ft)	0.000193	Area (sq ft)		137.20	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	29.84	Top Width (ft)		29.84	
Vel Total (ft/s)	4.01	Avg. Vel. (ft/s)		4.01	
Max Chl Dpth (ft)	6.12	Hydr. Depth (ft)		4.60	
Conv. Total (cfs)	39568.4	Conv. (cfs)		39568.4	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		34.23	
Min Ch El (ft)	2848.20	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	17.16	0.08
C & E Loss (ft)	0.10	Cum SA (acres)	0.08	7.70	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2853.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.013	
W.S. Elev (ft)	2853.33	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2850.57	Flow Area (sq ft)		108.88	
E.G. Slope (ft/ft)	0.000141	Area (sq ft)		108.88	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	27.44	Top Width (ft)		27.44	
Vel Total (ft/s)	3.12	Avg. Vel. (ft/s)		3.12	
Max Chl Dpth (ft)	5.13	Hydr. Depth (ft)		3.97	
Conv. Total (cfs)	28677.8	Conv. (cfs)		28677.8	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		31.13	
Min Ch El (ft)	2848.20	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	12.00	0.04
C & E Loss (ft)	0.08	Cum SA (acres)	0.06	7.28	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
         This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
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CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11635

INPUT
Description: 116+35 Chute (D/S)
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
222	2858.1	242	2858.1	254	2850.1	269	2850.1	281	2858.1
301	2858.1	364.24	2858.2	375.79	2858.47	381.31	2858.8	398.72	2859.24

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
222	.016	242	.013	281	.016	301	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	172.6	172.6	172.6	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
222	242	2859.5	T
281	398.72	2859.5	T

Left Levee Station= 242 Elevation= 2859.5
Right Levee Station= 281 Elevation= 2859.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2858.34	Element			
Vel Head (ft)	2.19	Wt. n-Val.		0.013	
W.S. Elev (ft)	2856.15	Reach Len. (ft)	172.60	172.60	172.60
Crit W.S. (ft)	2856.15	Flow Area (sq ft)		145.72	
E.G. Slope (ft/ft)	0.001723	Area (sq ft)		145.72	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	33.16	Top Width (ft)		33.16	
Vel Total (ft/s)	11.87	Avg. Vel. (ft/s)		11.87	
Max Chl Dpth (ft)	6.05	Hydr. Depth (ft)		4.39	
Conv. Total (cfs)	41673.1	Conv. (cfs)		41673.1	
Length Wtd. (ft)	172.60	Wetted Per. (ft)		36.82	
Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	0.35	38.80	0.34
C & E Loss (ft)	0.01	Cum SA (acres)	0.20	9.15	0.17

```
Warning: The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
         for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The
program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
```

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2856.09	Element			
Vel Head (ft)	0.46	Wt. n-Val.		0.013	
W.S. Elev (ft)	2855.63	Reach Len. (ft)	172.60	172.60	172.60
Crit W.S. (ft)	2853.71	Flow Area (sq ft)		128.77	
E.G. Slope (ft/ft)	0.000397	Area (sq ft)		128.77	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	31.58	Top Width (ft)		31.58	

Vel Total (ft/s)	5.44	Avg. Vel. (ft/s)		5.44	
Max Chl Dpth (ft)	5.53	Hydr. Depth (ft)		4.08	
Conv. Total (cfs)	35122.0	Conv. (cfs)		35122.0	
Length Wtd. (ft)	172.60	Wetted Per. (ft)		34.93	
Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.28	36.10	0.27
C & E Loss (ft)	0.17	Cum SA (acres)	0.17	8.98	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2854.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.20	Wt. n-Val.		0.013	
W.S. Elev (ft)	2853.04	Reach Len. (ft)	172.60	172.60	172.60
Crit W.S. (ft)	2853.04	Flow Area (sq ft)		56.95	
E.G. Slope (ft/ft)	0.002029	Area (sq ft)		56.95	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	23.81	Top Width (ft)		23.81	
Vel Total (ft/s)	8.78	Avg. Vel. (ft/s)		8.78	
Max Chl Dpth (ft)	2.94	Hydr. Depth (ft)		2.39	
Conv. Total (cfs)	11098.9	Conv. (cfs)		11098.9	
Length Wtd. (ft)	172.60	Wetted Per. (ft)		25.58	
Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	0.13	23.51	0.13
C & E Loss (ft)	0.05	Cum SA (acres)	0.11	8.17	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2851.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.013	
W.S. Elev (ft)	2851.17	Reach Len. (ft)	172.60	172.60	172.60
Crit W.S. (ft)	2851.17	Flow Area (sq ft)		17.83	
E.G. Slope (ft/ft)	0.002596	Area (sq ft)		17.83	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	18.22	Top Width (ft)		18.22	
Vel Total (ft/s)	5.61	Avg. Vel. (ft/s)		5.61	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		0.98	
Conv. Total (cfs)	1962.5	Conv. (cfs)		1962.5	
Length Wtd. (ft)	172.60	Wetted Per. (ft)		18.87	
Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	0.01	5.58	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	6.66	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2855.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.013	
W.S. Elev (ft)	2854.02	Reach Len. (ft)	172.60	172.60	172.60
Crit W.S. (ft)	2854.02	Flow Area (sq ft)		81.94	
E.G. Slope (ft/ft)	0.001885	Area (sq ft)		81.94	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	26.77	Top Width (ft)		26.77	
Vel Total (ft/s)	9.89	Avg. Vel. (ft/s)		9.89	
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		3.06	
Conv. Total (cfs)	18656.0	Conv. (cfs)		18656.0	
Length Wtd. (ft)	172.60	Wetted Per. (ft)		29.15	
Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.13	22.16	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	8.07	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2854.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.25	Wt. n-Val.		0.013	
W.S. Elev (ft)	2853.21	Reach Len. (ft)	172.60	172.60	172.60
Crit W.S. (ft)	2853.21	Flow Area (sq ft)		61.21	
E.G. Slope (ft/ft)	0.001995	Area (sq ft)		61.21	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	24.34	Top Width (ft)		24.34	
Vel Total (ft/s)	8.98	Avg. Vel. (ft/s)		8.98	
Max Chl Dpth (ft)	3.11	Hydr. Depth (ft)		2.52	
Conv. Total (cfs)	12313.1	Conv. (cfs)		12313.1	
Length Wtd. (ft)	172.60	Wetted Per. (ft)		26.22	
Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	0.08	17.14	0.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.08	7.70	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2853.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.98	Wt. n-Val.		0.013	
W.S. Elev (ft)	2852.42	Reach Len. (ft)	172.60	172.60	172.60
Crit W.S. (ft)	2852.42	Flow Area (sq ft)		42.78	
E.G. Slope (ft/ft)	0.002156	Area (sq ft)		42.78	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	21.95	Top Width (ft)		21.95	
Vel Total (ft/s)	7.95	Avg. Vel. (ft/s)		7.95	
Max Chl Dpth (ft)	2.32	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	7322.5	Conv. (cfs)		7322.5	
Length Wtd. (ft)	172.60	Wetted Per. (ft)		23.35	

Min Ch El (ft)	2850.10	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)	398.72	242.00	281.00
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	0.04	11.98	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.06	7.28	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11462.4*

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2859.8	135.8	2858.87	143.02	2858.68	165.01	2857.92	172.11	2857.65
183.37	2857.48	197	2855.58	203	2850.6	216	2850.6	222	2855.58
242	2855.58	254	2847.58	269	2847.58	281	2855.58	301	2855.58
361.34	2855.4	372.49	2855.6	377.82	2856.1	394.62	2856.48	420.43	2856.6
443.03	2856.1	452.5	2856.15	463.33	2856.41	484.06	2857.2		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.016	301	.035
484.06	.035								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	282.84	282.84	282.84	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2857	T
281	484.06	2857	T

Left Levee Station= 242 Elevation= 2857
Right Levee Station= 281 Elevation= 2857

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2857.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.13	Wt. n-Val.		0.013	
W.S. Elev (ft)	2852.42	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2854.07	Flow Area (sq ft)		107.82	
E.G. Slope (ft/ft)	0.005104	Area (sq ft)		107.82	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	29.53	Top Width (ft)		29.53	
Vel Total (ft/s)	18.18	Avg. Vel. (ft/s)		18.18	
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)		3.65	
Conv. Total (cfs)	27435.5	Conv. (cfs)		27435.5	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		32.46	
Min Ch El (ft)	2847.58	Shear (lb/sq ft)		1.06	
Alpha	1.00	Stream Power (lb/ft s)	484.06	242.00	281.00

Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	0.35	38.30	0.34
C & E Loss (ft)	0.29	Cum SA (acres)	0.20	9.03	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2855.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.17	Wt. n-Val.		0.013	
W.S. Elev (ft)	2853.58	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2853.58	Flow Area (sq ft)		143.96	
E.G. Slope (ft/ft)	0.001721	Area (sq ft)		143.96	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	33.00	Top Width (ft)		33.00	
Vel Total (ft/s)	11.81	Avg. Vel. (ft/s)		11.81	
Max Chl Dpth (ft)	6.00	Hydr. Depth (ft)		4.36	
Conv. Total (cfs)	40979.9	Conv. (cfs)		40979.9	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		36.63	
Min Ch El (ft)	2847.58	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)	484.06	242.00	281.00
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	0.28	35.55	0.27
C & E Loss (ft)	0.00	Cum SA (acres)	0.17	8.85	0.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2853.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2851.66	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2852.03	Flow Area (sq ft)		86.21	
E.G. Slope (ft/ft)	0.002489	Area (sq ft)		86.21	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	27.24	Top Width (ft)		27.24	
Vel Total (ft/s)	11.60	Avg. Vel. (ft/s)		11.60	
Max Chl Dpth (ft)	4.08	Hydr. Depth (ft)		3.16	
Conv. Total (cfs)	20044.7	Conv. (cfs)		20044.7	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		29.72	
Min Ch El (ft)	2847.58	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)	484.06	242.00	281.00
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.13	23.23	0.13
C & E Loss (ft)	0.09	Cum SA (acres)	0.11	8.07	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2850.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2848.39	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2848.98	Flow Area (sq ft)		13.06	
E.G. Slope (ft/ft)	0.015383	Area (sq ft)		13.06	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	17.42	Top Width (ft)		17.42	
Vel Total (ft/s)	11.49	Avg. Vel. (ft/s)		11.49	
Max Chl Dpth (ft)	0.81	Hydr. Depth (ft)		0.75	
Conv. Total (cfs)	1209.4	Conv. (cfs)		1209.4	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		17.90	
Min Ch El (ft)	2847.58	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)	484.06	242.00	281.00
Frctn Loss (ft)	1.07	Cum Volume (acre-ft)	0.01	5.52	0.01
C & E Loss (ft)	0.16	Cum SA (acres)	0.03	6.59	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2854.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.20	Wt. n-Val.		0.013	
W.S. Elev (ft)	2850.47	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2851.81	Flow Area (sq ft)		55.93	
E.G. Slope (ft/ft)	0.007241	Area (sq ft)		55.93	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	23.68	Top Width (ft)		23.68	
Vel Total (ft/s)	16.45	Avg. Vel. (ft/s)		16.45	
Max Chl Dpth (ft)	2.89	Hydr. Depth (ft)		2.36	
Conv. Total (cfs)	10811.7	Conv. (cfs)		10811.7	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		25.43	
Min Ch El (ft)	2847.58	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)	484.06	242.00	281.00
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	0.13	21.89	0.13
C & E Loss (ft)	0.27	Cum SA (acres)	0.11	7.97	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2853.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.79	Wt. n-Val.		0.013	
W.S. Elev (ft)	2849.75	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2850.92	Flow Area (sq ft)		39.69	
E.G. Slope (ft/ft)	0.008938	Area (sq ft)		39.69	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	21.52	Top Width (ft)		21.52	
Vel Total (ft/s)	15.62	Avg. Vel. (ft/s)		15.62	
Max Chl Dpth (ft)	2.17	Hydr. Depth (ft)		1.84	
Conv. Total (cfs)	6558.0	Conv. (cfs)		6558.0	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		22.84	
Min Ch El (ft)	2847.58	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)	484.06	242.00	281.00
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)	0.08	16.94	0.08
C & E Loss (ft)	0.25	Cum SA (acres)	0.08	7.61	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2852.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.32	Wt. n-Val.		0.013	
W.S. Elev (ft)	2849.09	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2850.07	Flow Area (sq ft)		26.00	
E.G. Slope (ft/ft)	0.011851	Area (sq ft)		26.00	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	19.52	Top Width (ft)		19.52	
Vel Total (ft/s)	14.61	Avg. Vel. (ft/s)		14.61	
Max Chl Dpth (ft)	1.51	Hydr. Depth (ft)		1.33	
Conv. Total (cfs)	3490.6	Conv. (cfs)		3490.6	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		20.43	
Min Ch El (ft)	2847.58	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)	484.06	242.00	281.00
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	0.04	11.85	0.04
C & E Loss (ft)	0.23	Cum SA (acres)	0.06	7.20	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11179.5*

```
INPUT
Description:
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2858.2   135.8  2857.3  143.02 2857.12  165.01 2856.28  172.11 2855.97
  183.37 2855.65     197 2852.72     203  2848.4     216  2848.4     222 2852.72
     242 2852.72     254 2844.72     269 2844.72     281 2852.72     301 2852.72
  358.44  2852.6  369.19 2852.73  374.32  2853.4  390.51 2853.72   415.4  2853.9
  437.18 2853.66  446.31 2853.72  456.75 2853.94  476.72  2854.8

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     281    .016     301    .035
  476.72    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     281           282.84  282.84  282.84             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     100     242 2852.72       T
Left Levee      Station=     242      Elevation= 2852.72

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2855.71    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               6.58    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2849.13    Reach Len. (ft)           282.84     282.84     282.84
  Crit W.S. (ft)           2851.21    Flow Area (sq ft)                     95.19
  E.G. Slope (ft/ft)      0.007235    Area (sq ft)                          95.19
  Q Total (cfs)            1960.00    Flow (cfs)                          1960.00
  Top Width (ft)             28.22    Top Width (ft)                        28.22
  Vel Total (ft/s)           20.59    Avg. Vel. (ft/s)                      20.59
  Max Chl Dpth (ft)           4.41    Hydr. Depth (ft)                       3.37
  Conv. Total (cfs)        23043.3    Conv. (cfs)                         23043.3
  Length Wtd. (ft)          282.84    Wetted Per. (ft)                      30.88
  Min Ch El (ft)           2844.72    Shear (lb/sq ft)                       1.39
  Alpha                       1.00    Stream Power (lb/ft s)    476.72     242.00       0.00
  Frctn Loss (ft)             1.71    Cum Volume (acre-ft)        0.35      37.64       0.34
  C & E Loss (ft)             0.15    Cum SA (acres)              0.20       8.84       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2854.54    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               5.63    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2848.91    Reach Len. (ft)           282.84     282.84     282.84
  Crit W.S. (ft)           2850.72    Flow Area (sq ft)                     89.28
  E.G. Slope (ft/ft)      0.006517    Area (sq ft)                          89.28
  Q Total (cfs)            1700.00    Flow (cfs)                          1700.00
  Top Width (ft)             27.58    Top Width (ft)                        27.58
  Vel Total (ft/s)           19.04    Avg. Vel. (ft/s)                      19.04
  Max Chl Dpth (ft)           4.19    Hydr. Depth (ft)                       3.24
  Conv. Total (cfs)        21058.7    Conv. (cfs)                         21058.7
  Length Wtd. (ft)          282.84    Wetted Per. (ft)                      30.12
  Min Ch El (ft)           2844.72    Shear (lb/sq ft)                       1.21
  Alpha                       1.00    Stream Power (lb/ft s)    476.72     242.00       0.00
  Frctn Loss (ft)             0.85    Cum Volume (acre-ft)        0.28      34.80       0.27
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C & E Loss (ft)	0.35	Cum SA (acres)	0.17	8.65	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2852.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.65	Wt. n-Val.		0.013	
W.S. Elev (ft)	2847.69	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2849.17	Flow Area (sq ft)		57.76	
E.G. Slope (ft/ft)	0.007794	Area (sq ft)		57.76	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	23.91	Top Width (ft)		23.91	
Vel Total (ft/s)	17.31	Avg. Vel. (ft/s)		17.31	
Max Chl Dpth (ft)	2.97	Hydr. Depth (ft)		2.42	
Conv. Total (cfs)	11327.0	Conv. (cfs)		11327.0	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		25.71	
Min Ch El (ft)	2844.72	Shear (lb/sq ft)		1.09	
Alpha	1.00	Stream Power (lb/ft s)	476.72	242.00	0.00
Frctn Loss (ft)	1.15	Cum Volume (acre-ft)	0.13	22.76	0.13
C & E Loss (ft)	0.26	Cum SA (acres)	0.11	7.91	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2847.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2845.68	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2846.08	Flow Area (sq ft)		15.81	
E.G. Slope (ft/ft)	0.008479	Area (sq ft)		15.81	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	17.88	Top Width (ft)		17.88	
Vel Total (ft/s)	9.49	Avg. Vel. (ft/s)		9.49	
Max Chl Dpth (ft)	0.96	Hydr. Depth (ft)		0.88	
Conv. Total (cfs)	1629.0	Conv. (cfs)		1629.0	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		18.47	
Min Ch El (ft)	2844.72	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)	476.72	242.00	0.00
Frctn Loss (ft)	3.16	Cum Volume (acre-ft)	0.01	5.42	0.01
C & E Loss (ft)	0.20	Cum SA (acres)	0.03	6.48	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2852.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.88	Wt. n-Val.		0.013	
W.S. Elev (ft)	2847.44	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2848.93	Flow Area (sq ft)		51.89	
E.G. Slope (ft/ft)	0.008996	Area (sq ft)		51.89	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	23.16	Top Width (ft)		23.16	
Vel Total (ft/s)	17.73	Avg. Vel. (ft/s)		17.73	
Max Chl Dpth (ft)	2.72	Hydr. Depth (ft)		2.24	
Conv. Total (cfs)	9699.9	Conv. (cfs)		9699.9	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		24.81	
Min Ch El (ft)	2844.72	Shear (lb/sq ft)		1.17	
Alpha	1.00	Stream Power (lb/ft s)	476.72	242.00	0.00
Frctn Loss (ft)	2.28	Cum Volume (acre-ft)	0.13	21.54	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	7.82	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2850.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2846.84	Reach Len. (ft)	282.84	282.84	282.84
Crit W.S. (ft)	2848.07	Flow Area (sq ft)		38.46	
E.G. Slope (ft/ft)	0.009807	Area (sq ft)		38.46	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	21.35	Top Width (ft)		21.35	
Vel Total (ft/s)	16.12	Avg. Vel. (ft/s)		16.12	
Max Chl Dpth (ft)	2.12	Hydr. Depth (ft)		1.80	
Conv. Total (cfs)	6260.7	Conv. (cfs)		6260.7	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		22.63	
Min Ch El (ft)	2844.72	Shear (lb/sq ft)		1.04	
Alpha	1.00	Stream Power (lb/ft s)	476.72	242.00	0.00
Frctn Loss (ft)	2.65	Cum Volume (acre-ft)	0.08	16.68	0.08
C & E Loss (ft)	0.02	Cum SA (acres)	0.08	7.47	0.08

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2849.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.93	Wt. n-Val.		0.013	
W.S. Elev (ft)	2846.31	Reach Len. (ft)	282.84	282.84	282.84

Crit W.S. (ft)	2847.21	Flow Area (sq ft)		27.67	
E.G. Slope (ft/ft)	0.009830	Area (sq ft)		27.67	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	19.77	Top Width (ft)		19.77	
Vel Total (ft/s)	13.73	Avg. Vel. (ft/s)		13.73	
Max Chl Dpth (ft)	1.59	Hydr. Depth (ft)		1.40	
Conv. Total (cfs)	3832.7	Conv. (cfs)		3832.7	
Length Wtd. (ft)	282.84	Wetted Per. (ft)		20.74	
Min Ch El (ft)	2844.72	Shear (lb/sq ft)		0.82	
Alpha	1.00	Stream Power (lb/ft s)	476.72	242.00	0.00
Frctn Loss (ft)	3.05	Cum Volume (acre-ft)	0.04	11.67	0.04
C & E Loss (ft)	0.12	Cum SA (acres)	0.06	7.07	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10896.7*

INPUT
Description:
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2856.6	135.8	2855.73	143.02	2855.56	165.01	2854.64	172.11	2854.29
183.37	2853.83	197	2849.86	203	2846.2	216	2846.2	222	2849.86
242	2849.86	254	2841.86	269	2841.86	281	2849.86	301	2849.86
355.54	2849.8	365.88	2849.87	370.83	2850.7	386.41	2850.96	410.36	2851.2
431.33	2851.21	440.12	2851.3	450.16	2851.47	469.39	2852.4		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.016	301	.035
469.39	.035								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	176.3	176.3	176.3	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2850	T
281	469.39	2850	T

Left Levee Station= 242 Elevation= 2850
Right Levee Station= 281 Elevation= 2850

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2853.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.34	Wt. n-Val.		0.013	
W.S. Elev (ft)	2846.08	Reach Len. (ft)	176.30	176.30	176.30
Crit W.S. (ft)	2848.35	Flow Area (sq ft)		90.13	
E.G. Slope (ft/ft)	0.008435	Area (sq ft)		90.13	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	27.67	Top Width (ft)		27.67	
Vel Total (ft/s)	21.75	Avg. Vel. (ft/s)		21.75	
Max Chl Dpth (ft)	4.22	Hydr. Depth (ft)		3.26	
Conv. Total (cfs)	21341.5	Conv. (cfs)		21341.5	
Length Wtd. (ft)	176.30	Wetted Per. (ft)		30.23	
Min Ch El (ft)	2841.86	Shear (lb/sq ft)		1.57	
Alpha	1.00	Stream Power (lb/ft s)	469.39	242.00	281.00

Frctn Loss (ft)	2.21	Cum Volume (acre-ft)	0.35	37.03	0.34
C & E Loss (ft)	0.08	Cum SA (acres)	0.20	8.66	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2852.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.59	Wt. n-Val.		0.013	
W.S. Elev (ft)	2845.81	Reach Len. (ft)	176.30	176.30	176.30
Crit W.S. (ft)	2847.85	Flow Area (sq ft)		82.53	
E.G. Slope (ft/ft)	0.008137	Area (sq ft)		82.53	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	26.84	Top Width (ft)		26.84	
Vel Total (ft/s)	20.60	Avg. Vel. (ft/s)		20.60	
Max Chl Dpth (ft)	3.95	Hydr. Depth (ft)		3.08	
Conv. Total (cfs)	18845.9	Conv. (cfs)		18845.9	
Length Wtd. (ft)	176.30	Wetted Per. (ft)		29.23	
Min Ch El (ft)	2841.86	Shear (lb/sq ft)		1.43	
Alpha	1.00	Stream Power (lb/ft s)	469.39	242.00	281.00
Frctn Loss (ft)	2.05	Cum Volume (acre-ft)	0.28	34.24	0.27
C & E Loss (ft)	0.10	Cum SA (acres)	0.17	8.48	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2849.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2844.70	Reach Len. (ft)	176.30	176.30	176.30
Crit W.S. (ft)	2846.31	Flow Area (sq ft)		54.61	
E.G. Slope (ft/ft)	0.009166	Area (sq ft)		54.61	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	23.51	Top Width (ft)		23.51	
Vel Total (ft/s)	18.31	Avg. Vel. (ft/s)		18.31	
Max Chl Dpth (ft)	2.84	Hydr. Depth (ft)		2.32	
Conv. Total (cfs)	10445.3	Conv. (cfs)		10445.3	
Length Wtd. (ft)	176.30	Wetted Per. (ft)		25.23	
Min Ch El (ft)	2841.86	Shear (lb/sq ft)		1.24	
Alpha	1.00	Stream Power (lb/ft s)	469.39	242.00	281.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	0.13	22.39	0.13
C & E Loss (ft)	0.06	Cum SA (acres)	0.11	7.75	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2844.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.62	Wt. n-Val.		0.013	
W.S. Elev (ft)	2842.76	Reach Len. (ft)	176.30	176.30	176.30
Crit W.S. (ft)	2843.25	Flow Area (sq ft)		14.70	
E.G. Slope (ft/ft)	0.010618	Area (sq ft)		14.70	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	17.70	Top Width (ft)		17.70	
Vel Total (ft/s)	10.20	Avg. Vel. (ft/s)		10.20	
Max Chl Dpth (ft)	0.90	Hydr. Depth (ft)		0.83	
Conv. Total (cfs)	1455.7	Conv. (cfs)		1455.7	
Length Wtd. (ft)	176.30	Wetted Per. (ft)		18.24	
Min Ch El (ft)	2841.86	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)	469.39	242.00	281.00
Frctn Loss (ft)	2.68	Cum Volume (acre-ft)	0.01	5.32	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	6.36	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2849.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.13	Wt. n-Val.		0.013	
W.S. Elev (ft)	2844.52	Reach Len. (ft)	176.30	176.30	176.30
Crit W.S. (ft)	2846.08	Flow Area (sq ft)		50.60	
E.G. Slope (ft/ft)	0.009678	Area (sq ft)		50.60	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	22.99	Top Width (ft)		22.99	
Vel Total (ft/s)	18.18	Avg. Vel. (ft/s)		18.18	
Max Chl Dpth (ft)	2.66	Hydr. Depth (ft)		2.20	
Conv. Total (cfs)	9352.0	Conv. (cfs)		9352.0	
Length Wtd. (ft)	176.30	Wetted Per. (ft)		24.60	
Min Ch El (ft)	2841.86	Shear (lb/sq ft)		1.24	
Alpha	1.00	Stream Power (lb/ft s)	469.39	242.00	281.00
Frctn Loss (ft)	2.64	Cum Volume (acre-ft)	0.13	21.20	0.13
C & E Loss (ft)	0.03	Cum SA (acres)	0.11	7.67	0.10

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2848.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2843.96	Reach Len. (ft)	176.30	176.30	176.30
Crit W.S. (ft)	2845.21	Flow Area (sq ft)		38.18	
E.G. Slope (ft/ft)	0.010018	Area (sq ft)		38.18	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	21.31	Top Width (ft)		21.31	
Vel Total (ft/s)	16.24	Avg. Vel. (ft/s)		16.24	
Max Chl Dpth (ft)	2.10	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	6194.5	Conv. (cfs)		6194.5	
Length Wtd. (ft)	176.30	Wetted Per. (ft)		22.58	
Min Ch El (ft)	2841.86	Shear (lb/sq ft)		1.06	

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  Alpha                        1.00    Stream Power (lb/ft s)    469.39     242.00     281.00
  Frctn Loss (ft)              2.80    Cum Volume (acre-ft)        0.08      16.44       0.08
  C & E Loss (ft)              0.01    Cum SA (acres)              0.08       7.33       0.08


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2846.42    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               2.98    Wt. n-Val.                           0.013
  W.S. Elev (ft)           2843.44    Reach Len. (ft)           176.30     176.30     176.30
  Crit W.S. (ft)           2844.35    Flow Area (sq ft)                     27.43
  E.G. Slope (ft/ft)      0.010087    Area (sq ft)                          27.43
  Q Total (cfs)             380.00    Flow (cfs)                           380.00
  Top Width (ft)             19.74    Top Width (ft)                        19.74
  Vel Total (ft/s)           13.85    Avg. Vel. (ft/s)                      13.85
  Max Chl Dpth (ft)           1.58    Hydr. Depth (ft)                       1.39
  Conv. Total (cfs)         3783.6    Conv. (cfs)                          3783.6
  Length Wtd. (ft)          176.30    Wetted Per. (ft)                      20.69
  Min Ch El (ft)           2841.86    Shear (lb/sq ft)                       0.83
  Alpha                       1.00    Stream Power (lb/ft s)    469.39     242.00     281.00
  Frctn Loss (ft)             2.82    Cum Volume (acre-ft)        0.04      11.49       0.04
  C & E Loss (ft)             0.01    Cum SA (acres)              0.06       6.94       0.06


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 10720.4

INPUT
Description: U/S Face of private road
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2853  194.52    2852     259    2852     262    2850     287  2839.5
     335  2839.5     360    2850     363    2852   385.8    2852  435.35    2853

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     259    .013     363    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           259     363               61      61      61             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     259    2854       T
     363  435.35    2854       T
Left Levee      Station=     259      Elevation=    2854
Right Levee     Station=     363      Elevation=    2854

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2850.50    Element                   Left OB    Channel   Right OB
```

Vel Head (ft)	0.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2850.40	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2843.02	Flow Area (sq ft)		806.37	
E.G. Slope (ft/ft)	0.000029	Area (sq ft)		806.37	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	99.21	Top Width (ft)		99.21	
Vel Total (ft/s)	2.43	Avg. Vel. (ft/s)		2.43	
Max Chl Dpth (ft)	10.90	Hydr. Depth (ft)		8.13	
Conv. Total (cfs)	361785.7	Conv. (cfs)		361785.7	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		103.69	
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.35	35.22	0.34
C & E Loss (ft)		Cum SA (acres)	0.20	8.40	0.17

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2850.59	Element			
Vel Head (ft)	0.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2850.53	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2842.71	Flow Area (sq ft)		818.62	
E.G. Slope (ft/ft)	0.000021	Area (sq ft)		818.62	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	99.58	Top Width (ft)		99.58	
Vel Total (ft/s)	2.08	Avg. Vel. (ft/s)		2.08	
Max Chl Dpth (ft)	11.03	Hydr. Depth (ft)		8.22	
Conv. Total (cfs)	369939.3	Conv. (cfs)		369939.3	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		104.13	
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.28	32.42	0.27
C & E Loss (ft)		Cum SA (acres)	0.17	8.22	0.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2847.38	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2847.32	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2841.80	Flow Area (sq ft)		520.86	
E.G. Slope (ft/ft)	0.000027	Area (sq ft)		520.86	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	85.23	Top Width (ft)		85.23	
Vel Total (ft/s)	1.92	Avg. Vel. (ft/s)		1.92	
Max Chl Dpth (ft)	7.82	Hydr. Depth (ft)		6.11	
Conv. Total (cfs)	194242.4	Conv. (cfs)		194242.4	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		88.38	
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	21.23	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	7.53	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2841.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.013	
W.S. Elev (ft)	2841.65	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2840.17	Flow Area (sq ft)		113.90	
E.G. Slope (ft/ft)	0.000055	Area (sq ft)		113.90	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	58.21	Top Width (ft)		58.21	
Vel Total (ft/s)	1.32	Avg. Vel. (ft/s)		1.32	
Max Chl Dpth (ft)	2.14	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	20167.6	Conv. (cfs)		20167.6	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		59.08	
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	5.06	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	6.21	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2846.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2846.46	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2841.65	Flow Area (sq ft)		449.53	
E.G. Slope (ft/ft)	0.000034	Area (sq ft)		449.53	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	81.15	Top Width (ft)		81.15	
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)		2.05	
Max Chl Dpth (ft)	6.96	Hydr. Depth (ft)		5.54	
Conv. Total (cfs)	157262.1	Conv. (cfs)		157262.1	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		83.95	
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	20.19	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	7.46	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2845.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2844.98	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2841.19	Flow Area (sq ft)		334.76	
E.G. Slope (ft/ft)	0.000037	Area (sq ft)		334.76	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	74.11	Top Width (ft)		74.11	
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)		1.85	
Max Chl Dpth (ft)	5.48	Hydr. Depth (ft)		4.52	
Conv. Total (cfs)	102529.1	Conv. (cfs)		102529.1	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		76.32	
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	15.68	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	7.13	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2843.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2843.52	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2840.72	Flow Area (sq ft)		231.67	
E.G. Slope (ft/ft)	0.000041	Area (sq ft)		231.67	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	67.16	Top Width (ft)		67.16	
Vel Total (ft/s)	1.64	Avg. Vel. (ft/s)		1.64	
Max Chl Dpth (ft)	4.02	Hydr. Depth (ft)		3.45	
Conv. Total (cfs)	59500.2	Conv. (cfs)		59500.2	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		68.78	
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	10.97	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	6.76	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 10694.4

INPUT
Description: Private Road
Distance from Upstream XS = .5
Deck/Roadway Width = 60
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
100	2853.6		274	2853.6		340	2853.6	
440	2853.6							

Upstream Bridge Cross Section Data
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2853	194.52	2852	259	2852	262	2850	287	2839.5
335	2839.5	360	2850	363	2852	385.8	2852	435.35	2853

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	259	.013	363	.035

Bank Sta: Left Right Coeff Contr. Expan.
259 363 .3 .5
Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	259	2854	T
363	435.35	2854	T

Left Levee Station= 259 Elevation= 2854
Right Levee Station= 363 Elevation= 2854

Downstream Deck/Roadway Coordinates

```
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100  2853.6             274  2853.6             340  2853.6
     440  2853.6

Downstream Bridge Cross Section Data
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2853  194.52    2852     259    2852     262    2850     287  2839.5
     335  2839.5     360    2850     363    2852   385.8    2852  435.35    2853

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     259    .013     363    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           259     363             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     259  2853.5       T
     363  435.35  2853.5       T
Left Levee      Station=     259      Elevation=  2853.5
Right Levee     Station=     363      Elevation=  2853.5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       9      12
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  1      60     .013     .013        0                   .2                1
Number of Barrels =  3
Upstream   Elevation =  2839.5
Centerline Stations
    Sta.    Sta.    Sta.
     298     311     324
Downstream Elevation =  2839.5
Centerline Stations
    Sta.    Sta.    Sta.
     298     311     324

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1960.00    Culv Full Len (ft)         60.00
  # Barrels                      3    Culv Vel US (ft/s)          6.05
  Q Barrel (cfs)            653.33    Culv Vel DS (ft/s)          6.05
  E.G. US. (ft)            2850.50    Culv Inv El Up (ft)      2839.50
  W.S. US. (ft)            2850.40    Culv Inv El Dn (ft)      2839.50
  E.G. DS (ft)             2849.88    Culv Frctn Ls (ft)          0.05
  W.S. DS (ft)             2849.77    Culv Exit Loss (ft)         0.46
  Delta EG (ft)               0.62    Culv Entr Loss (ft)         0.11
  Delta WS (ft)               0.64    Q Weir (cfs)
  E.G. IC (ft)             2846.75    Weir Sta Lft (ft)
  E.G. OC (ft)             2850.50    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
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  Culv WS Inlet (ft)       2848.50    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2848.50    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         4.52    Min El Weir Flow (ft)    2853.61


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1700.00    Culv Full Len (ft)         60.00
  # Barrels                      3    Culv Vel US (ft/s)          5.25
  Q Barrel (cfs)            566.67    Culv Vel DS (ft/s)          5.25
  E.G. US. (ft)            2850.60    Culv Inv El Up (ft)      2839.50
  W.S. US. (ft)            2850.53    Culv Inv El Dn (ft)      2839.50
  E.G. DS (ft)             2850.12    Culv Frctn Ls (ft)          0.04
  W.S. DS (ft)             2850.05    Culv Exit Loss (ft)         0.35
  Delta EG (ft)               0.47    Culv Entr Loss (ft)         0.09
  Delta WS (ft)               0.48    Q Weir (cfs)
  E.G. IC (ft)             2846.07    Weir Sta Lft (ft)
  E.G. OC (ft)             2850.60    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2848.50    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2848.50    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         4.11    Min El Weir Flow (ft)    2853.61


CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1000.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          3.64
  Q Barrel (cfs)            333.33    Culv Vel DS (ft/s)          3.65
  E.G. US. (ft)            2847.38    Culv Inv El Up (ft)      2839.50
  W.S. US. (ft)            2847.32    Culv Inv El Dn (ft)      2839.50
  E.G. DS (ft)             2847.18    Culv Frctn Ls (ft)          0.01
  W.S. DS (ft)             2847.12    Culv Exit Loss (ft)         0.15
  Delta EG (ft)               0.20    Culv Entr Loss (ft)         0.04
  Delta WS (ft)               0.20    Q Weir (cfs)
  E.G. IC (ft)             2844.07    Weir Sta Lft (ft)
  E.G. OC (ft)             2847.38    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2847.13    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2847.12    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         2.88    Min El Weir Flow (ft)    2853.61


CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)        150.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          1.99
  Q Barrel (cfs)             50.00    Culv Vel DS (ft/s)          2.00
  E.G. US. (ft)            2841.67    Culv Inv El Up (ft)      2839.50
  W.S. US. (ft)            2841.65    Culv Inv El Dn (ft)      2839.50
  E.G. DS (ft)             2841.62    Culv Frctn Ls (ft)          0.01
  W.S. DS (ft)             2841.59    Culv Exit Loss (ft)         0.03
  Delta EG (ft)               0.06    Culv Entr Loss (ft)         0.01
  Delta WS (ft)               0.06    Q Weir (cfs)
  E.G. IC (ft)             2840.76    Weir Sta Lft (ft)
  E.G. OC (ft)             2841.67    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2841.60    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2841.59    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         0.81    Min El Weir Flow (ft)    2853.61
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CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	920.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	3.78
Q Barrel (cfs)	306.67	Culv Vel DS (ft/s)	3.79
E.G. US. (ft)	2846.53	Culv Inv El Up (ft)	2839.50
W.S. US. (ft)	2846.46	Culv Inv El Dn (ft)	2839.50
E.G. DS (ft)	2846.32	Culv Frctn Ls (ft)	0.01
W.S. DS (ft)	2846.25	Culv Exit Loss (ft)	0.15
Delta EG (ft)	0.21	Culv Entr Loss (ft)	0.04
Delta WS (ft)	0.22	Q Weir (cfs)	
E.G. IC (ft)	2843.81	Weir Sta Lft (ft)	
E.G. OC (ft)	2846.53	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2846.26	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2846.25	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.73	Min El Weir Flow (ft)	2853.61

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	620.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	3.22
Q Barrel (cfs)	206.67	Culv Vel DS (ft/s)	3.23
E.G. US. (ft)	2845.04	Culv Inv El Up (ft)	2839.50
W.S. US. (ft)	2844.98	Culv Inv El Dn (ft)	2839.50
E.G. DS (ft)	2844.89	Culv Frctn Ls (ft)	0.01
W.S. DS (ft)	2844.83	Culv Exit Loss (ft)	0.10
Delta EG (ft)	0.15	Culv Entr Loss (ft)	0.03
Delta WS (ft)	0.15	Q Weir (cfs)	
E.G. IC (ft)	2842.79	Weir Sta Lft (ft)	
E.G. OC (ft)	2845.04	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2844.84	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2844.83	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.10	Min El Weir Flow (ft)	2853.61

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	380.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	2.69
Q Barrel (cfs)	126.67	Culv Vel DS (ft/s)	2.69
E.G. US. (ft)	2843.57	Culv Inv El Up (ft)	2839.50
W.S. US. (ft)	2843.52	Culv Inv El Dn (ft)	2839.50
E.G. DS (ft)	2843.46	Culv Frctn Ls (ft)	0.01
W.S. DS (ft)	2843.42	Culv Exit Loss (ft)	0.07
Delta EG (ft)	0.10	Culv Entr Loss (ft)	0.02
Delta WS (ft)	0.10	Q Weir (cfs)	
E.G. IC (ft)	2841.86	Weir Sta Lft (ft)	
E.G. OC (ft)	2843.57	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2843.43	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2843.42	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.51	Min El Weir Flow (ft)	2853.61

CROSS SECTION

RIVER: Desert Knolls Wa

REACH: Main RS: 10659.4

INPUT
Description: D/S Face of Private Road
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2853	194.52	2852	259	2852	262	2850	287	2839.5
335	2839.5	360	2850	363	2852	385.8	2852	435.35	2853

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	259	.013	363	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
259	363	45.5	45.5	45.5	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	259	2853.5	T
363	435.35	2853.5	T

Left Levee Station= 259 Elevation= 2853.5
Right Levee Station= 363 Elevation= 2853.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2849.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.013	
W.S. Elev (ft)	2849.77	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)	2843.02	Flow Area (sq ft)		743.78	
E.G. Slope (ft/ft)	0.000037	Area (sq ft)		743.78	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	96.89	Top Width (ft)		96.89	
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)		2.64	
Max Chl Dpth (ft)	10.27	Hydr. Depth (ft)		7.68	
Conv. Total (cfs)	321737.8	Conv. (cfs)		321737.8	
Length Wtd. (ft)	45.50	Wetted Per. (ft)		101.03	
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.35	35.05	0.34
C & E Loss (ft)	0.60	Cum SA (acres)	0.20	8.27	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2850.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2850.05	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)	2842.73	Flow Area (sq ft)		771.00	
E.G. Slope (ft/ft)	0.000025	Area (sq ft)		771.00	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	98.14	Top Width (ft)		98.14	
Vel Total (ft/s)	2.20	Avg. Vel. (ft/s)		2.20	
Max Chl Dpth (ft)	10.55	Hydr. Depth (ft)		7.86	
Conv. Total (cfs)	338548.0	Conv. (cfs)		338548.0	
Length Wtd. (ft)	45.50	Wetted Per. (ft)		102.40	
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.28	32.25	0.27

C & E Loss (ft)	0.63	Cum SA (acres)	0.17	8.08	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2847.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2847.12	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)	2841.80	Flow Area (sq ft)		503.71	
E.G. Slope (ft/ft)	0.000029	Area (sq ft)		503.71	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	84.27	Top Width (ft)		84.27	
Vel Total (ft/s)	1.99	Avg. Vel. (ft/s)		1.99	
Max Chl Dpth (ft)	7.62	Hydr. Depth (ft)		5.98	
Conv. Total (cfs)	185161.5	Conv. (cfs)		185161.5	
Length Wtd. (ft)	45.50	Wetted Per. (ft)		87.34	
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	21.09	0.13
C & E Loss (ft)	0.48	Cum SA (acres)	0.11	7.41	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2841.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.013	
W.S. Elev (ft)	2841.59	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)	2840.16	Flow Area (sq ft)		110.58	
E.G. Slope (ft/ft)	0.000061	Area (sq ft)		110.58	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	57.94	Top Width (ft)		57.94	
Vel Total (ft/s)	1.36	Avg. Vel. (ft/s)		1.36	
Max Chl Dpth (ft)	2.09	Hydr. Depth (ft)		1.91	
Conv. Total (cfs)	19262.2	Conv. (cfs)		19262.2	
Length Wtd. (ft)	45.50	Wetted Per. (ft)		58.78	
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	5.03	0.01
C & E Loss (ft)	0.21	Cum SA (acres)	0.03	6.13	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2846.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2846.25	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)	2841.68	Flow Area (sq ft)		432.09	
E.G. Slope (ft/ft)	0.000038	Area (sq ft)		432.09	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	80.12	Top Width (ft)		80.12	
Vel Total (ft/s)	2.13	Avg. Vel. (ft/s)		2.13	
Max Chl Dpth (ft)	6.75	Hydr. Depth (ft)		5.39	
Conv. Total (cfs)	148545.3	Conv. (cfs)		148545.3	
Length Wtd. (ft)	45.50	Wetted Per. (ft)		82.84	
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	20.07	0.13
C & E Loss (ft)	0.44	Cum SA (acres)	0.11	7.35	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2844.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2844.83	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)	2841.17	Flow Area (sq ft)		323.49	
E.G. Slope (ft/ft)	0.000040	Area (sq ft)		323.49	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	73.38	Top Width (ft)		73.38	
Vel Total (ft/s)	1.92	Avg. Vel. (ft/s)		1.92	
Max Chl Dpth (ft)	5.33	Hydr. Depth (ft)		4.41	
Conv. Total (cfs)	97514.3	Conv. (cfs)		97514.3	
Length Wtd. (ft)	45.50	Wetted Per. (ft)		75.53	
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.08	15.58	0.08
C & E Loss (ft)	0.38	Cum SA (acres)	0.08	7.03	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2843.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2843.42	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)	2840.73	Flow Area (sq ft)		224.74	
E.G. Slope (ft/ft)	0.000045	Area (sq ft)		224.74	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	66.67	Top Width (ft)		66.67	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69	
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		3.37	

Conv. Total (cfs)	56859.9	Conv. (cfs)		56859.9		
Length Wtd. (ft)	45.50	Wetted Per. (ft)		68.25		
Min Ch El (ft)	2839.50	Shear (lb/sq ft)		0.01		
Alpha	1.00	Stream Power (lb/ft s)	435.35	259.00	363.00	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.04	10.90	0.04	
C & E Loss (ft)	0.32	Cum SA (acres)	0.06	6.67	0.06	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10613.9

INPUT
Description: Section 106+13.9
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2855	143.02	2854	165.01	2853	183.37	2852	197	2847
203	2844	216	2844	222	2847	242	2847	254	2839
269	2839	281	2847	362.58	2847	367.33	2848	443.58	2849
462.06	2850								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	269.45	269.45	269.45	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2850.5	T
281	462.06	2850.5	T

Left Levee Station= 242 Elevation= 2850.5
Right Levee Station= 281 Elevation= 2850.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2849.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	2847.15	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2846.56	Flow Area (sq ft)		221.71	
E.G. Slope (ft/ft)	0.001214	Area (sq ft)		221.71	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	11.68	Avg. Vel. (ft/s)		11.68	
Max Chl Dpth (ft)	8.15	Hydr. Depth (ft)		5.68	
Conv. Total (cfs)	74330.3	Conv. (cfs)		74330.3	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		44.14	
Min Ch El (ft)	2839.00	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	0.35	34.55	0.34
C & E Loss (ft)	0.14	Cum SA (acres)	0.20	8.20	0.17

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2849.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.17	Wt. n-Val.		0.013	
W.S. Elev (ft)	2847.32	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2846.75	Flow Area (sq ft)		228.54	
E.G. Slope (ft/ft)	0.001205	Area (sq ft)		228.54	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	11.81	Avg. Vel. (ft/s)		11.81	
Max Chl Dpth (ft)	8.32	Hydr. Depth (ft)		5.86	
Conv. Total (cfs)	77773.1	Conv. (cfs)		77773.1	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		44.49	
Min Ch El (ft)	2839.00	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	0.28	31.72	0.27
C & E Loss (ft)	0.14	Cum SA (acres)	0.17	8.01	0.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2846.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.68	Wt. n-Val.		0.013	
W.S. Elev (ft)	2845.01	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2844.60	Flow Area (sq ft)		144.40	
E.G. Slope (ft/ft)	0.001329	Area (sq ft)		144.40	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	33.04	Top Width (ft)		33.04	
Vel Total (ft/s)	10.39	Avg. Vel. (ft/s)		10.39	
Max Chl Dpth (ft)	6.01	Hydr. Depth (ft)		4.37	
Conv. Total (cfs)	41151.0	Conv. (cfs)		41151.0	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		36.68	
Min Ch El (ft)	2839.00	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.13	20.75	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	7.35	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2841.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.		0.013	
W.S. Elev (ft)	2840.67	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2840.67	Flow Area (sq ft)		29.24	
E.G. Slope (ft/ft)	0.002306	Area (sq ft)		29.24	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	20.01	Top Width (ft)		20.01	
Vel Total (ft/s)	6.84	Avg. Vel. (ft/s)		6.84	
Max Chl Dpth (ft)	1.67	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	4164.8	Conv. (cfs)		4164.8	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		21.02	
Min Ch El (ft)	2839.00	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.01	4.95	0.01
C & E Loss (ft)	0.10	Cum SA (acres)	0.03	6.09	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2845.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.54	Wt. n-Val.		0.013	
W.S. Elev (ft)	2844.32	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2843.98	Flow Area (sq ft)		122.39	
E.G. Slope (ft/ft)	0.001389	Area (sq ft)		122.39	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	30.97	Top Width (ft)		30.97	
Vel Total (ft/s)	9.97	Avg. Vel. (ft/s)		9.97	
Max Chl Dpth (ft)	5.32	Hydr. Depth (ft)		3.95	
Conv. Total (cfs)	32732.2	Conv. (cfs)		32732.2	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		34.20	
Min Ch El (ft)	2839.00	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	0.13	19.78	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	7.29	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2844.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.33	Wt. n-Val.		0.013	
W.S. Elev (ft)	2843.17	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2842.95	Flow Area (sq ft)		88.70	
E.G. Slope (ft/ft)	0.001545	Area (sq ft)		88.70	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	27.52	Top Width (ft)		27.52	
Vel Total (ft/s)	9.24	Avg. Vel. (ft/s)		9.24	
Max Chl Dpth (ft)	4.17	Hydr. Depth (ft)		3.22	
Conv. Total (cfs)	20864.6	Conv. (cfs)		20864.6	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		30.04	
Min Ch El (ft)	2839.00	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	0.08	15.37	0.08
C & E Loss (ft)	0.13	Cum SA (acres)	0.08	6.98	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2843.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.013	
W.S. Elev (ft)	2842.02	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2841.94	Flow Area (sq ft)		59.08	
E.G. Slope (ft/ft)	0.001826	Area (sq ft)		59.08	

Q Total (cfs)	500.00	Flow (cfs)	500.00		
Top Width (ft)	24.07	Top Width (ft)	24.07		
Vel Total (ft/s)	8.46	Avg. Vel. (ft/s)	8.46		
Max Chl Dpth (ft)	3.02	Hydr. Depth (ft)	2.45		
Conv. Total (cfs)	11701.0	Conv. (cfs)	11701.0		
Length Wtd. (ft)	269.45	Wetted Per. (ft)	25.90		
Min Ch El (ft)	2839.00	Shear (lb/sq ft)	0.26		
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	0.04	10.75	0.04
C & E Loss (ft)	0.13	Cum SA (acres)	0.06	6.62	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10525

INPUT
Description: Section 105+25 Chute (U/S)
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
222	2846.3	242	2846.3	254	2838.3	269	2838.3	281	2846.3
362.58	2846.3	367.33	2848	443.58	2849	462.06	2850		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	8	8	8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
222	242	2850.5	T
281	462.06	2850.5	T

Left Levee Station= 242 Elevation= 2850.5
Right Levee Station= 281 Elevation= 2850.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2848.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.65	Wt. n-Val.		0.013	
W.S. Elev (ft)	2847.21	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2845.86	Flow Area (sq ft)		251.29	
E.G. Slope (ft/ft)	0.000837	Area (sq ft)		251.29	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	10.31	Avg. Vel. (ft/s)		10.31	
Max Chl Dpth (ft)	8.90	Hydr. Depth (ft)		6.44	
Conv. Total (cfs)	89539.6	Conv. (cfs)		89539.6	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		45.65	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.35	33.08	0.34
C & E Loss (ft)	0.19	Cum SA (acres)	0.20	7.95	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2849.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.70	Wt. n-Val.		0.013	
W.S. Elev (ft)	2847.38	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2846.04	Flow Area (sq ft)		258.09	
E.G. Slope (ft/ft)	0.000840	Area (sq ft)		258.09	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	10.46	Avg. Vel. (ft/s)		10.46	
Max Chl Dpth (ft)	9.08	Hydr. Depth (ft)		6.62	
Conv. Total (cfs)	93139.7	Conv. (cfs)		93139.7	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		46.00	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.28	30.22	0.27
C & E Loss (ft)	0.19	Cum SA (acres)	0.17	7.77	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2846.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2845.05	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2843.89	Flow Area (sq ft)		169.59	
E.G. Slope (ft/ft)	0.000853	Area (sq ft)		169.59	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	35.25	Top Width (ft)		35.25	
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)		8.84	
Max Chl Dpth (ft)	6.75	Hydr. Depth (ft)		4.81	
Conv. Total (cfs)	51348.8	Conv. (cfs)		51348.8	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		39.34	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	19.78	0.13
C & E Loss (ft)	0.18	Cum SA (acres)	0.11	7.14	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2840.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2840.46	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2839.97	Flow Area (sq ft)		39.44	
E.G. Slope (ft/ft)	0.000948	Area (sq ft)		39.44	
Q Total (cfs)	200.00	Flow (cfs)		200.00	

Top Width (ft)	21.49	Top Width (ft)		21.49	
Vel Total (ft/s)	5.07	Avg. Vel. (ft/s)		5.07	
Max Chl Dpth (ft)	2.16	Hydr. Depth (ft)		1.84	
Conv. Total (cfs)	6496.7	Conv. (cfs)		6496.7	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		22.79	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	4.74	0.01
C & E Loss (ft)	0.09	Cum SA (acres)	0.03	5.96	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2845.44	Element			
Vel Head (ft)	1.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2844.35	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2843.28	Flow Area (sq ft)		145.69	
E.G. Slope (ft/ft)	0.000858	Area (sq ft)		145.69	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	33.15	Top Width (ft)		33.15	
Vel Total (ft/s)	8.37	Avg. Vel. (ft/s)		8.37	
Max Chl Dpth (ft)	6.05	Hydr. Depth (ft)		4.39	
Conv. Total (cfs)	41660.3	Conv. (cfs)		41660.3	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		36.82	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	18.95	0.13
C & E Loss (ft)	0.17	Cum SA (acres)	0.11	7.09	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2844.06	Element			
Vel Head (ft)	0.88	Wt. n-Val.		0.013	
W.S. Elev (ft)	2843.18	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2842.24	Flow Area (sq ft)		108.81	
E.G. Slope (ft/ft)	0.000871	Area (sq ft)		108.81	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	29.63	Top Width (ft)		29.63	
Vel Total (ft/s)	7.54	Avg. Vel. (ft/s)		7.54	
Max Chl Dpth (ft)	4.88	Hydr. Depth (ft)		3.67	
Conv. Total (cfs)	27787.5	Conv. (cfs)		27787.5	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		32.58	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	14.76	0.08
C & E Loss (ft)	0.16	Cum SA (acres)	0.08	6.80	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2842.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.013	
W.S. Elev (ft)	2842.00	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2841.23	Flow Area (sq ft)		75.93	
E.G. Slope (ft/ft)	0.000891	Area (sq ft)		75.93	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	26.09	Top Width (ft)		26.09	
Vel Total (ft/s)	6.58	Avg. Vel. (ft/s)		6.58	
Max Chl Dpth (ft)	3.70	Hydr. Depth (ft)		2.91	
Conv. Total (cfs)	16748.1	Conv. (cfs)		16748.1	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		28.33	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	10.33	0.04
C & E Loss (ft)	0.13	Cum SA (acres)	0.06	6.47	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10517

INPUT
Description: Section 105+17 Chute (sag)
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
222	2846.2	242	2846.2	254	2836.4	269	2836.4	281	2846.2
362.58	2846.2	367.33	2848	443.58	2849	462.06	2850		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	4	4	4	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
222	242	2851	T
281	462.06	2851	T

Left Levee Station= 242 Elevation= 2851
Right Levee Station= 281 Elevation= 2851

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2848.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2847.65	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2844.25	Flow Area (sq ft)		320.97	
E.G. Slope (ft/ft)	0.000405	Area (sq ft)		320.97	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	

Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	8.07	Avg. Vel. (ft/s)		8.07	
Max Chl Dpth (ft)	11.25	Hydr. Depth (ft)		8.23	
Conv. Total (cfs)	128652.6	Conv. (cfs)		128652.6	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		48.88	
Min Ch El (ft)	2836.40	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.35	33.03	0.34
C & E Loss (ft)	0.00	Cum SA (acres)	0.20	7.95	0.17

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2848.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2847.83	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2844.42	Flow Area (sq ft)		328.00	
E.G. Slope (ft/ft)	0.000414	Area (sq ft)		328.00	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	8.23	Avg. Vel. (ft/s)		8.23	
Max Chl Dpth (ft)	11.43	Hydr. Depth (ft)		8.41	
Conv. Total (cfs)	132729.5	Conv. (cfs)		132729.5	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		49.24	
Min Ch El (ft)	2836.40	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.28	30.17	0.27
C & E Loss (ft)	0.00	Cum SA (acres)	0.17	7.76	0.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2846.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.013	
W.S. Elev (ft)	2845.46	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2842.17	Flow Area (sq ft)		236.24	
E.G. Slope (ft/ft)	0.000325	Area (sq ft)		236.24	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	37.18	Top Width (ft)		37.18	
Vel Total (ft/s)	6.35	Avg. Vel. (ft/s)		6.35	
Max Chl Dpth (ft)	9.06	Hydr. Depth (ft)		6.35	
Conv. Total (cfs)	83260.0	Conv. (cfs)		83260.0	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		43.63	
Min Ch El (ft)	2836.40	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	19.74	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	7.13	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2840.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2840.68	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2838.09	Flow Area (sq ft)		86.67	
E.G. Slope (ft/ft)	0.000093	Area (sq ft)		86.67	

Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.49	Top Width (ft)		25.49	
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)		2.31	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		3.40	
Conv. Total (cfs)	20777.3	Conv. (cfs)		20777.3	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		28.54	
Min Ch El (ft)	2836.40	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	4.73	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	5.96	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2845.26	Element			
Vel Head (ft)	0.52	Wt. n-Val.		0.013	
W.S. Elev (ft)	2844.74	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2841.52	Flow Area (sq ft)		210.29	
E.G. Slope (ft/ft)	0.000295	Area (sq ft)		210.29	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	35.43	Top Width (ft)		35.43	
Vel Total (ft/s)	5.80	Avg. Vel. (ft/s)		5.80	
Max Chl Dpth (ft)	8.34	Hydr. Depth (ft)		5.94	
Conv. Total (cfs)	71058.1	Conv. (cfs)		71058.1	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		41.37	
Min Ch El (ft)	2836.40	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	18.92	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	7.08	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2843.90	Element			
Vel Head (ft)	0.36	Wt. n-Val.		0.013	
W.S. Elev (ft)	2843.54	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2840.43	Flow Area (sq ft)		169.38	
E.G. Slope (ft/ft)	0.000241	Area (sq ft)		169.38	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	32.47	Top Width (ft)		32.47	
Vel Total (ft/s)	4.84	Avg. Vel. (ft/s)		4.84	
Max Chl Dpth (ft)	7.14	Hydr. Depth (ft)		5.22	
Conv. Total (cfs)	52842.4	Conv. (cfs)		52842.4	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		37.56	
Min Ch El (ft)	2836.40	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	14.73	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	6.80	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2842.53	Element			
Vel Head (ft)	0.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2842.31	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2839.39	Flow Area (sq ft)		131.33	

E.G. Slope (ft/ft)	0.000181	Area (sq ft)		131.33	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	29.47	Top Width (ft)		29.47	
Vel Total (ft/s)	3.81	Avg. Vel. (ft/s)		3.81	
Max Chl Dpth (ft)	5.91	Hydr. Depth (ft)		4.46	
Conv. Total (cfs)	37190.7	Conv. (cfs)		37190.7	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		33.68	
Min Ch El (ft)	2836.40	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	10.31	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	6.46	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

LATERAL STRUCTURE

RIVER: Desert Knolls Wa
REACH: Main RS: 10515

INPUT
Description: Reach 3 Diversion Chute #3
Lateral structure position = Left overbank
Distance from Upstream XS =
Deck/Roadway Width = 20
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 3

Sta	Elev	Sta	Elev	Sta	Elev
0	2846.2	70.6	2844.9	340	2842.9

Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Circular	2	

FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	439	.013	.013	0	.5	1

Upstream Elevation = 2836.35
Centerline Station = 0
Downstream Elevation = 2836.2
Centerline Station = 0

LATERAL STRUCTURE OUTPUT Profile #100-yr SBCFCD Culv Group: Culvert #1

E.G. US. (ft)	2848.66	Weir Sta US (ft)	0.00
W.S. US. (ft)	2847.64	Weir Sta DS (ft)	10.00
E.G. DS (ft)	2846.55	Min El Weir Flow (ft)	2842.90
W.S. DS (ft)	2840.43	Wr Top Wdth (ft)	9.22
Q US (cfs)	2590.00	Weir Max Depth (ft)	1.48
Q Leaving Total (cfs)	46.93	Weir Avg Depth (ft)	0.90
Q DS (cfs)	2590.00	Weir Flow Area (sq ft)	8.27
Perc Q Leaving	1.81	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	17.47	Weir Submerg	0.00
Q Gates (cfs)		Q Culv Group (cfs)	29.46
Q Culv (cfs)	29.46	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	439.00
		Culv Depth Blocked (ft)	

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  Q Breach (cfs)                          Culv Inv El Up (ft)          2836.35
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2836.20
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2848.88    Weir Sta US (ft)                0.00
  W.S. US. (ft)                2847.82    Weir Sta DS (ft)               10.00
  E.G. DS (ft)                 2846.79    Min El Weir Flow (ft)        2842.90
  W.S. DS (ft)                 2840.57    Wr Top Wdth (ft)               10.00
  Q US (cfs)                   2700.00    Weir Max Depth (ft)             1.66
  Q Leaving Total (cfs)          52.04    Weir Avg Depth (ft)             1.00
  Q DS (cfs)                   2700.00    Weir Flow Area (sq ft)         10.02
  Perc Q Leaving                  1.93    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                   22.31    Weir Submerg                    0.00
  Q Gates (cfs)                           Q Culv Group (cfs)             29.73
  Q Culv (cfs)                   29.73    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              439.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2836.35
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2836.20
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2846.08    Weir Sta US (ft)
  W.S. US. (ft)                2845.45    Weir Sta DS (ft)
  E.G. DS (ft)                 2843.81    Min El Weir Flow (ft)        2842.90
  W.S. DS (ft)                 2838.85    Wr Top Wdth (ft)
  Q US (cfs)                   1500.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          25.89    Weir Avg Depth (ft)
  Q DS (cfs)                   1500.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  1.73    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             25.89
  Q Culv (cfs)                   25.89    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              439.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2836.35
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2836.20
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1
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  E.G. US. (ft)                2840.76    Weir Sta US (ft)
  W.S. US. (ft)                2840.68    Weir Sta DS (ft)
  E.G. DS (ft)                 2837.57    Min El Weir Flow (ft)        2842.90
  W.S. DS (ft)                 2836.05    Wr Top Wdth (ft)
  Q US (cfs)                    200.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          15.96    Weir Avg Depth (ft)
  Q DS (cfs)                    200.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  7.98    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             15.96
  Q Culv (cfs)                   15.96    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              439.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2836.35
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2836.20
  Breach Flow Area (sq ft)


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

LATERAL STRUCTURE OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2845.26    Weir Sta US (ft)
  W.S. US. (ft)                2844.74    Weir Sta DS (ft)
  E.G. DS (ft)                 2842.92    Min El Weir Flow (ft)        2842.90
  W.S. DS (ft)                 2838.36    Wr Top Wdth (ft)
  Q US (cfs)                   1220.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          24.64    Weir Avg Depth (ft)
  Q DS (cfs)                   1220.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  2.02    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             24.64
  Q Culv (cfs)                   24.64    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              439.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2836.35
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2836.20
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2843.90    Weir Sta US (ft)
  W.S. US. (ft)                2843.54    Weir Sta DS (ft)
  E.G. DS (ft)                 2841.39    Min El Weir Flow (ft)        2842.90
  W.S. DS (ft)                 2837.59    Wr Top Wdth (ft)
  Q US (cfs)                    820.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          22.36    Weir Avg Depth (ft)
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  Q DS (cfs)                      820.00    Weir Flow Area (sq ft)
  Perc Q Leaving                    2.73    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                      0.00    Weir Submerg
  Q Gates (cfs)                             Q Culv Group (cfs)             22.36
  Q Culv (cfs)                     22.36    # Barrels                           1
  Q Lat RC (cfs)                            Culv Length (ft)              439.00
                                            Culv Depth Blocked (ft)
  Q Breach (cfs)                            Culv Inv El Up (ft)          2836.35
  Breach Avg Velocity (ft/s)                Culv Inv El Dn (ft)          2836.20
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                  2842.53    Weir Sta US (ft)
  W.S. US. (ft)                  2842.31    Weir Sta DS (ft)
  E.G. DS (ft)                   2839.80    Min El Weir Flow (ft)        2842.90
  W.S. DS (ft)                   2836.87    Wr Top Wdth (ft)
  Q US (cfs)                      500.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)            19.82    Weir Avg Depth (ft)
  Q DS (cfs)                      500.00    Weir Flow Area (sq ft)
  Perc Q Leaving                    3.96    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                      0.00    Weir Submerg
  Q Gates (cfs)                             Q Culv Group (cfs)             19.82
  Q Culv (cfs)                     19.82    # Barrels                           1
  Q Lat RC (cfs)                            Culv Length (ft)              439.00
                                            Culv Depth Blocked (ft)
  Q Breach (cfs)                            Culv Inv El Up (ft)          2836.35
  Breach Avg Velocity (ft/s)                Culv Inv El Dn (ft)          2836.20
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 10513

INPUT
Description: Section 105+13 Chute (sag)
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     222  2846.2     242  2846.2     254  2836.4     269  2836.4     281  2846.2
  362.58  2846.2  367.33    2848  443.58    2849  462.06    2850

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
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     222    .016     242    .013     281    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     281                8       8       8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     222     242    2851       T
     281  462.06    2851       T
Left Levee      Station=     242      Elevation=    2851
Right Levee     Station=     281      Elevation=    2851

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2848.66    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.01    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2847.64    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2844.25    Flow Area (sq ft)                    320.87
  E.G. Slope (ft/ft)      0.000406    Area (sq ft)                         320.87
  Q Total (cfs)            2590.00    Flow (cfs)                          2590.00
  Top Width (ft)             39.00    Top Width (ft)                        39.00
  Vel Total (ft/s)            8.07    Avg. Vel. (ft/s)                       8.07
  Max Chl Dpth (ft)          11.24    Hydr. Depth (ft)                       8.23
  Conv. Total (cfs)       128597.6    Conv. (cfs)                        128597.6
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      48.87
  Min Ch El (ft)           2836.40    Shear (lb/sq ft)                       0.17
  Alpha                       1.00    Stream Power (lb/ft s)    462.06     242.00     281.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.35      33.00       0.34
  C & E Loss (ft)             0.16    Cum SA (acres)              0.20       7.94       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2848.88    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.05    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2847.82    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2844.42    Flow Area (sq ft)                    327.90
  E.G. Slope (ft/ft)      0.000414    Area (sq ft)                         327.90
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             39.00    Top Width (ft)                        39.00
  Vel Total (ft/s)            8.23    Avg. Vel. (ft/s)                       8.23
  Max Chl Dpth (ft)          11.42    Hydr. Depth (ft)                       8.41
  Conv. Total (cfs)       132674.0    Conv. (cfs)                        132674.0
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      49.23
  Min Ch El (ft)           2836.40    Shear (lb/sq ft)                       0.17
  Alpha                       1.00    Stream Power (lb/ft s)    462.06     242.00     281.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.28      30.14       0.27
  C & E Loss (ft)             0.16    Cum SA (acres)              0.17       7.76       0.15


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.
```

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2846.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.013	
W.S. Elev (ft)	2845.45	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2842.17	Flow Area (sq ft)		236.17	
E.G. Slope (ft/ft)	0.000325	Area (sq ft)		236.17	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	37.17	Top Width (ft)		37.17	
Vel Total (ft/s)	6.35	Avg. Vel. (ft/s)		6.35	
Max Chl Dpth (ft)	9.05	Hydr. Depth (ft)		6.35	
Conv. Total (cfs)	83225.1	Conv. (cfs)		83225.1	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		43.63	
Min Ch El (ft)	2836.40	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	19.72	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	7.13	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2840.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2840.68	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2838.09	Flow Area (sq ft)		86.66	
E.G. Slope (ft/ft)	0.000093	Area (sq ft)		86.66	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.48	Top Width (ft)		25.48	
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)		2.31	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		3.40	
Conv. Total (cfs)	20773.0	Conv. (cfs)		20773.0	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		28.54	
Min Ch El (ft)	2836.40	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	4.72	0.01
C & E Loss (ft)	0.07	Cum SA (acres)	0.03	5.95	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2845.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.013	
W.S. Elev (ft)	2844.74	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2841.52	Flow Area (sq ft)		210.23	
E.G. Slope (ft/ft)	0.000295	Area (sq ft)		210.23	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	35.42	Top Width (ft)		35.42	
Vel Total (ft/s)	5.80	Avg. Vel. (ft/s)		5.80	
Max Chl Dpth (ft)	8.34	Hydr. Depth (ft)		5.94	

Conv. Total (cfs)	71030.2	Conv. (cfs)		71030.2	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		41.37	
Min Ch El (ft)	2836.40	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	18.90	0.13
C & E Loss (ft)	0.13	Cum SA (acres)	0.11	7.08	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2843.90	Element			
Vel Head (ft)	0.36	Wt. n-Val.		0.013	
W.S. Elev (ft)	2843.53	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2840.43	Flow Area (sq ft)		169.33	
E.G. Slope (ft/ft)	0.000241	Area (sq ft)		169.33	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	32.47	Top Width (ft)		32.47	
Vel Total (ft/s)	4.84	Avg. Vel. (ft/s)		4.84	
Max Chl Dpth (ft)	7.13	Hydr. Depth (ft)		5.21	
Conv. Total (cfs)	52822.0	Conv. (cfs)		52822.0	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		37.56	
Min Ch El (ft)	2836.40	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	14.72	0.08
C & E Loss (ft)	0.12	Cum SA (acres)	0.08	6.79	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2842.53	Element			
Vel Head (ft)	0.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2842.31	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2839.39	Flow Area (sq ft)		131.31	
E.G. Slope (ft/ft)	0.000181	Area (sq ft)		131.31	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	29.46	Top Width (ft)		29.46	
Vel Total (ft/s)	3.81	Avg. Vel. (ft/s)		3.81	
Max Chl Dpth (ft)	5.91	Hydr. Depth (ft)		4.46	
Conv. Total (cfs)	37182.3	Conv. (cfs)		37182.3	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		33.67	
Min Ch El (ft)	2836.40	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	10.30	0.04
C & E Loss (ft)	0.10	Cum SA (acres)	0.06	6.46	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10505

INPUT
Description: Section 105+05 Chute (D/S)
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
222	2846.3	242	2846.3	254	2838.3	269	2838.3	281	2846.3
362.58	2846.3	367.33	2848	443.58	2849	462.06	2850		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	160.6	160.6	160.6	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
222	242	2849.5	T
281	462.06	2849.5	T

Left Levee Station= 242 Elevation= 2849.5
Right Levee Station= 281 Elevation= 2849.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2848.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.63	Wt. n-Val.		0.013	
W.S. Elev (ft)	2845.86	Reach Len. (ft)	160.60	160.60	160.60
Crit W.S. (ft)	2845.86	Flow Area (sq ft)		198.98	
E.G. Slope (ft/ft)	0.001642	Area (sq ft)		198.98	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	37.67	Top Width (ft)		37.67	
Vel Total (ft/s)	13.02	Avg. Vel. (ft/s)		13.02	
Max Chl Dpth (ft)	7.56	Hydr. Depth (ft)		5.28	
Conv. Total (cfs)	63907.1	Conv. (cfs)		63907.1	
Length Wtd. (ft)	160.60	Wetted Per. (ft)		42.24	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.35	32.95	0.34
C & E Loss (ft)	0.00	Cum SA (acres)	0.20	7.94	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2848.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.67	Wt. n-Val.		0.013	
W.S. Elev (ft)	2846.04	Reach Len. (ft)	160.60	160.60	160.60
Crit W.S. (ft)	2846.04	Flow Area (sq ft)		205.96	
E.G. Slope (ft/ft)	0.001624	Area (sq ft)		205.96	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	38.22	Top Width (ft)		38.22	
Vel Total (ft/s)	13.11	Avg. Vel. (ft/s)		13.11	
Max Chl Dpth (ft)	7.74	Hydr. Depth (ft)		5.39	
Conv. Total (cfs)	66989.8	Conv. (cfs)		66989.8	
Length Wtd. (ft)	160.60	Wetted Per. (ft)		42.91	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.28	30.09	0.27
C & E Loss (ft)	0.00	Cum SA (acres)	0.17	7.75	0.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2845.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2843.90	Reach Len. (ft)	160.60	160.60	160.60
Crit W.S. (ft)	2843.90	Flow Area (sq ft)		130.91	
E.G. Slope (ft/ft)	0.001742	Area (sq ft)		130.91	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	31.79	Top Width (ft)		31.79	
Vel Total (ft/s)	11.46	Avg. Vel. (ft/s)		11.46	
Max Chl Dpth (ft)	5.60	Hydr. Depth (ft)		4.12	
Conv. Total (cfs)	35934.5	Conv. (cfs)		35934.5	
Length Wtd. (ft)	160.60	Wetted Per. (ft)		35.18	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.13	19.69	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	7.12	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2840.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.		0.013	
W.S. Elev (ft)	2839.96	Reach Len. (ft)	160.60	160.60	160.60
Crit W.S. (ft)	2839.96	Flow Area (sq ft)		29.09	
E.G. Slope (ft/ft)	0.002342	Area (sq ft)		29.09	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	19.99	Top Width (ft)		19.99	
Vel Total (ft/s)	6.88	Avg. Vel. (ft/s)		6.88	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	4132.5	Conv. (cfs)		4132.5	
Length Wtd. (ft)	160.60	Wetted Per. (ft)		21.00	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	0.01	4.71	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	5.95	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2845.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	Wt. n-Val.		0.013	
W.S. Elev (ft)	2843.28	Reach Len. (ft)	160.60	160.60	160.60
Crit W.S. (ft)	2843.28	Flow Area (sq ft)		111.99	
E.G. Slope (ft/ft)	0.001779	Area (sq ft)		111.99	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	29.95	Top Width (ft)		29.95	
Vel Total (ft/s)	10.89	Avg. Vel. (ft/s)		10.89	
Max Chl Dpth (ft)	4.98	Hydr. Depth (ft)		3.74	
Conv. Total (cfs)	28926.2	Conv. (cfs)		28926.2	
Length Wtd. (ft)	160.60	Wetted Per. (ft)		32.97	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	0.13	18.87	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	7.07	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2843.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.013	
W.S. Elev (ft)	2842.25	Reach Len. (ft)	160.60	160.60	160.60
Crit W.S. (ft)	2842.25	Flow Area (sq ft)		82.76	
E.G. Slope (ft/ft)	0.001878	Area (sq ft)		82.76	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	26.86	Top Width (ft)		26.86	
Vel Total (ft/s)	9.91	Avg. Vel. (ft/s)		9.91	
Max Chl Dpth (ft)	3.95	Hydr. Depth (ft)		3.08	
Conv. Total (cfs)	18922.1	Conv. (cfs)		18922.1	
Length Wtd. (ft)	160.60	Wetted Per. (ft)		29.26	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.08	14.69	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	6.79	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2842.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.18	Wt. n-Val.		0.013	
W.S. Elev (ft)	2841.25	Reach Len. (ft)	160.60	160.60	160.60
Crit W.S. (ft)	2841.25	Flow Area (sq ft)		57.26	
E.G. Slope (ft/ft)	0.001999	Area (sq ft)		57.26	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	23.84	Top Width (ft)		23.84	
Vel Total (ft/s)	8.73	Avg. Vel. (ft/s)		8.73	
Max Chl Dpth (ft)	2.95	Hydr. Depth (ft)		2.40	
Conv. Total (cfs)	11184.0	Conv. (cfs)		11184.0	
Length Wtd. (ft)	160.60	Wetted Per. (ft)		25.63	
Min Ch El (ft)	2838.30	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)	462.06	242.00	281.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.04	10.28	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	6.46	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

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         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 10344.4*

INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2851.5  123.58 2850.84  143.02 2850.33   152.2 2849.94  165.01  2849.4
  183.37 2848.51  184.35 2848.23     197 2844.93     203 2841.93     216 2841.93
     222 2844.93     242 2844.93     254 2836.93     269 2836.93     281 2844.93
     301 2844.93  356.13 2844.56  360.51 2845.29  368.87 2845.34  430.73  2846.2
  447.75    2847

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     281    .016     301    .035
  447.75    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     281           269.45  269.45  269.45             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242  2846.5       T
     281  447.75  2846.5       T
Left Levee      Station=     242      Elevation=  2846.5
Right Levee     Station=     281      Elevation=  2846.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2847.87    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               4.88    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2842.99    Reach Len. (ft)            269.45     269.45     269.45
  Crit W.S. (ft)           2844.49    Flow Area (sq ft)                     146.08
  E.G. Slope (ft/ft)      0.003837    Area (sq ft)                          146.08
  Q Total (cfs)            2590.00    Flow (cfs)                           2590.00
  Top Width (ft)             33.19    Top Width (ft)                         33.19
  Vel Total (ft/s)           17.73    Avg. Vel. (ft/s)                       17.73
  Max Chl Dpth (ft)           6.06    Hydr. Depth (ft)                        4.40
  Conv. Total (cfs)        41813.7    Conv. (cfs)                         41813.7
  Length Wtd. (ft)          269.45    Wetted Per. (ft)                       36.86
  Min Ch El (ft)           2836.93    Shear (lb/sq ft)                        0.95
  Alpha                       1.00    Stream Power (lb/ft s)     447.75     242.00     281.00
  Frctn Loss (ft)             0.39    Cum Volume (acre-ft)         0.35      32.32       0.34
  C & E Loss (ft)             0.23    Cum SA (acres)               0.20       7.81       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2848.10    Element                    Left OB    Channel   Right OB
```

Vel Head (ft)	4.95	Wt. n-Val.		0.013	
W.S. Elev (ft)	2843.15	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2844.67	Flow Area (sq ft)		151.20	
E.G. Slope (ft/ft)	0.003791	Area (sq ft)		151.20	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	33.65	Top Width (ft)		33.65	
Vel Total (ft/s)	17.86	Avg. Vel. (ft/s)		17.86	
Max Chl Dpth (ft)	6.22	Hydr. Depth (ft)		4.49	
Conv. Total (cfs)	43849.3	Conv. (cfs)		43849.3	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		37.41	
Min Ch El (ft)	2836.93	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)	447.75	242.00	281.00
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.28	29.43	0.27
C & E Loss (ft)	0.23	Cum SA (acres)	0.17	7.62	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2845.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2841.25	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2842.51	Flow Area (sq ft)		92.86	
E.G. Slope (ft/ft)	0.004542	Area (sq ft)		92.86	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	27.97	Top Width (ft)		27.97	
Vel Total (ft/s)	16.15	Avg. Vel. (ft/s)		16.15	
Max Chl Dpth (ft)	4.32	Hydr. Depth (ft)		3.32	
Conv. Total (cfs)	22256.5	Conv. (cfs)		22256.5	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		30.59	
Min Ch El (ft)	2836.93	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)	447.75	242.00	281.00
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	0.13	19.27	0.13
C & E Loss (ft)	0.20	Cum SA (acres)	0.11	7.01	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2839.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.88	Wt. n-Val.		0.013	
W.S. Elev (ft)	2838.02	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2838.60	Flow Area (sq ft)		18.19	
E.G. Slope (ft/ft)	0.009771	Area (sq ft)		18.19	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.28	Top Width (ft)		18.28	
Vel Total (ft/s)	11.00	Avg. Vel. (ft/s)		11.00	
Max Chl Dpth (ft)	1.09	Hydr. Depth (ft)		0.99	
Conv. Total (cfs)	2023.3	Conv. (cfs)		2023.3	

Length Wtd. (ft)	269.45	Wetted Per. (ft)		18.94	
Min Ch El (ft)	2836.93	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)	447.75	242.00	281.00
Frctn Loss (ft)	0.68	Cum Volume (acre-ft)	0.01	4.62	0.01
C & E Loss (ft)	0.11	Cum SA (acres)	0.03	5.88	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2844.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.77	Wt. n-Val.		0.013	
W.S. Elev (ft)	2840.72	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2841.91	Flow Area (sq ft)		78.31	
E.G. Slope (ft/ft)	0.004862	Area (sq ft)		78.31	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	26.36	Top Width (ft)		26.36	
Vel Total (ft/s)	15.58	Avg. Vel. (ft/s)		15.58	
Max Chl Dpth (ft)	3.79	Hydr. Depth (ft)		2.97	
Conv. Total (cfs)	17496.1	Conv. (cfs)		17496.1	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		28.65	
Min Ch El (ft)	2836.93	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)	447.75	242.00	281.00
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	0.13	18.52	0.13
C & E Loss (ft)	0.19	Cum SA (acres)	0.11	6.97	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2843.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.28	Wt. n-Val.		0.013	
W.S. Elev (ft)	2839.84	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2840.88	Flow Area (sq ft)		56.44	
E.G. Slope (ft/ft)	0.005602	Area (sq ft)		56.44	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	23.74	Top Width (ft)		23.74	
Vel Total (ft/s)	14.53	Avg. Vel. (ft/s)		14.53	
Max Chl Dpth (ft)	2.91	Hydr. Depth (ft)		2.38	
Conv. Total (cfs)	10955.7	Conv. (cfs)		10955.7	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		25.51	
Min Ch El (ft)	2836.93	Shear (lb/sq ft)		0.77	
Alpha	1.00	Stream Power (lb/ft s)	447.75	242.00	281.00
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	0.08	14.44	0.08
C & E Loss (ft)	0.18	Cum SA (acres)	0.08	6.69	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2841.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.73	Wt. n-Val.		0.013	
W.S. Elev (ft)	2839.01	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2839.88	Flow Area (sq ft)		37.72	
E.G. Slope (ft/ft)	0.006754	Area (sq ft)		37.72	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	21.24	Top Width (ft)		21.24	
Vel Total (ft/s)	13.25	Avg. Vel. (ft/s)		13.25	
Max Chl Dpth (ft)	2.08	Hydr. Depth (ft)		1.78	
Conv. Total (cfs)	6084.1	Conv. (cfs)		6084.1	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		22.51	
Min Ch El (ft)	2836.93	Shear (lb/sq ft)		0.71	
Alpha	1.00	Stream Power (lb/ft s)	447.75	242.00	281.00
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)	0.04	10.11	0.04
C & E Loss (ft)	0.15	Cum SA (acres)	0.06	6.37	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10075*

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2848	123.58	2847.23	143.02	2846.66	152.2	2846.29	165.01	2845.8
183.37	2845.02	184.35	2844.82	197	2842.85	203	2839.85	216	2839.85
222	2842.85	242	2842.85	254	2834.85	269	2834.85	281	2842.85
301	2842.85	349.69	2842.12	353.69	2842.58	361.33	2842.56	417.89	2843.39
433.45	2844								

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	216	.016	242	.013	281	.016	301	.035
433.45	.035								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	269.45	269.45	269.45	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2844	T
281	433.45	2844	T

Left Levee Station= 242 Elevation= 2844
Right Levee Station= 281 Elevation= 2844

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2846.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	2840.43	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2842.41	Flow Area (sq ft)		130.47	
E.G. Slope (ft/ft)	0.005244	Area (sq ft)		130.47	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	31.75	Top Width (ft)		31.75	
Vel Total (ft/s)	19.85	Avg. Vel. (ft/s)		19.85	
Max Chl Dpth (ft)	5.58	Hydr. Depth (ft)		4.11	
Conv. Total (cfs)	35766.5	Conv. (cfs)		35766.5	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		35.13	
Min Ch El (ft)	2834.85	Shear (lb/sq ft)		1.22	
Alpha	1.00	Stream Power (lb/ft s)	433.45	242.00	281.00
Frctn Loss (ft)	1.20	Cum Volume (acre-ft)	0.35	31.46	0.34
C & E Loss (ft)	0.12	Cum SA (acres)	0.20	7.61	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2846.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2840.57	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2842.56	Flow Area (sq ft)		134.96	
E.G. Slope (ft/ft)	0.005189	Area (sq ft)		134.96	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	32.17	Top Width (ft)		32.17	
Vel Total (ft/s)	20.01	Avg. Vel. (ft/s)		20.01	
Max Chl Dpth (ft)	5.72	Hydr. Depth (ft)		4.20	
Conv. Total (cfs)	37483.4	Conv. (cfs)		37483.4	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		35.63	
Min Ch El (ft)	2834.85	Shear (lb/sq ft)		1.23	
Alpha	1.00	Stream Power (lb/ft s)	433.45	242.00	281.00
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)	0.28	28.54	0.27
C & E Loss (ft)	0.13	Cum SA (acres)	0.17	7.42	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2843.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.96	Wt. n-Val.		0.013	
W.S. Elev (ft)	2838.85	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2840.45	Flow Area (sq ft)		83.93	
E.G. Slope (ft/ft)	0.006041	Area (sq ft)		83.93	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	26.99	Top Width (ft)		26.99	
Vel Total (ft/s)	17.87	Avg. Vel. (ft/s)		17.87	
Max Chl Dpth (ft)	4.00	Hydr. Depth (ft)		3.11	

Conv. Total (cfs)	19299.1	Conv. (cfs)		19299.1	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		29.41	
Min Ch El (ft)	2834.85	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)	433.45	242.00	281.00
Frctn Loss (ft)	1.40	Cum Volume (acre-ft)	0.13	18.73	0.13
C & E Loss (ft)	0.09	Cum SA (acres)	0.11	6.84	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2837.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.013	
W.S. Elev (ft)	2836.05	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2836.53	Flow Area (sq ft)		20.23	
E.G. Slope (ft/ft)	0.007044	Area (sq ft)		20.23	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.61	Top Width (ft)		18.61	
Vel Total (ft/s)	9.89	Avg. Vel. (ft/s)		9.89	
Max Chl Dpth (ft)	1.20	Hydr. Depth (ft)		1.09	
Conv. Total (cfs)	2383.0	Conv. (cfs)		2383.0	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		19.34	
Min Ch El (ft)	2834.85	Shear (lb/sq ft)		0.46	
Alpha	1.00	Stream Power (lb/ft s)	433.45	242.00	281.00
Frctn Loss (ft)	2.22	Cum Volume (acre-ft)	0.01	4.50	0.01
C & E Loss (ft)	0.11	Cum SA (acres)	0.03	5.76	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2842.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.56	Wt. n-Val.		0.013	
W.S. Elev (ft)	2838.36	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2839.83	Flow Area (sq ft)		71.23	
E.G. Slope (ft/ft)	0.006364	Area (sq ft)		71.23	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	25.54	Top Width (ft)		25.54	
Vel Total (ft/s)	17.13	Avg. Vel. (ft/s)		17.13	
Max Chl Dpth (ft)	3.51	Hydr. Depth (ft)		2.79	
Conv. Total (cfs)	15292.9	Conv. (cfs)		15292.9	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		27.67	
Min Ch El (ft)	2834.85	Shear (lb/sq ft)		1.02	
Alpha	1.00	Stream Power (lb/ft s)	433.45	242.00	281.00
Frctn Loss (ft)	1.49	Cum Volume (acre-ft)	0.13	18.06	0.13
C & E Loss (ft)	0.08	Cum SA (acres)	0.11	6.81	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2841.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.80	Wt. n-Val.		0.013	
W.S. Elev (ft)	2837.59	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2838.81	Flow Area (sq ft)		52.41	
E.G. Slope (ft/ft)	0.006943	Area (sq ft)		52.41	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	23.23	Top Width (ft)		23.23	
Vel Total (ft/s)	15.65	Avg. Vel. (ft/s)		15.65	
Max Chl Dpth (ft)	2.74	Hydr. Depth (ft)		2.26	
Conv. Total (cfs)	9841.4	Conv. (cfs)		9841.4	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		24.89	
Min Ch El (ft)	2834.85	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)	433.45	242.00	281.00
Frctn Loss (ft)	1.68	Cum Volume (acre-ft)	0.08	14.10	0.08
C & E Loss (ft)	0.05	Cum SA (acres)	0.08	6.55	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2839.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.93	Wt. n-Val.		0.013	
W.S. Elev (ft)	2836.87	Reach Len. (ft)	269.45	269.45	269.45
Crit W.S. (ft)	2837.80	Flow Area (sq ft)		36.41	
E.G. Slope (ft/ft)	0.007502	Area (sq ft)		36.41	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	21.06	Top Width (ft)		21.06	
Vel Total (ft/s)	13.73	Avg. Vel. (ft/s)		13.73	
Max Chl Dpth (ft)	2.02	Hydr. Depth (ft)		1.73	
Conv. Total (cfs)	5772.7	Conv. (cfs)		5772.7	
Length Wtd. (ft)	269.45	Wetted Per. (ft)		22.28	
Min Ch El (ft)	2834.85	Shear (lb/sq ft)		0.77	
Alpha	1.00	Stream Power (lb/ft s)	433.45	242.00	281.00
Frctn Loss (ft)	1.92	Cum Volume (acre-ft)	0.04	9.88	0.04
C & E Loss (ft)	0.02	Cum SA (acres)	0.06	6.24	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9805.55*

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
     100  2844.5  123.58 2843.61  143.02 2842.99   152.2 2842.65  165.01  2842.2
  183.37 2841.52  184.35 2841.41     197 2840.77     203 2837.77     216 2837.77
     222 2840.77     242 2840.77     254 2832.77     269 2832.77     281 2840.77
     301 2840.77  343.24 2839.68  346.86 2839.87  353.79 2839.78  405.04 2840.59
  419.14    2841

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     216    .016     242    .013     281    .016     301    .035
  419.14    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     281           230.55  230.55  230.55             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242  2841.5       T
     281  419.14  2841.5       T
Left Levee      Station=     242      Elevation=  2841.5
Right Levee     Station=     281      Elevation=  2841.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2844.96    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               6.83    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2838.13    Reach Len. (ft)            230.55     230.55     230.55
  Crit W.S. (ft)           2840.33    Flow Area (sq ft)                     123.47
  E.G. Slope (ft/ft)      0.006111    Area (sq ft)                          123.47
  Q Total (cfs)            2590.00    Flow (cfs)                           2590.00
  Top Width (ft)             31.08    Top Width (ft)                         31.08
  Vel Total (ft/s)           20.98    Avg. Vel. (ft/s)                       20.98
  Max Chl Dpth (ft)           5.36    Hydr. Depth (ft)                        3.97
  Conv. Total (cfs)        33132.3    Conv. (cfs)                         33132.3
  Length Wtd. (ft)          230.55    Wetted Per. (ft)                       34.32
  Min Ch El (ft)           2832.77    Shear (lb/sq ft)                        1.37
  Alpha                       1.00    Stream Power (lb/ft s)     419.14     242.00     281.00
  Frctn Loss (ft)             1.52    Cum Volume (acre-ft)         0.35      30.68       0.34
  C & E Loss (ft)             0.07    Cum SA (acres)               0.20       7.41       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2845.21    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               6.95    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2838.26    Reach Len. (ft)            230.55     230.55     230.55
  Crit W.S. (ft)           2840.51    Flow Area (sq ft)                     127.64
  E.G. Slope (ft/ft)      0.006056    Area (sq ft)                          127.64
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             31.48    Top Width (ft)                         31.48
  Vel Total (ft/s)           21.15    Avg. Vel. (ft/s)                       21.15
  Max Chl Dpth (ft)           5.49    Hydr. Depth (ft)                        4.05
  Conv. Total (cfs)        34694.8    Conv. (cfs)                         34694.8
  Length Wtd. (ft)          230.55    Wetted Per. (ft)                       34.80
  Min Ch El (ft)           2832.77    Shear (lb/sq ft)                        1.39
  Alpha                       1.00    Stream Power (lb/ft s)     419.14     242.00     281.00
  Frctn Loss (ft)             1.51    Cum Volume (acre-ft)         0.28      27.73       0.27
  C & E Loss (ft)             0.07    Cum SA (acres)               0.17       7.22       0.15
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Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2842.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2836.64	Reach Len. (ft)	230.55	230.55	230.55
Crit W.S. (ft)	2838.37	Flow Area (sq ft)		80.44	
E.G. Slope (ft/ft)	0.006811	Area (sq ft)		80.44	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	26.60	Top Width (ft)		26.60	
Vel Total (ft/s)	18.65	Avg. Vel. (ft/s)		18.65	
Max Chl Dpth (ft)	3.87	Hydr. Depth (ft)		3.02	
Conv. Total (cfs)	18175.1	Conv. (cfs)		18175.1	
Length Wtd. (ft)	230.55	Wetted Per. (ft)		28.94	
Min Ch El (ft)	2832.77	Shear (lb/sq ft)		1.18	
Alpha	1.00	Stream Power (lb/ft s)	419.14	242.00	281.00
Frctn Loss (ft)	1.73	Cum Volume (acre-ft)	0.13	18.22	0.13
C & E Loss (ft)	0.04	Cum SA (acres)	0.11	6.68	0.10

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2835.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.62	Wt. n-Val.		0.013	
W.S. Elev (ft)	2833.94	Reach Len. (ft)	230.55	230.55	230.55
Crit W.S. (ft)	2834.44	Flow Area (sq ft)		19.56	
E.G. Slope (ft/ft)	0.007816	Area (sq ft)		19.56	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.50	Top Width (ft)		18.50	
Vel Total (ft/s)	10.23	Avg. Vel. (ft/s)		10.23	
Max Chl Dpth (ft)	1.17	Hydr. Depth (ft)		1.06	
Conv. Total (cfs)	2262.2	Conv. (cfs)		2262.2	
Length Wtd. (ft)	230.55	Wetted Per. (ft)		19.21	
Min Ch El (ft)	2832.77	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	419.14	242.00	281.00
Frctn Loss (ft)	2.00	Cum Volume (acre-ft)	0.01	4.38	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	5.65	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2841.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.90	Wt. n-Val.		0.013	
W.S. Elev (ft)	2836.18	Reach Len. (ft)	230.55	230.55	230.55
Crit W.S. (ft)	2837.75	Flow Area (sq ft)		68.70	

E.G. Slope (ft/ft)	0.007055	Area (sq ft)		68.70	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	25.24	Top Width (ft)		25.24	
Vel Total (ft/s)	17.76	Avg. Vel. (ft/s)		17.76	
Max Chl Dpth (ft)	3.41	Hydr. Depth (ft)		2.72	
Conv. Total (cfs)	14524.5	Conv. (cfs)		14524.5	
Length Wtd. (ft)	230.55	Wetted Per. (ft)		27.31	
Min Ch El (ft)	2832.77	Shear (lb/sq ft)		1.11	
Alpha	1.00	Stream Power (lb/ft s)	419.14	242.00	281.00
Frctn Loss (ft)	1.80	Cum Volume (acre-ft)	0.13	17.62	0.13
C & E Loss (ft)	0.03	Cum SA (acres)	0.11	6.65	0.10

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2839.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.98	Wt. n-Val.		0.013	
W.S. Elev (ft)	2835.46	Reach Len. (ft)	230.55	230.55	230.55
Crit W.S. (ft)	2836.71	Flow Area (sq ft)		51.20	
E.G. Slope (ft/ft)	0.007426	Area (sq ft)		51.20	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	23.07	Top Width (ft)		23.07	
Vel Total (ft/s)	16.01	Avg. Vel. (ft/s)		16.01	
Max Chl Dpth (ft)	2.69	Hydr. Depth (ft)		2.22	
Conv. Total (cfs)	9515.4	Conv. (cfs)		9515.4	
Length Wtd. (ft)	230.55	Wetted Per. (ft)		24.70	
Min Ch El (ft)	2832.77	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)	419.14	242.00	281.00
Frctn Loss (ft)	1.93	Cum Volume (acre-ft)	0.08	13.78	0.08
C & E Loss (ft)	0.02	Cum SA (acres)	0.08	6.41	0.08

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2837.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.97	Wt. n-Val.		0.013	
W.S. Elev (ft)	2834.78	Reach Len. (ft)	230.55	230.55	230.55
Crit W.S. (ft)	2835.70	Flow Area (sq ft)		36.14	
E.G. Slope (ft/ft)	0.007664	Area (sq ft)		36.14	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	21.02	Top Width (ft)		21.02	
Vel Total (ft/s)	13.83	Avg. Vel. (ft/s)		13.83	
Max Chl Dpth (ft)	2.01	Hydr. Depth (ft)		1.72	
Conv. Total (cfs)	5711.3	Conv. (cfs)		5711.3	
Length Wtd. (ft)	230.55	Wetted Per. (ft)		22.24	
Min Ch El (ft)	2832.77	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)	419.14	242.00	281.00
Frctn Loss (ft)	2.04	Cum Volume (acre-ft)	0.04	9.65	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	6.11	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

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         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 9575

INPUT
Description: Section 95+75 (approach to Pohez Rd.)
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2841  123.58    2840   152.2    2839  184.35    2838     197  2838.7
     203  2835.7     216  2835.7     222  2838.7     242  2838.7     243  2830.3
     280  2830.3     281  2838.7  346.25    2837  404.83    2838

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     281    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     281             38.9    38.9    38.9             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     100     242  2838.7       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2842.64    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               9.54    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2833.10    Reach Len. (ft)            38.90      38.90      38.90
  Crit W.S. (ft)           2835.63    Flow Area (sq ft)                    104.52
  E.G. Slope (ft/ft)      0.014222    Area (sq ft)                         104.52
  Q Total (cfs)            2590.00    Flow (cfs)                          2590.00
  Top Width (ft)             37.67    Top Width (ft)                        37.67
  Vel Total (ft/s)           24.78    Avg. Vel. (ft/s)                      24.78
  Max Chl Dpth (ft)           2.80    Hydr. Depth (ft)                       2.77
  Conv. Total (cfs)        21718.3    Conv. (cfs)                         21718.3
  Length Wtd. (ft)           38.90    Wetted Per. (ft)                      42.64
  Min Ch El (ft)           2830.30    Shear (lb/sq ft)                       2.18
  Alpha                       1.00    Stream Power (lb/ft s)    404.83       0.00       0.00
  Frctn Loss (ft)             2.06    Cum Volume (acre-ft)        0.35      30.07       0.34
  C & E Loss (ft)             0.27    Cum SA (acres)              0.20       7.23       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2842.90    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               9.71    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2833.19    Reach Len. (ft)            38.90      38.90      38.90
  Crit W.S. (ft)           2835.77    Flow Area (sq ft)                    107.96
  E.G. Slope (ft/ft)      0.013954    Area (sq ft)                         107.96
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Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	37.69	Top Width (ft)		37.69	
Vel Total (ft/s)	25.01	Avg. Vel. (ft/s)		25.01	
Max Chl Dpth (ft)	2.89	Hydr. Depth (ft)		2.86	
Conv. Total (cfs)	22857.1	Conv. (cfs)		22857.1	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		42.82	
Min Ch El (ft)	2830.30	Shear (lb/sq ft)		2.20	
Alpha	1.00	Stream Power (lb/ft s)	404.83	0.00	0.00
Frctn Loss (ft)	2.03	Cum Volume (acre-ft)	0.28	27.11	0.27
C & E Loss (ft)	0.28	Cum SA (acres)	0.17	7.04	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2839.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2832.16	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2834.00	Flow Area (sq ft)		69.22	
E.G. Slope (ft/ft)	0.017734	Area (sq ft)		69.22	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	37.44	Top Width (ft)		37.44	
Vel Total (ft/s)	21.67	Avg. Vel. (ft/s)		21.67	
Max Chl Dpth (ft)	1.86	Hydr. Depth (ft)		1.85	
Conv. Total (cfs)	11264.0	Conv. (cfs)		11264.0	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		40.75	
Min Ch El (ft)	2830.30	Shear (lb/sq ft)		1.88	
Alpha	1.00	Stream Power (lb/ft s)	404.83	0.00	0.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	0.13	17.82	0.13
C & E Loss (ft)	0.19	Cum SA (acres)	0.11	6.51	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2832.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.83	Wt. n-Val.		0.013	
W.S. Elev (ft)	2830.80	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2831.27	Flow Area (sq ft)		18.40	
E.G. Slope (ft/ft)	0.023771	Area (sq ft)		18.40	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	37.12	Top Width (ft)		37.12	
Vel Total (ft/s)	10.87	Avg. Vel. (ft/s)		10.87	
Max Chl Dpth (ft)	0.50	Hydr. Depth (ft)		0.50	
Conv. Total (cfs)	1297.2	Conv. (cfs)		1297.2	

Length Wtd. (ft)	38.90	Wetted Per. (ft)		38.00	
Min Ch El (ft)	2830.30	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)	404.83	0.00	0.00
Frctn Loss (ft)	2.91	Cum Volume (acre-ft)	0.01	4.28	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	5.50	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2838.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.51	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.90	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2833.53	Flow Area (sq ft)		59.58	
E.G. Slope (ft/ft)	0.019008	Area (sq ft)		59.58	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	37.38	Top Width (ft)		37.38	
Vel Total (ft/s)	20.48	Avg. Vel. (ft/s)		20.48	
Max Chl Dpth (ft)	1.60	Hydr. Depth (ft)		1.59	
Conv. Total (cfs)	8849.0	Conv. (cfs)		8849.0	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		40.23	
Min Ch El (ft)	2830.30	Shear (lb/sq ft)		1.76	
Alpha	1.00	Stream Power (lb/ft s)	404.83	0.00	0.00
Frctn Loss (ft)	2.51	Cum Volume (acre-ft)	0.13	17.28	0.13
C & E Loss (ft)	0.16	Cum SA (acres)	0.11	6.49	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2836.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.52	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2832.78	Flow Area (sq ft)		45.16	
E.G. Slope (ft/ft)	0.021071	Area (sq ft)		45.16	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	37.29	Top Width (ft)		37.29	
Vel Total (ft/s)	18.16	Avg. Vel. (ft/s)		18.16	
Max Chl Dpth (ft)	1.22	Hydr. Depth (ft)		1.21	
Conv. Total (cfs)	5649.0	Conv. (cfs)		5649.0	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		39.45	
Min Ch El (ft)	2830.30	Shear (lb/sq ft)		1.51	
Alpha	1.00	Stream Power (lb/ft s)	404.83	0.00	0.00
Frctn Loss (ft)	2.70	Cum Volume (acre-ft)	0.08	13.52	0.08
C & E Loss (ft)	0.11	Cum SA (acres)	0.08	6.25	0.08

```
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)          2834.85    Element                    Left OB    Channel   Right OB
  Vel Head (ft)              3.67    Wt. n-Val.                            0.013
  W.S. Elev (ft)          2831.18    Reach Len. (ft)             38.90     38.90      38.90
  Crit W.S. (ft)          2832.09    Flow Area (sq ft)                     32.53
  E.G. Slope (ft/ft)     0.022847    Area (sq ft)                          32.53
  Q Total (cfs)            500.00    Flow (cfs)                           500.00
  Top Width (ft)            37.21    Top Width (ft)                        37.21
  Vel Total (ft/s)          15.37    Avg. Vel. (ft/s)                      15.37
  Max Chl Dpth (ft)          0.88    Hydr. Depth (ft)                       0.87
  Conv. Total (cfs)        3307.9    Conv. (cfs)                          3307.9
  Length Wtd. (ft)          38.90    Wetted Per. (ft)                      38.77
  Min Ch El (ft)          2830.30    Shear (lb/sq ft)                       1.20
  Alpha                      1.00    Stream Power (lb/ft s)    404.83       0.00       0.00
  Frctn Loss (ft)            2.83    Cum Volume (acre-ft)        0.04       9.47       0.04
  C & E Loss (ft)            0.07    Cum SA (acres)              0.06       5.96       0.06


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 9536.1

INPUT
Description: Section 95+36 (u/s face of Pohez Rd.)
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2841  123.58    2840   152.2    2839  184.35    2838     197  2838.7
     203  2835.7     216  2835.7     222  2838.7     242  2838.7     242    2830
     287    2830     287  2838.7  346.25    2837  404.83    2838

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     287             20.9    20.9    20.9             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2842       T
     287  404.83    2842       T
```

```
Left Levee      Station=     242      Elevation=    2842
Right Levee     Station=     287      Elevation=    2842

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2839.40    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.68    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2838.73    Reach Len. (ft)            20.90      20.90      20.90
  Crit W.S. (ft)           2834.70    Flow Area (sq ft)                    392.71
  E.G. Slope (ft/ft)      0.000287    Area (sq ft)                         392.71
  Q Total (cfs)            2590.00    Flow (cfs)                          2590.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)            6.60    Avg. Vel. (ft/s)                       6.60
  Max Chl Dpth (ft)           8.73    Hydr. Depth (ft)                       8.73
  Conv. Total (cfs)       152918.4    Conv. (cfs)                        152918.4
  Length Wtd. (ft)           20.90    Wetted Per. (ft)                      62.45
  Min Ch El (ft)           2830.00    Shear (lb/sq ft)                       0.11
  Alpha                       1.00    Stream Power (lb/ft s)    404.83     242.00     287.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.35      29.85       0.34
  C & E Loss (ft)                     Cum SA (acres)              0.20       7.19       0.17


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2839.62    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.70    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2838.92    Reach Len. (ft)            20.90      20.90      20.90
  Crit W.S. (ft)           2834.83    Flow Area (sq ft)                    401.41
  E.G. Slope (ft/ft)      0.000292    Area (sq ft)                         401.41
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)            6.73    Avg. Vel. (ft/s)                       6.73
  Max Chl Dpth (ft)           8.92    Hydr. Depth (ft)                       8.92
  Conv. Total (cfs)       157955.7    Conv. (cfs)                        157955.7
  Length Wtd. (ft)           20.90    Wetted Per. (ft)                      62.84
  Min Ch El (ft)           2830.00    Shear (lb/sq ft)                       0.12
  Alpha                       1.00    Stream Power (lb/ft s)    404.83     242.00     287.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.28      26.88       0.27
  C & E Loss (ft)                     Cum SA (acres)              0.17       7.00       0.15


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2836.57    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.46    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2836.11    Reach Len. (ft)            20.90      20.90      20.90
  Crit W.S. (ft)           2833.27    Flow Area (sq ft)                    274.99
  E.G. Slope (ft/ft)      0.000281    Area (sq ft)                         274.99
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)            5.45    Avg. Vel. (ft/s)                       5.45
  Max Chl Dpth (ft)           6.11    Hydr. Depth (ft)                       6.11
  Conv. Total (cfs)        89509.1    Conv. (cfs)                         89509.1
  Length Wtd. (ft)           20.90    Wetted Per. (ft)                      57.22
  Min Ch El (ft)           2830.00    Shear (lb/sq ft)                       0.08
  Alpha                       1.00    Stream Power (lb/ft s)    404.83     242.00     287.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.13      17.67       0.13
```

C & E Loss (ft)	Cum SA (acres)	0.11	6.47	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2831.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.43	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2830.85	Flow Area (sq ft)		64.41	
E.G. Slope (ft/ft)	0.000497	Area (sq ft)		64.41	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	3.10	Avg. Vel. (ft/s)		3.10	
Max Chl Dpth (ft)	1.43	Hydr. Depth (ft)		1.43	
Conv. Total (cfs)	8974.4	Conv. (cfs)		8974.4	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		47.86	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	404.83	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	4.24	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	5.47	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2835.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2835.32	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2832.86	Flow Area (sq ft)		239.16	
E.G. Slope (ft/ft)	0.000285	Area (sq ft)		239.16	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	5.10	Avg. Vel. (ft/s)		5.10	
Max Chl Dpth (ft)	5.31	Hydr. Depth (ft)		5.31	
Conv. Total (cfs)	72277.1	Conv. (cfs)		72277.1	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		55.63	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	404.83	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	17.15	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	6.45	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2834.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.		0.013	
W.S. Elev (ft)	2833.96	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2832.17	Flow Area (sq ft)		178.17	
E.G. Slope (ft/ft)	0.000321	Area (sq ft)		178.17	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	4.60	Avg. Vel. (ft/s)		4.60	
Max Chl Dpth (ft)	3.96	Hydr. Depth (ft)		3.96	
Conv. Total (cfs)	45745.9	Conv. (cfs)		45745.9	

Length Wtd. (ft)	20.90	Wetted Per. (ft)		52.92	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	404.83	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	13.42	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	6.21	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2833.79	Element			
Vel Head (ft)	2.99	Wt. n-Val.		0.013	
W.S. Elev (ft)	2830.80	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2831.57	Flow Area (sq ft)		36.05	
E.G. Slope (ft/ft)	0.020742	Area (sq ft)		36.05	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	13.87	Avg. Vel. (ft/s)		13.87	
Max Chl Dpth (ft)	0.80	Hydr. Depth (ft)		0.80	
Conv. Total (cfs)	3471.7	Conv. (cfs)		3471.7	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		46.60	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		1.00	
Alpha	1.00	Stream Power (lb/ft s)	404.83	242.00	287.00
Frctn Loss (ft)	0.85	Cum Volume (acre-ft)	0.04	9.44	0.04
C & E Loss (ft)	0.20	Cum SA (acres)	0.06	5.92	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 9525.6

INPUT
Description: Pohez Road
Distance from Upstream XS = .3
Deck/Roadway Width = 20.5
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
100	2841.5		222	2841.5		281	2841.5	
405	2841.5							

Upstream Bridge Cross Section Data
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2841	123.58	2840	152.2	2839	184.35	2838	197	2838.7
203	2835.7	216	2835.7	222	2838.7	242	2838.7	242	2830
287	2830	287	2838.7	346.25	2837	404.83	2838		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	287	.035

```
Bank Sta: Left   Right    Coeff Contr.   Expan.
           242     287             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2842       T
     287  404.83    2842       T
Left Levee      Station=     242      Elevation=    2842
Right Levee     Station=     287      Elevation=    2842

Downstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100  2841.5             222  2841.5             281  2841.5
   460.5  2841.5

Downstream Bridge Cross Section Data
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2841  122.95    2840   145.5    2839   180.5    2838     197    2838
     203    2835     216    2835     222    2838     242    2838     242    2830
     287    2830     287    2838  375.34    2837  424.69    2838  460.03    2839

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           242     287             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2841       T
     287  460.03    2841       T
Left Levee      Station=     242      Elevation=    2841
Right Levee     Station=     287      Elevation=    2841

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  2

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .3    20.5     .013     .013        0                   .2                1
Upstream   Elevation =  2835.7
           Centerline Station =  209.5
Downstream Elevation =  2835
           Centerline Station =  209.5

Culvert Name     Shape      Rise    Span
Culvert #2           Box       9      12
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .9      20     .013     .013        0                   .2                1
```

```
Number of Barrels =  3
Upstream   Elevation =  2830
Centerline Stations
    Sta.    Sta.    Sta.
     251   264.5     278
Downstream Elevation =  2830
Centerline Stations
    Sta.    Sta.    Sta.
     251   264.5     278

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)         22.09    Culv Full Len (ft)         20.50
  # Barrels                      1    Culv Vel US (ft/s)          7.03
  Q Barrel (cfs)             22.09    Culv Vel DS (ft/s)          7.03
  E.G. US. (ft)            2839.40    Culv Inv El Up (ft)      2835.70
  W.S. US. (ft)            2838.73    Culv Inv El Dn (ft)      2835.00
  E.G. DS (ft)             2838.69    Culv Frctn Ls (ft)          0.56
  W.S. DS (ft)             2837.84    Culv Exit Loss (ft)         0.00
  Delta EG (ft)               0.71    Culv Entr Loss (ft)         0.15
  Delta WS (ft)               0.89    Q Weir (cfs)
  E.G. IC (ft)             2838.97    Weir Sta Lft (ft)
  E.G. OC (ft)             2839.04    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2837.70    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2837.00    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.68    Min El Weir Flow (ft)    2841.51


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)         24.28    Culv Full Len (ft)         20.50
  # Barrels                      1    Culv Vel US (ft/s)          7.73
  Q Barrel (cfs)             24.28    Culv Vel DS (ft/s)          7.73
  E.G. US. (ft)            2839.62    Culv Inv El Up (ft)      2835.70
  W.S. US. (ft)            2838.92    Culv Inv El Dn (ft)      2835.00
  E.G. DS (ft)             2838.86    Culv Frctn Ls (ft)          0.52
  W.S. DS (ft)             2837.99    Culv Exit Loss (ft)         0.05
  Delta EG (ft)               0.76    Culv Entr Loss (ft)         0.19
  Delta WS (ft)               0.93    Q Weir (cfs)
  E.G. IC (ft)             2839.38    Weir Sta Lft (ft)
  E.G. OC (ft)             2839.34    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2837.70    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2837.00    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         1.10    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.74    Min El Weir Flow (ft)    2841.51


Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.
Note:    The culvert inlet is submerged and the culvert flows full over part or all of its length.
Therefore, the culvert inlet
         equations are not valid and the supercritical result has been discarded.  The outlet
answer will be used.

CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)          2.06    Culv Full Len (ft)
  # Barrels                      1    Culv Vel US (ft/s)          3.37
  Q Barrel (cfs)              2.06    Culv Vel DS (ft/s)          1.26
  E.G. US. (ft)            2836.57    Culv Inv El Up (ft)      2835.70
  W.S. US. (ft)            2836.11    Culv Inv El Dn (ft)      2835.00
  E.G. DS (ft)             2836.05    Culv Frctn Ls (ft)          0.32
  W.S. DS (ft)             2835.48    Culv Exit Loss (ft)         0.00
```

```
  Delta EG (ft)               0.52    Culv Entr Loss (ft)         0.04
  Delta WS (ft)               0.63    Q Weir (cfs)
  E.G. IC (ft)             2836.34    Weir Sta Lft (ft)
  E.G. OC (ft)             2836.41    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2836.20    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2836.03    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         0.30    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         0.50    Min El Weir Flow (ft)    2841.51


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    During supercritical analysis, the culvert direct step method went to normal depth.  The
program then assumed normal
         depth at the outlet.
Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)                   Culv Full Len (ft)
  # Barrels                       1    Culv Vel US (ft/s)
  Q Barrel (cfs)                       Culv Vel DS (ft/s)
  E.G. US. (ft)            2831.59    Culv Inv El Up (ft)      2835.70
  W.S. US. (ft)            2831.43    Culv Inv El Dn (ft)      2835.00
  E.G. DS (ft)             2831.28    Culv Frctn Ls (ft)
  W.S. DS (ft)             2830.85    Culv Exit Loss (ft)
  Delta EG (ft)               0.32    Culv Entr Loss (ft)
  Delta WS (ft)               0.58    Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2841.51


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Warning: For this profile, the culvert is located in an ineffective flow region.

CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)          0.00    Culv Full Len (ft)
  # Barrels                      1    Culv Vel US (ft/s)          0.51
  Q Barrel (cfs)              0.00    Culv Vel DS (ft/s)          0.01
  E.G. US. (ft)            2835.72    Culv Inv El Up (ft)      2835.70
  W.S. US. (ft)            2835.32    Culv Inv El Dn (ft)      2835.00
  E.G. DS (ft)             2835.27    Culv Frctn Ls (ft)          0.45
  W.S. DS (ft)             2834.75    Culv Exit Loss (ft)         0.00
  Delta EG (ft)               0.45    Culv Entr Loss (ft)         0.00
  Delta WS (ft)               0.56    Q Weir (cfs)
  E.G. IC (ft)             2835.68    Weir Sta Lft (ft)
  E.G. OC (ft)             2835.72    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2835.71    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2835.27    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         0.01    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         0.01    Min El Weir Flow (ft)    2841.51


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
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Note: During the supercritical analysis, the water surface at the inlet was within 0.01 feet of normal depth. Therefore, the
outlet will be at normal depth.
Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)	2834.29	Culv Inv El Up (ft)	2835.70
W.S. US. (ft)	2833.96	Culv Inv El Dn (ft)	2835.00
E.G. DS (ft)	2833.90	Culv Frctn Ls (ft)	
W.S. DS (ft)	2833.46	Culv Exit Loss (ft)	
Delta EG (ft)	0.39	Culv Entr Loss (ft)	
Delta WS (ft)	0.50	Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2841.51

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Warning: For this profile, the culvert is located in an ineffective flow region.

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2835.70
W.S. US. (ft)		Culv Inv El Dn (ft)	2835.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2841.51

Warning: The program cannot perform supercritical flow through multiple culverts. The program sets the water surface to critical
depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT Profile #100-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)	2567.91	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	9.06
Q Barrel (cfs)	855.97	Culv Vel DS (ft/s)	9.10
E.G. US. (ft)	2839.40	Culv Inv El Up (ft)	2830.00
W.S. US. (ft)	2838.73	Culv Inv El Dn (ft)	2830.00
E.G. DS (ft)	2838.69	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2837.84	Culv Exit Loss (ft)	0.43
Delta EG (ft)	0.71	Culv Entr Loss (ft)	0.25
Delta WS (ft)	0.89	Q Weir (cfs)	
E.G. IC (ft)	2838.73	Weir Sta Lft (ft)	

E.G. OC (ft)	2839.40	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2837.87	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2837.84	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.41	Min El Weir Flow (ft)	2841.51

CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	2675.72	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	9.26
Q Barrel (cfs)	891.91	Culv Vel DS (ft/s)	9.31
E.G. US. (ft)	2839.62	Culv Inv El Up (ft)	2830.00
W.S. US. (ft)	2838.92	Culv Inv El Dn (ft)	2830.00
E.G. DS (ft)	2838.86	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	2837.99	Culv Exit Loss (ft)	0.47
Delta EG (ft)	0.76	Culv Entr Loss (ft)	0.27
Delta WS (ft)	0.93	Q Weir (cfs)	
E.G. IC (ft)	2838.98	Weir Sta Lft (ft)	
E.G. OC (ft)	2839.62	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2838.02	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2837.99	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.56	Min El Weir Flow (ft)	2841.51

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	1497.94	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	7.55
Q Barrel (cfs)	499.31	Culv Vel DS (ft/s)	7.59
E.G. US. (ft)	2836.57	Culv Inv El Up (ft)	2830.00
W.S. US. (ft)	2836.11	Culv Inv El Dn (ft)	2830.00
E.G. DS (ft)	2836.05	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2835.48	Culv Exit Loss (ft)	0.32
Delta EG (ft)	0.52	Culv Entr Loss (ft)	0.18
Delta WS (ft)	0.63	Q Weir (cfs)	
E.G. IC (ft)	2836.02	Weir Sta Lft (ft)	
E.G. OC (ft)	2836.57	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2835.51	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2835.48	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.77	Min El Weir Flow (ft)	2841.51

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	200.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	4.74
Q Barrel (cfs)	66.67	Culv Vel DS (ft/s)	5.63
E.G. US. (ft)	2831.59	Culv Inv El Up (ft)	2830.00
W.S. US. (ft)	2831.43	Culv Inv El Dn (ft)	2830.00
E.G. DS (ft)	2831.28	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2830.85	Culv Exit Loss (ft)	0.20
Delta EG (ft)	0.32	Culv Entr Loss (ft)	0.07
Delta WS (ft)	0.58	Q Weir (cfs)	
E.G. IC (ft)	2831.53	Weir Sta Lft (ft)	
E.G. OC (ft)	2831.59	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	

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  Culv WS Inlet (ft)       2831.17    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2830.99    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         0.99    Min El Weir Flow (ft)    2841.51


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)       1220.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          7.08
  Q Barrel (cfs)            406.67    Culv Vel DS (ft/s)          7.13
  E.G. US. (ft)            2835.72    Culv Inv El Up (ft)      2830.00
  W.S. US. (ft)            2835.32    Culv Inv El Dn (ft)      2830.00
  E.G. DS (ft)             2835.27    Culv Frctn Ls (ft)          0.02
  W.S. DS (ft)             2834.75    Culv Exit Loss (ft)         0.28
  Delta EG (ft)               0.45    Culv Entr Loss (ft)         0.16
  Delta WS (ft)               0.56    Q Weir (cfs)
  E.G. IC (ft)             2835.23    Weir Sta Lft (ft)
  E.G. OC (ft)             2835.72    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2834.78    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2834.75    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.29    Min El Weir Flow (ft)    2841.51


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)        820.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          6.51
  Q Barrel (cfs)            273.33    Culv Vel DS (ft/s)          6.58
  E.G. US. (ft)            2834.29    Culv Inv El Up (ft)      2830.00
  W.S. US. (ft)            2833.96    Culv Inv El Dn (ft)      2830.00
  E.G. DS (ft)             2833.90    Culv Frctn Ls (ft)          0.02
  W.S. DS (ft)             2833.46    Culv Exit Loss (ft)         0.23
  Delta EG (ft)               0.39    Culv Entr Loss (ft)         0.13
  Delta WS (ft)               0.50    Q Weir (cfs)
  E.G. IC (ft)             2833.99    Weir Sta Lft (ft)
  E.G. OC (ft)             2834.29    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2833.50    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2833.46    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         2.53    Min El Weir Flow (ft)    2841.51


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2830.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2830.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
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Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2841.51

Warning: The program cannot perform supercritical flow through multiple culverts. The program sets the water surface to critical
depth at the downstream end of the culverts and continues on.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9515.1

INPUT
Description: Section 95+15 (d/s face of Pohez Rd.)
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2841	122.95	2840	145.5	2839	180.5	2838	197	2838
203	2835	216	2835	222	2838	242	2838	242	2830
287	2830	287	2838	375.34	2837	424.69	2838	460.03	2839

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	287	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	287	159.77	159.77	159.77	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2841	T
287	460.03	2841	T

Left Levee Station= 242 Elevation= 2841
Right Levee Station= 287 Elevation= 2841

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2838.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.013	
W.S. Elev (ft)	2837.84	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2834.71	Flow Area (sq ft)		352.63	
E.G. Slope (ft/ft)	0.000404	Area (sq ft)		352.63	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	7.43	Avg. Vel. (ft/s)		7.43	
Max Chl Dpth (ft)	7.84	Hydr. Depth (ft)		7.84	
Conv. Total (cfs)	130292.5	Conv. (cfs)		130292.5	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		60.67	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	460.03	242.00	287.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.35	29.80	0.34
C & E Loss (ft)	0.51	Cum SA (acres)	0.20	7.17	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2838.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.88	Wt. n-Val.		0.013	
W.S. Elev (ft)	2837.99	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2834.83	Flow Area (sq ft)		359.34	
E.G. Slope (ft/ft)	0.000406	Area (sq ft)		359.34	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	7.51	Avg. Vel. (ft/s)		7.51	
Max Chl Dpth (ft)	7.99	Hydr. Depth (ft)		7.99	
Conv. Total (cfs)	134013.5	Conv. (cfs)		134013.5	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		60.97	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	460.03	242.00	287.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.28	26.83	0.27
C & E Loss (ft)	0.53	Cum SA (acres)	0.17	6.98	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2836.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.		0.013	
W.S. Elev (ft)	2835.48	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2833.26	Flow Area (sq ft)		246.56	
E.G. Slope (ft/ft)	0.000392	Area (sq ft)		246.56	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	6.08	Avg. Vel. (ft/s)		6.08	
Max Chl Dpth (ft)	5.48	Hydr. Depth (ft)		5.48	
Conv. Total (cfs)	75741.5	Conv. (cfs)		75741.5	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		55.96	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	460.03	242.00	287.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.13	17.64	0.13
C & E Loss (ft)	0.42	Cum SA (acres)	0.11	6.45	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2831.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2830.85	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2830.85	Flow Area (sq ft)		38.41	
E.G. Slope (ft/ft)	0.002694	Area (sq ft)		38.41	
Q Total (cfs)	200.00	Flow (cfs)		200.00	

Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	5.21	Avg. Vel. (ft/s)		5.21	
Max Chl Dpth (ft)	0.85	Hydr. Depth (ft)		0.85	
Conv. Total (cfs)	3853.3	Conv. (cfs)		3853.3	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		46.71	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	460.03	242.00	287.00
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.01	4.24	0.01
C & E Loss (ft)	0.09	Cum SA (acres)	0.03	5.44	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2835.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.		0.013	
W.S. Elev (ft)	2834.75	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2832.84	Flow Area (sq ft)		213.84	
E.G. Slope (ft/ft)	0.000409	Area (sq ft)		213.84	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	5.75	Avg. Vel. (ft/s)		5.75	
Max Chl Dpth (ft)	4.75	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	60800.6	Conv. (cfs)		60800.6	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		54.50	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	460.03	242.00	287.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.13	17.12	0.13
C & E Loss (ft)	0.39	Cum SA (acres)	0.11	6.43	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2833.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.013	
W.S. Elev (ft)	2833.46	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2832.21	Flow Area (sq ft)		155.78	
E.G. Slope (ft/ft)	0.000502	Area (sq ft)		155.78	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	5.33	Avg. Vel. (ft/s)		5.33	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)		3.46	
Conv. Total (cfs)	37037.4	Conv. (cfs)		37037.4	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		51.92	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	460.03	242.00	287.00
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.08	13.40	0.08

C & E Loss (ft)	0.32	Cum SA (acres)	0.08	6.19	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2832.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.57	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2831.57	Flow Area (sq ft)		70.70	
E.G. Slope (ft/ft)	0.002386	Area (sq ft)		70.70	
Q Total (cfs)	510.00	Flow (cfs)		500.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	7.07	Avg. Vel. (ft/s)		7.07	
Max Chl Dpth (ft)	1.57	Hydr. Depth (ft)		1.57	
Conv. Total (cfs)	10440.1	Conv. (cfs)		10440.1	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		48.14	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	460.03	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	9.44	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	5.90	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9355.33*

INPUT
Description:
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2839	123	2838	127	2838	146	2837	153	2837
180	2836	197	2836	203	2833	216	2833	222	2836
242	2836	255	2828	270	2828	283	2836	303	2836
344	2835	375	2835	424	2836	458	2837		

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	283	.016	303	.035
458	.035								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	283	159.77	159.77	159.77	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2839	T
283	458	2839	T

Left Levee Station= 242 Elevation= 2839
Right Levee Station= 283 Elevation= 2839

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2838.06	Element	Left OB	Channel	Right OB

Vel Head (ft)	2.57	Wt. n-Val.		0.013	
W.S. Elev (ft)	2835.49	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2835.49	Flow Area (sq ft)		203.64	
E.G. Slope (ft/ft)	0.001623	Area (sq ft)		203.64	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	39.35	Top Width (ft)		39.35	
Vel Total (ft/s)	12.87	Avg. Vel. (ft/s)		12.87	
Max Chl Dpth (ft)	7.49	Hydr. Depth (ft)		5.17	
Conv. Total (cfs)	65041.7	Conv. (cfs)		65041.7	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		43.59	
Min Ch El (ft)	2828.00	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)	458.00	242.00	283.00
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.35	28.78	0.34
C & E Loss (ft)	0.01	Cum SA (acres)	0.20	7.02	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2838.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.63	Wt. n-Val.		0.013	
W.S. Elev (ft)	2835.59	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2835.59	Flow Area (sq ft)		207.53	
E.G. Slope (ft/ft)	0.001636	Area (sq ft)		207.53	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	39.67	Top Width (ft)		39.67	
Vel Total (ft/s)	13.01	Avg. Vel. (ft/s)		13.01	
Max Chl Dpth (ft)	7.59	Hydr. Depth (ft)		5.23	
Conv. Total (cfs)	66746.0	Conv. (cfs)		66746.0	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		43.97	
Min Ch El (ft)	2828.00	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)	458.00	242.00	283.00
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.28	25.79	0.27
C & E Loss (ft)	0.00	Cum SA (acres)	0.17	6.82	0.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2835.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.98	Wt. n-Val.		0.013	
W.S. Elev (ft)	2833.53	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2833.53	Flow Area (sq ft)		132.67	
E.G. Slope (ft/ft)	0.001726	Area (sq ft)		132.67	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	32.97	Top Width (ft)		32.97	
Vel Total (ft/s)	11.31	Avg. Vel. (ft/s)		11.31	
Max Chl Dpth (ft)	5.53	Hydr. Depth (ft)		4.02	
Conv. Total (cfs)	36109.1	Conv. (cfs)		36109.1	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		36.11	
Min Ch El (ft)	2828.00	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	458.00	242.00	283.00
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.13	16.94	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	6.31	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2830.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.15	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.35	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2829.67	Flow Area (sq ft)		23.22	
E.G. Slope (ft/ft)	0.004699	Area (sq ft)		23.22	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	19.39	Top Width (ft)		19.39	
Vel Total (ft/s)	8.61	Avg. Vel. (ft/s)		8.61	
Max Chl Dpth (ft)	1.35	Hydr. Depth (ft)		1.20	
Conv. Total (cfs)	2917.5	Conv. (cfs)		2917.5	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		20.15	
Min Ch El (ft)	2828.00	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)	458.00	242.00	283.00
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)	0.01	4.12	0.01
C & E Loss (ft)	0.22	Cum SA (acres)	0.03	5.33	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2834.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.82	Wt. n-Val.		0.013	
W.S. Elev (ft)	2832.94	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2832.94	Flow Area (sq ft)		113.75	
E.G. Slope (ft/ft)	0.001778	Area (sq ft)		113.75	

Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	31.05	Top Width (ft)		31.05	
Vel Total (ft/s)	10.81	Avg. Vel. (ft/s)		10.81	
Max Chl Dpth (ft)	4.94	Hydr. Depth (ft)		3.66	
Conv. Total (cfs)	29170.7	Conv. (cfs)		29170.7	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		33.85	
Min Ch El (ft)	2828.00	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)	458.00	242.00	283.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.13	16.52	0.13
C & E Loss (ft)	0.41	Cum SA (acres)	0.11	6.29	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2833.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.50	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.95	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2831.95	Flow Area (sq ft)		84.51	
E.G. Slope (ft/ft)	0.001860	Area (sq ft)		84.51	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	27.83	Top Width (ft)		27.83	
Vel Total (ft/s)	9.82	Avg. Vel. (ft/s)		9.82	
Max Chl Dpth (ft)	3.95	Hydr. Depth (ft)		3.04	
Conv. Total (cfs)	19242.7	Conv. (cfs)		19242.7	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		30.06	
Min Ch El (ft)	2828.00	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	458.00	242.00	283.00
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.08	12.96	0.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.08	6.05	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2832.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.18	Wt. n-Val.		0.013	
W.S. Elev (ft)	2830.96	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2830.96	Flow Area (sq ft)		58.53	

E.G. Slope (ft/ft)	0.001998	Area (sq ft)		58.53	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	24.61	Top Width (ft)		24.61	
Vel Total (ft/s)	8.71	Avg. Vel. (ft/s)		8.71	
Max Chl Dpth (ft)	2.96	Hydr. Depth (ft)		2.38	
Conv. Total (cfs)	11409.4	Conv. (cfs)		11409.4	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		26.28	
Min Ch El (ft)	2828.00	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)	458.00	242.00	283.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.04	9.20	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.06	5.77	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9195.56*

INPUT
Description:
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2837	123	2836	127	2836	146	2835	153	2835
180	2835	197	2835	203	2832	216	2832	222	2835
242	2835	256	2826	271	2826	285	2835	345	2834
375	2833	423	2834	457	2834				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	285	.035	457	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	285	159.77	159.77	159.77	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2835.5	T
285	457	2835.5	T

Left Levee Station= 242 Elevation= 2835.5
Right Levee Station= 285 Elevation= 2835.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2836.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.94	Wt. n-Val.		0.013	
W.S. Elev (ft)	2832.03	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2833.56	Flow Area (sq ft)		146.84	
E.G. Slope (ft/ft)	0.003918	Area (sq ft)		146.84	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	33.74	Top Width (ft)		33.74	
Vel Total (ft/s)	17.84	Avg. Vel. (ft/s)		17.84	

Max Chl Dpth (ft)	6.02	Hydr. Depth (ft)		4.35	
Conv. Total (cfs)	41858.2	Conv. (cfs)		41858.2	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		37.28	
Min Ch El (ft)	2826.00	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)	457.00	242.00	285.00
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.35	28.14	0.34
C & E Loss (ft)	0.71	Cum SA (acres)	0.20	6.88	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2837.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.99	Wt. n-Val.		0.013	
W.S. Elev (ft)	2832.14	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2833.68	Flow Area (sq ft)		150.60	
E.G. Slope (ft/ft)	0.003881	Area (sq ft)		150.60	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	34.09	Top Width (ft)		34.09	
Vel Total (ft/s)	17.93	Avg. Vel. (ft/s)		17.93	
Max Chl Dpth (ft)	6.14	Hydr. Depth (ft)		4.42	
Conv. Total (cfs)	43342.3	Conv. (cfs)		43342.3	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		37.69	
Min Ch El (ft)	2826.00	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)	457.00	242.00	285.00
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.28	25.13	0.27
C & E Loss (ft)	0.71	Cum SA (acres)	0.17	6.69	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2834.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.19	Wt. n-Val.		0.013	
W.S. Elev (ft)	2830.23	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2831.57	Flow Area (sq ft)		91.34	
E.G. Slope (ft/ft)	0.004814	Area (sq ft)		91.34	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	28.17	Top Width (ft)		28.17	
Vel Total (ft/s)	16.42	Avg. Vel. (ft/s)		16.42	
Max Chl Dpth (ft)	4.23	Hydr. Depth (ft)		3.24	
Conv. Total (cfs)	21618.8	Conv. (cfs)		21618.8	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		30.65	

Min Ch El (ft)	2826.00	Shear (lb/sq ft)		0.90	
Alpha	1.00	Stream Power (lb/ft s)	457.00	242.00	285.00
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	0.13	16.53	0.13
C & E Loss (ft)	0.66	Cum SA (acres)	0.11	6.19	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2829.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2827.04	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2827.67	Flow Area (sq ft)		17.33	
E.G. Slope (ft/ft)	0.011404	Area (sq ft)		17.33	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.24	Top Width (ft)		18.24	
Vel Total (ft/s)	11.54	Avg. Vel. (ft/s)		11.54	
Max Chl Dpth (ft)	1.04	Hydr. Depth (ft)		0.95	
Conv. Total (cfs)	1872.8	Conv. (cfs)		1872.8	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		18.86	
Min Ch El (ft)	2826.00	Shear (lb/sq ft)		0.65	
Alpha	1.00	Stream Power (lb/ft s)	457.00	242.00	285.00
Frctn Loss (ft)	1.11	Cum Volume (acre-ft)	0.01	4.05	0.01
C & E Loss (ft)	0.27	Cum SA (acres)	0.03	5.26	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2833.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.96	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.71	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2830.97	Flow Area (sq ft)		77.07	
E.G. Slope (ft/ft)	0.005229	Area (sq ft)		77.07	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	26.54	Top Width (ft)		26.54	
Vel Total (ft/s)	15.96	Avg. Vel. (ft/s)		15.96	
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)		2.90	
Conv. Total (cfs)	17009.0	Conv. (cfs)		17009.0	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		28.72	
Min Ch El (ft)	2826.00	Shear (lb/sq ft)		0.88	
Alpha	1.00	Stream Power (lb/ft s)	457.00	242.00	285.00
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	0.13	16.17	0.13
C & E Loss (ft)	0.64	Cum SA (acres)	0.11	6.18	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2832.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.50	Wt. n-Val.		0.013	
W.S. Elev (ft)	2828.85	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2829.95	Flow Area (sq ft)		55.27	
E.G. Slope (ft/ft)	0.006163	Area (sq ft)		55.27	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	23.85	Top Width (ft)		23.85	
Vel Total (ft/s)	15.02	Avg. Vel. (ft/s)		15.02	
Max Chl Dpth (ft)	2.84	Hydr. Depth (ft)		2.32	
Conv. Total (cfs)	10572.8	Conv. (cfs)		10572.8	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		25.52	
Min Ch El (ft)	2826.00	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)	457.00	242.00	285.00
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)	0.08	12.71	0.08
C & E Loss (ft)	0.60	Cum SA (acres)	0.08	5.96	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2831.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.00	Wt. n-Val.		0.013	
W.S. Elev (ft)	2828.02	Reach Len. (ft)	159.77	159.77	159.77
Crit W.S. (ft)	2828.96	Flow Area (sq ft)		36.67	
E.G. Slope (ft/ft)	0.007709	Area (sq ft)		36.67	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	21.29	Top Width (ft)		21.29	
Vel Total (ft/s)	13.91	Avg. Vel. (ft/s)		13.91	
Max Chl Dpth (ft)	2.02	Hydr. Depth (ft)		1.72	
Conv. Total (cfs)	5808.7	Conv. (cfs)		5808.7	
Length Wtd. (ft)	159.77	Wetted Per. (ft)		22.47	
Min Ch El (ft)	2826.00	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)	457.00	242.00	285.00
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)	0.04	9.03	0.04
C & E Loss (ft)	0.55	Cum SA (acres)	0.06	5.69	0.06

```
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 9035.8

INPUT
Description: Section 90+35.8 (u/s face of Mondamon Rd.)
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2835  126.93    2834  152.67    2833     197  2833.4     203  2830.4
     216  2830.4     222  2833.4     242  2833.4     242    2824     287    2824
     287  2833.4     307  2833.4  345.88  2831.6  454.95    2832

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .016     307    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     287             30.7    30.7    30.7             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242  2836.5       T
     287  454.95  2836.5       T
Left Levee      Station=     242      Elevation=  2836.5
Right Levee     Station=     287      Elevation=  2836.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2833.83    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.62    Wt. n-Val.                           0.013
  W.S. Elev (ft)           2833.21    Reach Len. (ft)            30.70     30.70      30.70
  Crit W.S. (ft)           2828.74    Flow Area (sq ft)                   414.55
  E.G. Slope (ft/ft)      0.000250    Area (sq ft)                        414.55
  Q Total (cfs)            2620.00    Flow (cfs)                         2620.00
  Top Width (ft)             45.00    Top Width (ft)                       45.00
  Vel Total (ft/s)            6.32    Avg. Vel. (ft/s)                      6.32
  Max Chl Dpth (ft)           9.21    Hydr. Depth (ft)                      9.21
  Conv. Total (cfs)       165642.2    Conv. (cfs)                       165642.2
  Length Wtd. (ft)           30.70    Wetted Per. (ft)                     63.42
  Min Ch El (ft)           2824.00    Shear (lb/sq ft)                      0.10
  Alpha                       1.00    Stream Power (lb/ft s)    454.95    242.00     287.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.35     27.11       0.34
  C & E Loss (ft)                     Cum SA (acres)              0.20      6.74       0.17


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2834.01    Element                   Left OB    Channel   Right OB
```

Vel Head (ft)	0.64	Wt. n-Val.		0.013	
W.S. Elev (ft)	2833.38	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2828.82	Flow Area (sq ft)		421.86	
E.G. Slope (ft/ft)	0.000252	Area (sq ft)		421.86	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.40	
Max Chl Dpth (ft)	9.37	Hydr. Depth (ft)		9.37	
Conv. Total (cfs)	169963.1	Conv. (cfs)		169963.1	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		63.75	
Min Ch El (ft)	2824.00	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	454.95	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.28	24.08	0.27
C & E Loss (ft)		Cum SA (acres)	0.17	6.54	0.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2830.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2830.60	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2827.28	Flow Area (sq ft)		296.83	
E.G. Slope (ft/ft)	0.000223	Area (sq ft)		296.83	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	5.05	Avg. Vel. (ft/s)		5.05	
Max Chl Dpth (ft)	6.60	Hydr. Depth (ft)		6.60	
Conv. Total (cfs)	100535.0	Conv. (cfs)		100535.0	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		58.19	
Min Ch El (ft)	2824.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	454.95	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	15.82	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	6.06	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2826.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.79	Wt. n-Val.		0.013	
W.S. Elev (ft)	2824.41	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2824.85	Flow Area (sq ft)		18.61	
E.G. Slope (ft/ft)	0.029392	Area (sq ft)		18.61	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	10.75	Avg. Vel. (ft/s)		10.75	
Max Chl Dpth (ft)	0.41	Hydr. Depth (ft)		0.41	
Conv. Total (cfs)	1166.6	Conv. (cfs)		1166.6	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		45.83	
Min Ch El (ft)	2824.00	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)	454.95	242.00	287.00
Frctn Loss (ft)	2.77	Cum Volume (acre-ft)	0.01	3.98	0.01
C & E Loss (ft)	0.14	Cum SA (acres)	0.03	5.14	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2830.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.81	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2826.87	Flow Area (sq ft)		261.60	
E.G. Slope (ft/ft)	0.000220	Area (sq ft)		261.60	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	4.70	Avg. Vel. (ft/s)		4.70	
Max Chl Dpth (ft)	5.81	Hydr. Depth (ft)		5.81	
Conv. Total (cfs)	82938.4	Conv. (cfs)		82938.4	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		56.63	
Min Ch El (ft)	2824.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	454.95	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	15.55	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	6.05	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2828.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.013	
W.S. Elev (ft)	2828.46	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2826.21	Flow Area (sq ft)		200.84	
E.G. Slope (ft/ft)	0.000226	Area (sq ft)		200.84	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	4.13	Avg. Vel. (ft/s)		4.13	
Max Chl Dpth (ft)	4.46	Hydr. Depth (ft)		4.46	
Conv. Total (cfs)	55157.6	Conv. (cfs)		55157.6	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		53.93	
Min Ch El (ft)	2824.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	454.95	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	12.24	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	5.83	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2827.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.013	
W.S. Elev (ft)	2827.13	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2825.57	Flow Area (sq ft)		140.68	
E.G. Slope (ft/ft)	0.000262	Area (sq ft)		140.68	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	3.63	Avg. Vel. (ft/s)		3.63	
Max Chl Dpth (ft)	3.13	Hydr. Depth (ft)		3.13	
Conv. Total (cfs)	31523.1	Conv. (cfs)		31523.1	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		51.25	

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  Min Ch El (ft)           2824.00    Shear (lb/sq ft)                        0.04
  Alpha                       1.00    Stream Power (lb/ft s)    454.95     242.00     287.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.04       8.70       0.04
  C & E Loss (ft)                     Cum SA (acres)              0.06       5.57       0.06


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CULVERT


RIVER: Desert Knolls Wa
REACH: Main               RS: 9020.399

INPUT
Description: Mondamon Road
Distance from Upstream XS =      .5
Deck/Roadway Width        =      30
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100  2836.2             222  2836.2             281  2836.2
     455  2836.2

Upstream Bridge Cross Section Data
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2835  126.93    2834  152.67    2833     197  2833.4     203  2830.4
     216  2830.4     222  2833.4     242  2833.4     242    2824     287    2824
     287  2833.4     307  2833.4  345.88  2831.6  454.95    2832

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .016     307    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           242     287             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242  2836.5       T
     287  454.95  2836.5       T
Left Levee      Station=     242      Elevation=  2836.5
Right Levee     Station=     287      Elevation=  2836.5

Downstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100  2836.2             222  2836.2             281  2836.2
     420  2836.2

Downstream Bridge Cross Section Data
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2835   123.1    2834  152.88    2833  185.37    2832     197    2832
     203    2829     216    2829     222    2832     242    2832     242    2824
     287    2824     287    2832     307    2832   315.1    2831  417.14  2831.2

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
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           242     287             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2836       T
     287  417.14    2836       T
Left Levee      Station=     242      Elevation=    2836
Right Levee     Station=     287      Elevation=    2836

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  2

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .1    30.5     .013     .013        0                  .5                1
Upstream   Elevation =  2830.4
           Centerline Station =  209.5
Downstream Elevation =  2829
           Centerline Station =  209.5

Culvert Name     Shape      Rise    Span
Culvert #2           Box       9      12
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .7      30     .013     .013        0                  .2                1
Number of Barrels =  3
Upstream   Elevation =  2824
Centerline Stations
    Sta.    Sta.    Sta.
     251   264.5     278
Downstream Elevation =  2824
Centerline Stations
    Sta.    Sta.    Sta.
     251   264.5     278

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)         16.78    Culv Full Len (ft)         30.50
  # Barrels                      1    Culv Vel US (ft/s)          5.34
  Q Barrel (cfs)             16.78    Culv Vel DS (ft/s)          5.34
  E.G. US. (ft)            2833.83    Culv Inv El Up (ft)      2830.40
  W.S. US. (ft)            2833.21    Culv Inv El Dn (ft)      2829.00
  E.G. DS (ft)             2833.17    Culv Frctn Ls (ft)          0.44
  W.S. DS (ft)             2832.43    Culv Exit Loss (ft)         0.00
  Delta EG (ft)               0.66    Culv Entr Loss (ft)         0.22
  Delta WS (ft)               0.78    Q Weir (cfs)
  E.G. IC (ft)             2832.82    Weir Sta Lft (ft)
  E.G. OC (ft)             2833.56    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2832.40    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2831.00    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.48    Min El Weir Flow (ft)    2836.21
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CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	17.16	Culv Full Len (ft)	30.50
# Barrels	1	Culv Vel US (ft/s)	5.46
Q Barrel (cfs)	17.16	Culv Vel DS (ft/s)	5.46
E.G. US. (ft)	2834.01	Culv Inv El Up (ft)	2830.40
W.S. US. (ft)	2833.38	Culv Inv El Dn (ft)	2829.00
E.G. DS (ft)	2833.33	Culv Frctn Ls (ft)	0.45
W.S. DS (ft)	2832.57	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.68	Culv Entr Loss (ft)	0.23
Delta WS (ft)	0.80	Q Weir (cfs)	
E.G. IC (ft)	2832.88	Weir Sta Lft (ft)	
E.G. OC (ft)	2833.74	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2832.40	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2831.00	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.49	Min El Weir Flow (ft)	2836.21

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	1.20	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	2.91
Q Barrel (cfs)	1.20	Culv Vel DS (ft/s)	0.46
E.G. US. (ft)	2830.99	Culv Inv El Up (ft)	2830.40
W.S. US. (ft)	2830.60	Culv Inv El Dn (ft)	2829.00
E.G. DS (ft)	2830.57	Culv Frctn Ls (ft)	0.34
W.S. DS (ft)	2830.10	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.43	Culv Entr Loss (ft)	0.07
Delta WS (ft)	0.49	Q Weir (cfs)	
E.G. IC (ft)	2830.87	Weir Sta Lft (ft)	
E.G. OC (ft)	2830.98	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2830.78	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2830.56	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	0.22	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.38	Min El Weir Flow (ft)	2836.21

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: During supercritical analysis, the culvert direct step method went to normal depth. The program then assumed normal
depth at the outlet.
Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2830.40
W.S. US. (ft)		Culv Inv El Dn (ft)	2829.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	

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  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2836.21


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)            2830.16    Culv Inv El Up (ft)      2830.40
  W.S. US. (ft)            2829.81    Culv Inv El Dn (ft)      2829.00
  E.G. DS (ft)             2829.79    Culv Frctn Ls (ft)
  W.S. DS (ft)             2829.39    Culv Exit Loss (ft)
  Delta EG (ft)               0.37    Culv Entr Loss (ft)
  Delta WS (ft)               0.43    Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2836.21


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Warning: For this profile, the culvert is located in an ineffective flow region.

CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)            2828.74    Culv Inv El Up (ft)      2830.40
  W.S. US. (ft)            2828.46    Culv Inv El Dn (ft)      2829.00
  E.G. DS (ft)             2828.45    Culv Frctn Ls (ft)
  W.S. DS (ft)             2828.14    Culv Exit Loss (ft)
  Delta EG (ft)               0.29    Culv Entr Loss (ft)
  Delta WS (ft)               0.32    Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2836.21


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Warning: For this profile, the culvert is located in an ineffective flow region.

CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)            2827.34    Culv Inv El Up (ft)      2830.40
  W.S. US. (ft)            2827.13    Culv Inv El Dn (ft)      2829.00
  E.G. DS (ft)             2827.10    Culv Frctn Ls (ft)
  W.S. DS (ft)             2826.86    Culv Exit Loss (ft)
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Delta EG (ft)	0.23	Culv Entr Loss (ft)	
Delta WS (ft)	0.27	Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2836.21

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Warning: For this profile, the culvert is located in an ineffective flow region.

CULVERT OUTPUT Profile #100-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)	2603.22	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	8.53
Q Barrel (cfs)	867.74	Culv Vel DS (ft/s)	8.57
E.G. US. (ft)	2833.83	Culv Inv El Up (ft)	2824.00
W.S. US. (ft)	2833.21	Culv Inv El Dn (ft)	2824.00
E.G. DS (ft)	2833.17	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	2832.43	Culv Exit Loss (ft)	0.40
Delta EG (ft)	0.66	Culv Entr Loss (ft)	0.23
Delta WS (ft)	0.78	Q Weir (cfs)	
E.G. IC (ft)	2832.81	Weir Sta Lft (ft)	
E.G. OC (ft)	2833.83	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2832.48	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2832.43	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.46	Min El Weir Flow (ft)	2836.21

CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	2682.84	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	8.65
Q Barrel (cfs)	894.28	Culv Vel DS (ft/s)	8.69
E.G. US. (ft)	2834.01	Culv Inv El Up (ft)	2824.00
W.S. US. (ft)	2833.38	Culv Inv El Dn (ft)	2824.00
E.G. DS (ft)	2833.33	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	2832.57	Culv Exit Loss (ft)	0.41
Delta EG (ft)	0.68	Culv Entr Loss (ft)	0.23
Delta WS (ft)	0.80	Q Weir (cfs)	
E.G. IC (ft)	2833.00	Weir Sta Lft (ft)	
E.G. OC (ft)	2834.01	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2832.62	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2832.57	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.57	Min El Weir Flow (ft)	2836.21

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	1498.80	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	6.79
Q Barrel (cfs)	499.60	Culv Vel DS (ft/s)	6.82
E.G. US. (ft)	2830.99	Culv Inv El Up (ft)	2824.00
W.S. US. (ft)	2830.60	Culv Inv El Dn (ft)	2824.00
E.G. DS (ft)	2830.57	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2830.10	Culv Exit Loss (ft)	0.26
Delta EG (ft)	0.43	Culv Entr Loss (ft)	0.14

Delta WS (ft)	0.49	Q Weir (cfs)	
E.G. IC (ft)	2830.02	Weir Sta Lft (ft)	
E.G. OC (ft)	2830.99	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2830.13	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2830.10	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.78	Min El Weir Flow (ft)	2836.21

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2824.00
W.S. US. (ft)		Culv Inv El Dn (ft)	2824.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2836.21

Warning: The program cannot perform supercritical flow through multiple culverts. The program sets the water surface to critical
depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)	1230.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	6.31
Q Barrel (cfs)	410.00	Culv Vel DS (ft/s)	6.34
E.G. US. (ft)	2830.16	Culv Inv El Up (ft)	2824.00
W.S. US. (ft)	2829.81	Culv Inv El Dn (ft)	2824.00
E.G. DS (ft)	2829.79	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2829.39	Culv Exit Loss (ft)	0.22
Delta EG (ft)	0.37	Culv Entr Loss (ft)	0.12
Delta WS (ft)	0.43	Q Weir (cfs)	
E.G. IC (ft)	2829.26	Weir Sta Lft (ft)	
E.G. OC (ft)	2830.16	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2829.42	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2829.39	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.31	Min El Weir Flow (ft)	2836.21

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)	830.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	5.53
Q Barrel (cfs)	276.67	Culv Vel DS (ft/s)	5.57

E.G. US. (ft)	2828.74	Culv Inv El Up (ft)	2824.00
W.S. US. (ft)	2828.46	Culv Inv El Dn (ft)	2824.00
E.G. DS (ft)	2828.45	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2828.14	Culv Exit Loss (ft)	0.17
Delta EG (ft)	0.29	Culv Entr Loss (ft)	0.09
Delta WS (ft)	0.32	Q Weir (cfs)	
E.G. IC (ft)	2828.02	Weir Sta Lft (ft)	
E.G. OC (ft)	2828.74	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2828.17	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2828.14	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.55	Min El Weir Flow (ft)	2836.21

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)	510.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	4.90
Q Barrel (cfs)	170.00	Culv Vel DS (ft/s)	4.95
E.G. US. (ft)	2827.34	Culv Inv El Up (ft)	2824.00
W.S. US. (ft)	2827.13	Culv Inv El Dn (ft)	2824.00
E.G. DS (ft)	2827.10	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2826.86	Culv Exit Loss (ft)	0.14
Delta EG (ft)	0.23	Culv Entr Loss (ft)	0.07
Delta WS (ft)	0.27	Q Weir (cfs)	
E.G. IC (ft)	2826.88	Weir Sta Lft (ft)	
E.G. OC (ft)	2827.34	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2826.89	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2826.86	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.84	Min El Weir Flow (ft)	2836.21

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9005

INPUT
Description: Section 90+05 (d/s face of Mondamon Rd.)
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2835	123.1	2834	152.88	2833	185.37	2832	197	2832
203	2829	216	2829	222	2832	242	2832	242	2824
287	2824	287	2832	307	2832	315.1	2831	417.14	2831.2

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	287	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	287	120	120	120	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2836	T
287	417.14	2836	T

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Left Levee      Station=     242      Elevation=    2836
Right Levee     Station=     287      Elevation=    2836

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2833.17    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.74    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2832.43    Reach Len. (ft)           120.00     120.00     120.00
  Crit W.S. (ft)           2828.74    Flow Area (sq ft)                    379.49
  E.G. Slope (ft/ft)      0.000325    Area (sq ft)                         379.49
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)            6.90    Avg. Vel. (ft/s)                       6.90
  Max Chl Dpth (ft)           8.43    Hydr. Depth (ft)                       8.43
  Conv. Total (cfs)       145350.4    Conv. (cfs)                        145350.4
  Length Wtd. (ft)          120.00    Wetted Per. (ft)                      61.87
  Min Ch El (ft)           2824.00    Shear (lb/sq ft)                       0.12
  Alpha                       1.00    Stream Power (lb/ft s)    417.14     242.00     287.00
  Frctn Loss (ft)             0.05    Cum Volume (acre-ft)        0.35      27.04       0.34
  C & E Loss (ft)             0.15    Cum SA (acres)              0.20       6.71       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2833.33    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.76    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2832.57    Reach Len. (ft)           120.00     120.00     120.00
  Crit W.S. (ft)           2828.83    Flow Area (sq ft)                    385.80
  E.G. Slope (ft/ft)      0.000329    Area (sq ft)                         385.80
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)            7.00    Avg. Vel. (ft/s)                       7.00
  Max Chl Dpth (ft)           8.57    Hydr. Depth (ft)                       8.57
  Conv. Total (cfs)       148948.7    Conv. (cfs)                        148948.7
  Length Wtd. (ft)          120.00    Wetted Per. (ft)                      62.15
  Min Ch El (ft)           2824.00    Shear (lb/sq ft)                       0.13
  Alpha                       1.00    Stream Power (lb/ft s)    417.14     242.00     287.00
  Frctn Loss (ft)             0.05    Cum Volume (acre-ft)        0.28      24.01       0.27
  C & E Loss (ft)             0.15    Cum SA (acres)              0.17       6.51       0.15


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2830.57    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.46    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2830.10    Reach Len. (ft)           120.00     120.00     120.00
  Crit W.S. (ft)           2827.27    Flow Area (sq ft)                    274.61
  E.G. Slope (ft/ft)      0.000282    Area (sq ft)                         274.61
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)            5.46    Avg. Vel. (ft/s)                       5.46
  Max Chl Dpth (ft)           6.10    Hydr. Depth (ft)                       6.10
  Conv. Total (cfs)        89323.8    Conv. (cfs)                         89323.8
  Length Wtd. (ft)          120.00    Wetted Per. (ft)                      57.21
  Min Ch El (ft)           2824.00    Shear (lb/sq ft)                       0.08
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Alpha	1.00	Stream Power (lb/ft s)	417.14	242.00	287.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.13	15.77	0.13
C & E Loss (ft)	0.13	Cum SA (acres)	0.11	6.03	0.10

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2825.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2824.85	Reach Len. (ft)	120.00	120.00	120.00
Crit W.S. (ft)	2824.85	Flow Area (sq ft)		38.41	
E.G. Slope (ft/ft)	0.002694	Area (sq ft)		38.41	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	5.21	Avg. Vel. (ft/s)		5.21	
Max Chl Dpth (ft)	0.85	Hydr. Depth (ft)		0.85	
Conv. Total (cfs)	3853.3	Conv. (cfs)		3853.3	
Length Wtd. (ft)	120.00	Wetted Per. (ft)		46.71	
Min Ch El (ft)	2824.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	417.14	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	3.98	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	5.11	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2829.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.39	Reach Len. (ft)	120.00	120.00	120.00
Crit W.S. (ft)	2826.87	Flow Area (sq ft)		242.34	
E.G. Slope (ft/ft)	0.000278	Area (sq ft)		242.34	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	5.08	Avg. Vel. (ft/s)		5.08	
Max Chl Dpth (ft)	5.39	Hydr. Depth (ft)		5.39	
Conv. Total (cfs)	73758.7	Conv. (cfs)		73758.7	
Length Wtd. (ft)	120.00	Wetted Per. (ft)		55.77	
Min Ch El (ft)	2824.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	417.14	242.00	287.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.13	15.50	0.13
C & E Loss (ft)	0.12	Cum SA (acres)	0.11	6.02	0.10

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2828.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.013	
W.S. Elev (ft)	2828.14	Reach Len. (ft)	120.00	120.00	120.00
Crit W.S. (ft)	2826.19	Flow Area (sq ft)		186.27	
E.G. Slope (ft/ft)	0.000286	Area (sq ft)		186.27	

Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	4.46	Avg. Vel. (ft/s)		4.46	
Max Chl Dpth (ft)	4.14	Hydr. Depth (ft)		4.14	
Conv. Total (cfs)	49045.5	Conv. (cfs)		49045.5	
Length Wtd. (ft)	120.00	Wetted Per. (ft)		53.28	
Min Ch El (ft)	2824.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	417.14	242.00	287.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.08	12.20	0.08
C & E Loss (ft)	0.10	Cum SA (acres)	0.08	5.80	0.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2827.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.013	
W.S. Elev (ft)	2826.86	Reach Len. (ft)	120.00	120.00	120.00
Crit W.S. (ft)	2825.58	Flow Area (sq ft)		128.74	
E.G. Slope (ft/ft)	0.000347	Area (sq ft)		128.74	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	3.96	Avg. Vel. (ft/s)		3.96	
Max Chl Dpth (ft)	2.86	Hydr. Depth (ft)		2.86	
Conv. Total (cfs)	27380.0	Conv. (cfs)		27380.0	
Length Wtd. (ft)	120.00	Wetted Per. (ft)		50.72	
Min Ch El (ft)	2824.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	417.14	242.00	287.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.04	8.68	0.04
C & E Loss (ft)	0.07	Cum SA (acres)	0.06	5.53	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8885

INPUT
Description: 88+65 Chute (D/S)
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
222	2830.9	242	2830.9	254	2822.9	274	2822.9	286	2830.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
222	.016	242	.013	286	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	286	8	8	8	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
222	242	2835	T
286	286	2835	T

Left Levee Station= 242 Elevation= 2835
Right Levee Station= 286 Elevation= 2835

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2832.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.25	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.72	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2829.70	Flow Area (sq ft)		292.00	
E.G. Slope (ft/ft)	0.000593	Area (sq ft)		292.00	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	44.00	Top Width (ft)		44.00	
Vel Total (ft/s)	8.97	Avg. Vel. (ft/s)		8.97	
Max Chl Dpth (ft)	8.82	Hydr. Depth (ft)		6.64	
Conv. Total (cfs)	107547.3	Conv. (cfs)		107547.3	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		50.48	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.35	26.11	0.34
C & E Loss (ft)	0.22	Cum SA (acres)	0.20	6.58	0.17

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2833.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.28	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.85	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2829.83	Flow Area (sq ft)		297.85	
E.G. Slope (ft/ft)	0.000594	Area (sq ft)		297.85	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	44.00	Top Width (ft)		44.00	
Vel Total (ft/s)	9.06	Avg. Vel. (ft/s)		9.06	
Max Chl Dpth (ft)	8.95	Hydr. Depth (ft)		6.77	
Conv. Total (cfs)	110776.1	Conv. (cfs)		110776.1	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		50.75	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.28	23.07	0.27
C & E Loss (ft)	0.22	Cum SA (acres)	0.17	6.39	0.15

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2830.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.48	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2827.82	Flow Area (sq ft)		196.60	
E.G. Slope (ft/ft)	0.000601	Area (sq ft)		196.60	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	39.74	Top Width (ft)		39.74	
Vel Total (ft/s)	7.63	Avg. Vel. (ft/s)		7.63	
Max Chl Dpth (ft)	6.58	Hydr. Depth (ft)		4.95	
Conv. Total (cfs)	61211.0	Conv. (cfs)		61211.0	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		43.73	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	15.12	0.13
C & E Loss (ft)	0.20	Cum SA (acres)	0.11	5.91	0.10

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2825.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.013	
W.S. Elev (ft)	2824.96	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2824.31	Flow Area (sq ft)		47.60	
E.G. Slope (ft/ft)	0.000648	Area (sq ft)		47.60	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	26.18	Top Width (ft)		26.18	
Vel Total (ft/s)	4.20	Avg. Vel. (ft/s)		4.20	
Max Chl Dpth (ft)	2.06	Hydr. Depth (ft)		1.82	
Conv. Total (cfs)	7856.1	Conv. (cfs)		7856.1	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		27.43	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	3.87	0.01
C & E Loss (ft)	0.11	Cum SA (acres)	0.03	5.01	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2829.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.81	Wt. n-Val.		0.013	
W.S. Elev (ft)	2828.81	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2827.28	Flow Area (sq ft)		170.45	
E.G. Slope (ft/ft)	0.000602	Area (sq ft)		170.45	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	37.72	Top Width (ft)		37.72	
Vel Total (ft/s)	7.22	Avg. Vel. (ft/s)		7.22	
Max Chl Dpth (ft)	5.91	Hydr. Depth (ft)		4.52	
Conv. Total (cfs)	50132.1	Conv. (cfs)		50132.1	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		41.30	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	14.94	0.13
C & E Loss (ft)	0.20	Cum SA (acres)	0.11	5.91	0.10

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2828.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.013	
W.S. Elev (ft)	2827.66	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2826.35	Flow Area (sq ft)		129.04	
E.G. Slope (ft/ft)	0.000602	Area (sq ft)		129.04	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	34.27	Top Width (ft)		34.27	

Vel Total (ft/s)	6.43	Avg. Vel. (ft/s)		6.43	
Max Chl Dpth (ft)	4.76	Hydr. Depth (ft)		3.77	
Conv. Total (cfs)	33832.3	Conv. (cfs)		33832.3	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		37.15	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	11.77	0.08
C & E Loss (ft)	0.18	Cum SA (acres)	0.08	5.69	0.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2826.98	Element			
Vel Head (ft)	0.49	Wt. n-Val.		0.013	
W.S. Elev (ft)	2826.49	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2825.45	Flow Area (sq ft)		91.19	
E.G. Slope (ft/ft)	0.000616	Area (sq ft)		91.19	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	30.78	Top Width (ft)		30.78	
Vel Total (ft/s)	5.59	Avg. Vel. (ft/s)		5.59	
Max Chl Dpth (ft)	3.59	Hydr. Depth (ft)		2.96	
Conv. Total (cfs)	20544.9	Conv. (cfs)		20544.9	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		32.95	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	8.38	0.04
C & E Loss (ft)	0.15	Cum SA (acres)	0.06	5.43	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8877

INPUT
Description: 88+73 Chute (sag)
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
222	2830.9	242	2830.9	254	2821	274	2821	286	2830.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
222	.016	242	.013	286	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	286	4	4	4	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
222	242	2835.5	T
286	286	2835.5	T

Left Levee Station= 242 Elevation= 2835.5
Right Levee Station= 286 Elevation= 2835.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2832.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.81	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.94	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2828.00	Flow Area (sq ft)		362.34	
E.G. Slope (ft/ft)	0.000310	Area (sq ft)		362.34	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	44.00	Top Width (ft)		44.00	
Vel Total (ft/s)	7.23	Avg. Vel. (ft/s)		7.23	
Max Chl Dpth (ft)	10.94	Hydr. Depth (ft)		8.24	
Conv. Total (cfs)	148845.3	Conv. (cfs)		148845.3	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		53.18	
Min Ch El (ft)	2821.00	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.35	26.05	0.34
C & E Loss (ft)	0.00	Cum SA (acres)	0.20	6.58	0.17

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2832.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.83	Wt. n-Val.		0.013	
W.S. Elev (ft)	2832.07	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2828.12	Flow Area (sq ft)		368.26	
E.G. Slope (ft/ft)	0.000314	Area (sq ft)		368.26	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	44.00	Top Width (ft)		44.00	
Vel Total (ft/s)	7.33	Avg. Vel. (ft/s)		7.33	
Max Chl Dpth (ft)	11.07	Hydr. Depth (ft)		8.37	
Conv. Total (cfs)	152406.1	Conv. (cfs)		152406.1	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		53.45	
Min Ch El (ft)	2821.00	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.28	23.01	0.27
C & E Loss (ft)	0.00	Cum SA (acres)	0.17	6.38	0.15

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2830.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.68	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2826.05	Flow Area (sq ft)		264.91	
E.G. Slope (ft/ft)	0.000247	Area (sq ft)		264.91	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	41.04	Top Width (ft)		41.04	
Vel Total (ft/s)	5.66	Avg. Vel. (ft/s)		5.66	
Max Chl Dpth (ft)	8.68	Hydr. Depth (ft)		6.45	
Conv. Total (cfs)	95524.2	Conv. (cfs)		95524.2	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		47.28	
Min Ch El (ft)	2821.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	15.07	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	5.90	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2825.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2825.07	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2822.43	Flow Area (sq ft)		101.36	
E.G. Slope (ft/ft)	0.000066	Area (sq ft)		101.36	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	29.86	Top Width (ft)		29.86	
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)		1.97	
Max Chl Dpth (ft)	4.07	Hydr. Depth (ft)		3.39	
Conv. Total (cfs)	24592.1	Conv. (cfs)		24592.1	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		32.78	
Min Ch El (ft)	2821.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	3.85	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	5.01	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2829.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.00	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2825.47	Flow Area (sq ft)		237.56	
E.G. Slope (ft/ft)	0.000224	Area (sq ft)		237.56	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	39.39	Top Width (ft)		39.39	
Vel Total (ft/s)	5.18	Avg. Vel. (ft/s)		5.18	
Max Chl Dpth (ft)	8.00	Hydr. Depth (ft)		6.03	
Conv. Total (cfs)	82152.4	Conv. (cfs)		82152.4	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		45.14	
Min Ch El (ft)	2821.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	14.90	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	5.90	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2828.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2827.83	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2824.51	Flow Area (sq ft)		193.18	
E.G. Slope (ft/ft)	0.000182	Area (sq ft)		193.18	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	36.56	Top Width (ft)		36.56	
Vel Total (ft/s)	4.30	Avg. Vel. (ft/s)		4.30	
Max Chl Dpth (ft)	6.83	Hydr. Depth (ft)		5.28	
Conv. Total (cfs)	61591.7	Conv. (cfs)		61591.7	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		41.47	
Min Ch El (ft)	2821.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	11.74	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	5.69	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2826.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.013	
W.S. Elev (ft)	2826.64	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2823.59	Flow Area (sq ft)		151.49	
E.G. Slope (ft/ft)	0.000136	Area (sq ft)		151.49	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	33.68	Top Width (ft)		33.68	
Vel Total (ft/s)	3.37	Avg. Vel. (ft/s)		3.37	
Max Chl Dpth (ft)	5.64	Hydr. Depth (ft)		4.50	
Conv. Total (cfs)	43737.8	Conv. (cfs)		43737.8	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		37.74	
Min Ch El (ft)	2821.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	8.36	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	5.42	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

LATERAL STRUCTURE

RIVER: Desert Knolls Wa
REACH: Main RS: 8875

INPUT
Description: Reach 3 Diversion Chute #2
Lateral structure position = Left overbank
Distance from Upstream XS =
Deck/Roadway Width = 20
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2830.9	4	2830.9	12	2830.9	120.78	2829.6

Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Circular	2	

FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG

Culvert	Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
		757	.013	.013	0	.5	1

Upstream Elevation = 2821
Centerline Station = 2
Downstream Elevation = 2819.5
Centerline Station = 2

LATERAL STRUCTURE OUTPUT Profile #100-yr SBCFCD Culv Group: Culvert #1

E.G. US. (ft)	2832.75	Weir Sta US (ft)	0.00
W.S. US. (ft)	2831.94	Weir Sta DS (ft)	4.00

E.G. DS (ft)	2831.88	Min El Weir Flow (ft)	2829.60
W.S. DS (ft)	2828.85	Wr Top Wdth (ft)	4.00
Q US (cfs)	2620.00	Weir Max Depth (ft)	1.04
Q Leaving Total (cfs)	33.20	Weir Avg Depth (ft)	1.03
Q DS (cfs)	2620.00	Weir Flow Area (sq ft)	4.14
Perc Q Leaving	1.27	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	8.41	Weir Submerg	0.00
Q Gates (cfs)		Q Culv Group (cfs)	24.78
Q Culv (cfs)	24.78	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	757.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2821.00
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2819.50
Breach Flow Area (sq ft)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

LATERAL STRUCTURE OUTPUT Profile #100-yr FIS Culv Group: Culvert #1

E.G. US. (ft)	2832.90	Weir Sta US (ft)	0.00
W.S. US. (ft)	2832.07	Weir Sta DS (ft)	12.00
E.G. DS (ft)	2832.04	Min El Weir Flow (ft)	2829.60
W.S. DS (ft)	2828.96	Wr Top Wdth (ft)	8.16
Q US (cfs)	2700.00	Weir Max Depth (ft)	1.17
Q Leaving Total (cfs)	39.25	Weir Avg Depth (ft)	0.87
Q DS (cfs)	2700.00	Weir Flow Area (sq ft)	7.10
Perc Q Leaving	1.45	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	14.31	Weir Submerg	0.00
Q Gates (cfs)		Q Culv Group (cfs)	24.94
Q Culv (cfs)	24.94	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	757.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2821.00
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2819.50
Breach Flow Area (sq ft)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

LATERAL STRUCTURE OUTPUT Profile #50-yr FIS Culv Group: Culvert #1

E.G. US. (ft)	2830.18	Weir Sta US (ft)	
W.S. US. (ft)	2829.68	Weir Sta DS (ft)	
E.G. DS (ft)	2829.32	Min El Weir Flow (ft)	2829.60
W.S. DS (ft)	2826.71	Wr Top Wdth (ft)	
Q US (cfs)	1500.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	22.01	Weir Avg Depth (ft)	
Q DS (cfs)	1500.00	Weir Flow Area (sq ft)	
Perc Q Leaving	1.47	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	22.01
Q Culv (cfs)	22.01	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	757.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2821.00
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2819.50

```
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2825.13    Weir Sta US (ft)
  W.S. US. (ft)                2825.07    Weir Sta DS (ft)
  E.G. DS (ft)                 2824.29    Min El Weir Flow (ft)        2829.60
  W.S. DS (ft)                 2822.82    Wr Top Wdth (ft)
  Q US (cfs)                    200.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          15.10    Weir Avg Depth (ft)
  Q DS (cfs)                    200.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  7.55    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             15.10
  Q Culv (cfs)                   15.10    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              757.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2821.00
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2819.50
  Breach Flow Area (sq ft)


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

LATERAL STRUCTURE OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2829.42    Weir Sta US (ft)
  W.S. US. (ft)                2829.00    Weir Sta DS (ft)
  E.G. DS (ft)                 2828.56    Min El Weir Flow (ft)        2829.60
  W.S. DS (ft)                 2826.09    Wr Top Wdth (ft)
  Q US (cfs)                   1230.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          21.11    Weir Avg Depth (ft)
  Q DS (cfs)                   1230.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  1.72    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             21.11
  Q Culv (cfs)                   21.11    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              757.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2821.00
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2819.50
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

LATERAL STRUCTURE OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

E.G. US. (ft)	2828.12	Weir Sta US (ft)	
W.S. US. (ft)	2827.83	Weir Sta DS (ft)	
E.G. DS (ft)	2827.27	Min El Weir Flow (ft)	2829.60
W.S. DS (ft)	2825.04	Wr Top Wdth (ft)	
Q US (cfs)	830.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	19.50	Weir Avg Depth (ft)	
Q DS (cfs)	830.00	Weir Flow Area (sq ft)	
Perc Q Leaving	2.35	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	19.50
Q Culv (cfs)	19.50	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	757.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2821.00
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2819.50
Breach Flow Area (sq ft)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

LATERAL STRUCTURE OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #1

E.G. US. (ft)	2826.82	Weir Sta US (ft)	
W.S. US. (ft)	2826.64	Weir Sta DS (ft)	
E.G. DS (ft)	2825.99	Min El Weir Flow (ft)	2829.60
W.S. DS (ft)	2824.04	Wr Top Wdth (ft)	
Q US (cfs)	510.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	17.73	Weir Avg Depth (ft)	
Q DS (cfs)	510.00	Weir Flow Area (sq ft)	
Perc Q Leaving	3.48	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	17.73
Q Culv (cfs)	17.73	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	757.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2821.00
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2819.50
Breach Flow Area (sq ft)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 8873

INPUT
Description: 88+73 Chute (sag)
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     222  2830.9     242  2830.9     254    2821     274    2821     286  2830.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     222    .016     242    .013     286    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     286                8       8       8             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     222     242  2835.5       T
     286     286  2835.5       T
Left Levee      Station=     242      Elevation=  2835.5
Right Levee     Station=     286      Elevation=  2835.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2832.75    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.81    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2831.93    Reach Len. (ft)              8.00       8.00       8.00
  Crit W.S. (ft)           2828.00    Flow Area (sq ft)                     362.26
  E.G. Slope (ft/ft)      0.000310    Area (sq ft)                          362.26
  Q Total (cfs)            2620.00    Flow (cfs)                           2620.00
  Top Width (ft)             44.00    Top Width (ft)                         44.00
  Vel Total (ft/s)            7.23    Avg. Vel. (ft/s)                        7.23
  Max Chl Dpth (ft)          10.93    Hydr. Depth (ft)                        8.23
  Conv. Total (cfs)       148793.7    Conv. (cfs)                         148793.7
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                       53.18
  Min Ch El (ft)           2821.00    Shear (lb/sq ft)                        0.13
  Alpha                       1.00    Stream Power (lb/ft s)    286.00     242.00     286.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.35      26.02       0.34
  C & E Loss (ft)             0.51    Cum SA (acres)              0.20       6.57       0.17


Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2832.90    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.84    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2832.07    Reach Len. (ft)              8.00       8.00       8.00
  Crit W.S. (ft)           2828.12    Flow Area (sq ft)                     368.18
  E.G. Slope (ft/ft)      0.000314    Area (sq ft)                          368.18
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             44.00    Top Width (ft)                         44.00
  Vel Total (ft/s)            7.33    Avg. Vel. (ft/s)                        7.33
  Max Chl Dpth (ft)          11.07    Hydr. Depth (ft)                        8.37
  Conv. Total (cfs)       152354.2    Conv. (cfs)                         152354.2
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                       53.45
  Min Ch El (ft)           2821.00    Shear (lb/sq ft)                        0.14
  Alpha                       1.00    Stream Power (lb/ft s)    286.00     242.00     286.00
```

Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.28	22.97	0.27
C & E Loss (ft)	0.52	Cum SA (acres)	0.17	6.38	0.15

Warning: The cross-section end points had to be extended vertically for the computed water surface.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2830.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.68	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2826.05	Flow Area (sq ft)		264.86	
E.G. Slope (ft/ft)	0.000247	Area (sq ft)		264.86	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	41.04	Top Width (ft)		41.04	
Vel Total (ft/s)	5.66	Avg. Vel. (ft/s)		5.66	
Max Chl Dpth (ft)	8.68	Hydr. Depth (ft)		6.45	
Conv. Total (cfs)	95499.3	Conv. (cfs)		95499.3	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		47.27	
Min Ch El (ft)	2821.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	15.05	0.13
C & E Loss (ft)	0.43	Cum SA (acres)	0.11	5.90	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2825.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2825.07	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2822.43	Flow Area (sq ft)		101.36	
E.G. Slope (ft/ft)	0.000066	Area (sq ft)		101.36	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	29.86	Top Width (ft)		29.86	
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)		1.97	
Max Chl Dpth (ft)	4.07	Hydr. Depth (ft)		3.39	
Conv. Total (cfs)	24589.5	Conv. (cfs)		24589.5	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		32.78	
Min Ch El (ft)	2821.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	3.84	0.01
C & E Loss (ft)	0.18	Cum SA (acres)	0.03	5.00	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2829.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.00	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2825.47	Flow Area (sq ft)		237.51	
E.G. Slope (ft/ft)	0.000224	Area (sq ft)		237.51	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	39.39	Top Width (ft)		39.39	
Vel Total (ft/s)	5.18	Avg. Vel. (ft/s)		5.18	
Max Chl Dpth (ft)	8.00	Hydr. Depth (ft)		6.03	
Conv. Total (cfs)	82129.3	Conv. (cfs)		82129.3	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		45.14	
Min Ch El (ft)	2821.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	14.88	0.13
C & E Loss (ft)	0.40	Cum SA (acres)	0.11	5.90	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2828.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2827.83	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2824.51	Flow Area (sq ft)		193.16	
E.G. Slope (ft/ft)	0.000182	Area (sq ft)		193.16	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	36.56	Top Width (ft)		36.56	
Vel Total (ft/s)	4.30	Avg. Vel. (ft/s)		4.30	
Max Chl Dpth (ft)	6.83	Hydr. Depth (ft)		5.28	
Conv. Total (cfs)	61579.7	Conv. (cfs)		61579.7	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		41.47	
Min Ch El (ft)	2821.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	11.72	0.08
C & E Loss (ft)	0.35	Cum SA (acres)	0.08	5.68	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2826.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.013	
W.S. Elev (ft)	2826.64	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2823.59	Flow Area (sq ft)		151.48	
E.G. Slope (ft/ft)	0.000136	Area (sq ft)		151.48	
Q Total (cfs)	510.00	Flow (cfs)		510.00	

Top Width (ft)	33.68	Top Width (ft)		33.68	
Vel Total (ft/s)	3.37	Avg. Vel. (ft/s)		3.37	
Max Chl Dpth (ft)	5.64	Hydr. Depth (ft)		4.50	
Conv. Total (cfs)	43731.0	Conv. (cfs)		43731.0	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		37.74	
Min Ch El (ft)	2821.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	8.34	0.04
C & E Loss (ft)	0.27	Cum SA (acres)	0.06	5.42	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8865

INPUT
Description: 88+65 Chute (D/S)
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
222	2830.9	242	2830.9	254	2822.9	274	2822.9	286	2830.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
222	.016	242	.013	286	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	286	108.78	108.78	108.78	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
222	242	2833	T
286	286	2833	T

Left Levee Station= 242 Elevation= 2833
Right Levee Station= 286 Elevation= 2833

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2832.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.52	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.70	Reach Len. (ft)	108.78	108.78	108.78
Crit W.S. (ft)	2829.70	Flow Area (sq ft)		205.49	
E.G. Slope (ft/ft)	0.001620	Area (sq ft)		205.49	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	40.41	Top Width (ft)		40.41	
Vel Total (ft/s)	12.75	Avg. Vel. (ft/s)		12.75	
Max Chl Dpth (ft)	6.80	Hydr. Depth (ft)		5.09	
Conv. Total (cfs)	65103.8	Conv. (cfs)		65103.8	
Length Wtd. (ft)	108.78	Wetted Per. (ft)		44.53	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.35	25.97	0.34
C & E Loss (ft)	0.03	Cum SA (acres)	0.20	6.56	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2832.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.56	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.82	Reach Len. (ft)	108.78	108.78	108.78
Crit W.S. (ft)	2829.82	Flow Area (sq ft)		210.35	
E.G. Slope (ft/ft)	0.001612	Area (sq ft)		210.35	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	40.77	Top Width (ft)		40.77	
Vel Total (ft/s)	12.84	Avg. Vel. (ft/s)		12.84	
Max Chl Dpth (ft)	6.92	Hydr. Depth (ft)		5.16	
Conv. Total (cfs)	67254.2	Conv. (cfs)		67254.2	
Length Wtd. (ft)	108.78	Wetted Per. (ft)		44.96	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.28	22.92	0.27
C & E Loss (ft)	0.03	Cum SA (acres)	0.17	6.37	0.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2829.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.92	Wt. n-Val.		0.013	
W.S. Elev (ft)	2827.82	Reach Len. (ft)	108.78	108.78	108.78
Crit W.S. (ft)	2827.82	Flow Area (sq ft)		134.83	
E.G. Slope (ft/ft)	0.001735	Area (sq ft)		134.83	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	34.77	Top Width (ft)		34.77	
Vel Total (ft/s)	11.13	Avg. Vel. (ft/s)		11.13	
Max Chl Dpth (ft)	4.92	Hydr. Depth (ft)		3.88	
Conv. Total (cfs)	36006.8	Conv. (cfs)		36006.8	
Length Wtd. (ft)	108.78	Wetted Per. (ft)		37.75	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.13	15.01	0.13
C & E Loss (ft)	0.03	Cum SA (acres)	0.11	5.89	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2824.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.013	
W.S. Elev (ft)	2824.30	Reach Len. (ft)	108.78	108.78	108.78
Crit W.S. (ft)	2824.30	Flow Area (sq ft)		30.97	
E.G. Slope (ft/ft)	0.002405	Area (sq ft)		30.97	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	24.20	Top Width (ft)		24.20	
Vel Total (ft/s)	6.46	Avg. Vel. (ft/s)		6.46	
Max Chl Dpth (ft)	1.40	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	4078.1	Conv. (cfs)		4078.1	
Length Wtd. (ft)	108.78	Wetted Per. (ft)		25.05	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.01	3.83	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	5.00	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2829.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.74	Wt. n-Val.		0.013	
W.S. Elev (ft)	2827.28	Reach Len. (ft)	108.78	108.78	108.78
Crit W.S. (ft)	2827.28	Flow Area (sq ft)		116.26	
E.G. Slope (ft/ft)	0.001780	Area (sq ft)		116.26	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	33.13	Top Width (ft)		33.13	
Vel Total (ft/s)	10.58	Avg. Vel. (ft/s)		10.58	
Max Chl Dpth (ft)	4.38	Hydr. Depth (ft)		3.51	
Conv. Total (cfs)	29152.5	Conv. (cfs)		29152.5	
Length Wtd. (ft)	108.78	Wetted Per. (ft)		35.78	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.13	14.84	0.13
C & E Loss (ft)	0.03	Cum SA (acres)	0.11	5.89	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2827.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.44	Wt. n-Val.		0.013	
W.S. Elev (ft)	2826.33	Reach Len. (ft)	108.78	108.78	108.78
Crit W.S. (ft)	2826.33	Flow Area (sq ft)		86.15	
E.G. Slope (ft/ft)	0.001925	Area (sq ft)		86.15	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	30.28	Top Width (ft)		30.28	
Vel Total (ft/s)	9.63	Avg. Vel. (ft/s)		9.63	
Max Chl Dpth (ft)	3.43	Hydr. Depth (ft)		2.85	
Conv. Total (cfs)	18916.4	Conv. (cfs)		18916.4	
Length Wtd. (ft)	108.78	Wetted Per. (ft)		32.36	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	0.08	11.69	0.08
C & E Loss (ft)	0.03	Cum SA (acres)	0.08	5.68	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2826.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2825.46	Reach Len. (ft)	108.78	108.78	108.78
Crit W.S. (ft)	2825.46	Flow Area (sq ft)		61.00	
E.G. Slope (ft/ft)	0.002006	Area (sq ft)		61.00	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	27.68	Top Width (ft)		27.68	
Vel Total (ft/s)	8.36	Avg. Vel. (ft/s)		8.36	
Max Chl Dpth (ft)	2.56	Hydr. Depth (ft)		2.20	
Conv. Total (cfs)	11386.8	Conv. (cfs)		11386.8	
Length Wtd. (ft)	108.78	Wetted Per. (ft)		29.23	
Min Ch El (ft)	2822.90	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)	286.00	242.00	286.00
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	0.04	8.32	0.04
C & E Loss (ft)	0.04	Cum SA (acres)	0.06	5.41	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8756.22*

```
INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2833  109.97 2832.45  122.81 2831.81   123.1  2831.8  139.34 2831.16
  150.37 2830.67  152.88 2830.57  167.82 2830.03  185.37  2829.6     197  2829.6
     203  2826.6     216  2826.6     222  2829.6     242  2829.6     254  2821.6
     269  2821.6     281  2829.6  314.96  2828.5  326.95 2828.42  382.38 2828.71
  416.58 2828.96

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     281    .035  416.58    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     281           248.78  248.78  248.78             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242  2832.5       T
     281  416.58  2832.5       T
Left Levee      Station=     242      Elevation=    2832
Right Levee     Station=     281      Elevation=    2832

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2831.88    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               3.03    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2828.85    Reach Len. (ft)            248.78     248.78     248.78
  Crit W.S. (ft)           2829.22    Flow Area (sq ft)                     187.50
  E.G. Slope (ft/ft)      0.001977    Area (sq ft)                          187.50
  Q Total (cfs)            2620.00    Flow (cfs)                           2620.00
  Top Width (ft)             36.74    Top Width (ft)                         36.74
  Vel Total (ft/s)           13.97    Avg. Vel. (ft/s)                       13.97
  Max Chl Dpth (ft)           7.25    Hydr. Depth (ft)                        5.10
  Conv. Total (cfs)        58919.4    Conv. (cfs)                          58919.4
  Length Wtd. (ft)          248.78    Wetted Per. (ft)                       41.13
  Min Ch El (ft)           2821.60    Shear (lb/sq ft)                        0.56
  Alpha                       1.00    Stream Power (lb/ft s)     416.58     242.00     281.00
  Frctn Loss (ft)             0.19    Cum Volume (acre-ft)         0.35      25.48       0.34
  C & E Loss (ft)             0.15    Cum SA (acres)               0.20       6.47       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2832.04    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               3.08    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2828.96    Reach Len. (ft)            248.78     248.78     248.78
  Crit W.S. (ft)           2829.34    Flow Area (sq ft)                     191.80
  E.G. Slope (ft/ft)      0.001973    Area (sq ft)                          191.80
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             37.09    Top Width (ft)                         37.09
  Vel Total (ft/s)           14.08    Avg. Vel. (ft/s)                       14.08
  Max Chl Dpth (ft)           7.36    Hydr. Depth (ft)                        5.17
  Conv. Total (cfs)        60779.2    Conv. (cfs)                          60779.2
  Length Wtd. (ft)          248.78    Wetted Per. (ft)                       41.55
  Min Ch El (ft)           2821.60    Shear (lb/sq ft)                        0.57
  Alpha                       1.00    Stream Power (lb/ft s)     416.58     242.00     281.00
  Frctn Loss (ft)             0.19    Cum Volume (acre-ft)         0.28      22.42       0.27
  C & E Loss (ft)             0.16    Cum SA (acres)               0.17       6.27       0.15
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2829.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.61	Wt. n-Val.		0.013	
W.S. Elev (ft)	2826.71	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2827.20	Flow Area (sq ft)		115.72	
E.G. Slope (ft/ft)	0.002454	Area (sq ft)		115.72	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	30.32	Top Width (ft)		30.32	
Vel Total (ft/s)	12.96	Avg. Vel. (ft/s)		12.96	
Max Chl Dpth (ft)	5.11	Hydr. Depth (ft)		3.82	
Conv. Total (cfs)	30277.0	Conv. (cfs)		30277.0	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		33.41	
Min Ch El (ft)	2821.60	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)	416.58	242.00	281.00
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	0.13	14.70	0.13
C & E Loss (ft)	0.21	Cum SA (acres)	0.11	5.81	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2824.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.47	Wt. n-Val.		0.013	
W.S. Elev (ft)	2822.82	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2823.27	Flow Area (sq ft)		20.55	
E.G. Slope (ft/ft)	0.006715	Area (sq ft)		20.55	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.66	Top Width (ft)		18.66	
Vel Total (ft/s)	9.73	Avg. Vel. (ft/s)		9.73	
Max Chl Dpth (ft)	1.22	Hydr. Depth (ft)		1.10	
Conv. Total (cfs)	2440.7	Conv. (cfs)		2440.7	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		19.40	
Min Ch El (ft)	2821.60	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)	416.58	242.00	281.00
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	0.01	3.77	0.01
C & E Loss (ft)	0.25	Cum SA (acres)	0.03	4.94	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2828.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.47	Wt. n-Val.		0.013	

W.S. Elev (ft)	2826.09	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2826.61	Flow Area (sq ft)		97.46	
E.G. Slope (ft/ft)	0.002667	Area (sq ft)		97.46	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	28.46	Top Width (ft)		28.46	
Vel Total (ft/s)	12.62	Avg. Vel. (ft/s)		12.62	
Max Chl Dpth (ft)	4.49	Hydr. Depth (ft)		3.42	
Conv. Total (cfs)	23817.8	Conv. (cfs)		23817.8	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		31.17	
Min Ch El (ft)	2821.60	Shear (lb/sq ft)		0.52	
Alpha	1.00	Stream Power (lb/ft s)	416.58	242.00	281.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.13	14.58	0.13
C & E Loss (ft)	0.22	Cum SA (acres)	0.11	5.81	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2827.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2825.04	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2825.57	Flow Area (sq ft)		69.31	
E.G. Slope (ft/ft)	0.003185	Area (sq ft)		69.31	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	25.31	Top Width (ft)		25.31	
Vel Total (ft/s)	11.98	Avg. Vel. (ft/s)		11.98	
Max Chl Dpth (ft)	3.44	Hydr. Depth (ft)		2.74	
Conv. Total (cfs)	14707.3	Conv. (cfs)		14707.3	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		27.40	
Min Ch El (ft)	2821.60	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	416.58	242.00	281.00
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	0.08	11.50	0.08
C & E Loss (ft)	0.24	Cum SA (acres)	0.08	5.61	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2825.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.94	Wt. n-Val.		0.013	
W.S. Elev (ft)	2824.04	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2824.58	Flow Area (sq ft)		45.58	
E.G. Slope (ft/ft)	0.004030	Area (sq ft)		45.58	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	22.33	Top Width (ft)		22.33	
Vel Total (ft/s)	11.19	Avg. Vel. (ft/s)		11.19	
Max Chl Dpth (ft)	2.44	Hydr. Depth (ft)		2.04	
Conv. Total (cfs)	8034.2	Conv. (cfs)		8034.2	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		23.81	
Min Ch El (ft)	2821.60	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)	416.58	242.00	281.00
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.04	8.19	0.04
C & E Loss (ft)	0.26	Cum SA (acres)	0.06	5.35	0.06

```
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 8507.43*

INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2831  109.97 2830.34  122.81 2829.61   123.1 2829.59  139.34 2828.87
  150.37 2828.25  152.88 2828.14  167.82 2827.52  185.37  2827.2     197  2827.2
     203  2824.2     216  2824.2     222  2827.2     242  2827.2     254  2819.2
     269  2819.2     281  2827.2  314.82 2826.01  326.76 2825.81  381.96 2826.28
  416.02 2826.72

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     281    .035  416.02    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     281           248.78  248.78  248.78             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242  2828.5       T
     281  416.02  2828.5       T
Left Levee      Station=     242      Elevation=  2828.5
Right Levee     Station=     281      Elevation=  2828.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2830.48    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               5.37    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2825.10    Reach Len. (ft)           248.78     248.78     248.78
  Crit W.S. (ft)           2826.81    Flow Area (sq ft)                    140.84
  E.G. Slope (ft/ft)      0.004343    Area (sq ft)                         140.84
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             32.71    Top Width (ft)                        32.71
  Vel Total (ft/s)           18.60    Avg. Vel. (ft/s)                      18.60
  Max Chl Dpth (ft)           5.90    Hydr. Depth (ft)                       4.31
  Conv. Total (cfs)        39758.5    Conv. (cfs)                         39758.5
  Length Wtd. (ft)          248.78    Wetted Per. (ft)                      36.29
  Min Ch El (ft)           2819.20    Shear (lb/sq ft)                       1.05
  Alpha                       1.00    Stream Power (lb/ft s)    416.02     242.00     281.00
  Frctn Loss (ft)             0.70    Cum Volume (acre-ft)        0.35      24.54       0.34
  C & E Loss (ft)             0.70    Cum SA (acres)              0.20       6.27       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
```

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2830.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.43	Wt. n-Val.		0.013	
W.S. Elev (ft)	2825.21	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2826.94	Flow Area (sq ft)		144.43	
E.G. Slope (ft/ft)	0.004302	Area (sq ft)		144.43	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	33.04	Top Width (ft)		33.04	
Vel Total (ft/s)	18.69	Avg. Vel. (ft/s)		18.69	
Max Chl Dpth (ft)	6.01	Hydr. Depth (ft)		4.37	
Conv. Total (cfs)	41163.7	Conv. (cfs)		41163.7	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		36.68	
Min Ch El (ft)	2819.20	Shear (lb/sq ft)		1.06	
Alpha	1.00	Stream Power (lb/ft s)	416.02	242.00	281.00
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	0.28	21.46	0.27
C & E Loss (ft)	0.70	Cum SA (acres)	0.17	6.07	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2827.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.54	Wt. n-Val.		0.013	
W.S. Elev (ft)	2823.34	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2824.80	Flow Area (sq ft)		87.70	
E.G. Slope (ft/ft)	0.005336	Area (sq ft)		87.70	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	27.41	Top Width (ft)		27.41	
Vel Total (ft/s)	17.10	Avg. Vel. (ft/s)		17.10	
Max Chl Dpth (ft)	4.14	Hydr. Depth (ft)		3.20	
Conv. Total (cfs)	20534.2	Conv. (cfs)		20534.2	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		29.91	
Min Ch El (ft)	2819.20	Shear (lb/sq ft)		0.98	
Alpha	1.00	Stream Power (lb/ft s)	416.02	242.00	281.00
Frctn Loss (ft)	0.87	Cum Volume (acre-ft)	0.13	14.12	0.13
C & E Loss (ft)	0.58	Cum SA (acres)	0.11	5.65	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2822.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.87	Wt. n-Val.		0.013	
W.S. Elev (ft)	2820.29	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2820.87	Flow Area (sq ft)		18.21	
E.G. Slope (ft/ft)	0.009741	Area (sq ft)		18.21	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.28	Top Width (ft)		18.28	
Vel Total (ft/s)	10.99	Avg. Vel. (ft/s)		10.99	
Max Chl Dpth (ft)	1.09	Hydr. Depth (ft)		1.00	
Conv. Total (cfs)	2026.4	Conv. (cfs)		2026.4	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		18.94	
Min Ch El (ft)	2819.20	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)	416.02	242.00	281.00
Frctn Loss (ft)	1.99	Cum Volume (acre-ft)	0.01	3.66	0.01
C & E Loss (ft)	0.12	Cum SA (acres)	0.03	4.84	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2827.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.25	Wt. n-Val.		0.013	
W.S. Elev (ft)	2822.84	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2824.18	Flow Area (sq ft)		74.35	
E.G. Slope (ft/ft)	0.005726	Area (sq ft)		74.35	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	25.91	Top Width (ft)		25.91	
Vel Total (ft/s)	16.54	Avg. Vel. (ft/s)		16.54	
Max Chl Dpth (ft)	3.64	Hydr. Depth (ft)		2.87	
Conv. Total (cfs)	16255.1	Conv. (cfs)		16255.1	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		28.11	
Min Ch El (ft)	2819.20	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)	416.02	242.00	281.00
Frctn Loss (ft)	0.94	Cum Volume (acre-ft)	0.13	14.09	0.13
C & E Loss (ft)	0.53	Cum SA (acres)	0.11	5.66	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2825.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.72	Wt. n-Val.		0.013	
W.S. Elev (ft)	2822.00	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2823.18	Flow Area (sq ft)		53.65	
E.G. Slope (ft/ft)	0.006645	Area (sq ft)		53.65	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	23.39	Top Width (ft)		23.39	
Vel Total (ft/s)	15.47	Avg. Vel. (ft/s)		15.47	
Max Chl Dpth (ft)	2.80	Hydr. Depth (ft)		2.29	
Conv. Total (cfs)	10181.9	Conv. (cfs)		10181.9	

Length Wtd. (ft)	248.78	Wetted Per. (ft)		25.08	
Min Ch El (ft)	2819.20	Shear (lb/sq ft)		0.89	
Alpha	1.00	Stream Power (lb/ft s)	416.02	242.00	281.00
Frctn Loss (ft)	1.11	Cum Volume (acre-ft)	0.08	11.15	0.08
C & E Loss (ft)	0.45	Cum SA (acres)	0.08	5.47	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2824.28	Element			
Vel Head (ft)	3.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2821.21	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2822.18	Flow Area (sq ft)		36.27	
E.G. Slope (ft/ft)	0.007894	Area (sq ft)		36.27	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	21.04	Top Width (ft)		21.04	
Vel Total (ft/s)	14.06	Avg. Vel. (ft/s)		14.06	
Max Chl Dpth (ft)	2.01	Hydr. Depth (ft)		1.72	
Conv. Total (cfs)	5740.2	Conv. (cfs)		5740.2	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		22.26	
Min Ch El (ft)	2819.20	Shear (lb/sq ft)		0.80	
Alpha	1.00	Stream Power (lb/ft s)	416.02	242.00	281.00
Frctn Loss (ft)	1.36	Cum Volume (acre-ft)	0.04	7.95	0.04
C & E Loss (ft)	0.34	Cum SA (acres)	0.06	5.23	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8258.66*

INPUT
Description:
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2829	109.97	2828.23	122.81	2827.41	123.1	2827.39	139.34	2826.58
150.37	2825.83	152.88	2825.71	167.82	2825.02	185.37	2824.8	197	2824.8
203	2821.8	216	2821.8	222	2824.8	242	2824.8	254	2816.8
269	2816.8	281	2824.8	314.68	2823.51	326.57	2823.21	381.54	2823.85
415.47	2824.48								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.035	415.47	.035

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Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     281           248.78  248.78  248.78             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242  2825.5       T
     281  415.47  2825.5       T
Left Levee      Station=     242      Elevation=  2825.5
Right Levee     Station=     281      Elevation=  2825.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2828.87    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               6.60    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2822.28    Reach Len. (ft)           248.78     248.78     248.78
  Crit W.S. (ft)           2824.42    Flow Area (sq ft)                    127.13
  E.G. Slope (ft/ft)      0.005766    Area (sq ft)                         127.13
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             31.43    Top Width (ft)                        31.43
  Vel Total (ft/s)           20.61    Avg. Vel. (ft/s)                      20.61
  Max Chl Dpth (ft)           5.48    Hydr. Depth (ft)                       4.04
  Conv. Total (cfs)        34503.9    Conv. (cfs)                         34503.9
  Length Wtd. (ft)          248.78    Wetted Per. (ft)                      34.75
  Min Ch El (ft)           2816.80    Shear (lb/sq ft)                       1.32
  Alpha                       1.00    Stream Power (lb/ft s)    415.47     242.00     281.00
  Frctn Loss (ft)             1.24    Cum Volume (acre-ft)        0.35      23.77       0.34
  C & E Loss (ft)             0.37    Cum SA (acres)              0.20       6.09       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2829.04    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               6.66    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2822.38    Reach Len. (ft)           248.78     248.78     248.78
  Crit W.S. (ft)           2824.54    Flow Area (sq ft)                    130.35
  E.G. Slope (ft/ft)      0.005713    Area (sq ft)                         130.35
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             31.74    Top Width (ft)                        31.74
  Vel Total (ft/s)           20.71    Avg. Vel. (ft/s)                      20.71
  Max Chl Dpth (ft)           5.58    Hydr. Depth (ft)                       4.11
  Conv. Total (cfs)        35722.3    Conv. (cfs)                         35722.3
  Length Wtd. (ft)          248.78    Wetted Per. (ft)                      35.11
  Min Ch El (ft)           2816.80    Shear (lb/sq ft)                       1.32
  Alpha                       1.00    Stream Power (lb/ft s)    415.47     242.00     281.00
  Frctn Loss (ft)             1.23    Cum Volume (acre-ft)        0.28      20.67       0.27
  C & E Loss (ft)             0.37    Cum SA (acres)              0.17       5.89       0.15


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS
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E.G. Elev (ft)	2826.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.45	Wt. n-Val.		0.013	
W.S. Elev (ft)	2820.65	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2822.40	Flow Area (sq ft)		80.08	
E.G. Slope (ft/ft)	0.006899	Area (sq ft)		80.08	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	26.56	Top Width (ft)		26.56	
Vel Total (ft/s)	18.73	Avg. Vel. (ft/s)		18.73	
Max Chl Dpth (ft)	3.85	Hydr. Depth (ft)		3.01	
Conv. Total (cfs)	18059.0	Conv. (cfs)		18059.0	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		28.89	
Min Ch El (ft)	2816.80	Shear (lb/sq ft)		1.19	
Alpha	1.00	Stream Power (lb/ft s)	415.47	242.00	281.00
Frctn Loss (ft)	1.50	Cum Volume (acre-ft)	0.13	13.64	0.13
C & E Loss (ft)	0.27	Cum SA (acres)	0.11	5.49	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2819.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.85	Wt. n-Val.		0.013	
W.S. Elev (ft)	2817.90	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2818.47	Flow Area (sq ft)		18.31	
E.G. Slope (ft/ft)	0.009567	Area (sq ft)		18.31	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.30	Top Width (ft)		18.30	
Vel Total (ft/s)	10.92	Avg. Vel. (ft/s)		10.92	
Max Chl Dpth (ft)	1.10	Hydr. Depth (ft)		1.00	
Conv. Total (cfs)	2044.8	Conv. (cfs)		2044.8	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		18.97	
Min Ch El (ft)	2816.80	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)	415.47	242.00	281.00
Frctn Loss (ft)	2.40	Cum Volume (acre-ft)	0.01	3.55	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	4.73	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2825.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2820.20	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2821.81	Flow Area (sq ft)		68.28	
E.G. Slope (ft/ft)	0.007300	Area (sq ft)		68.28	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	25.19	Top Width (ft)		25.19	
Vel Total (ft/s)	18.02	Avg. Vel. (ft/s)		18.02	
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)		2.71	
Conv. Total (cfs)	14396.5	Conv. (cfs)		14396.5	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		27.25	
Min Ch El (ft)	2816.80	Shear (lb/sq ft)		1.14	
Alpha	1.00	Stream Power (lb/ft s)	415.47	242.00	281.00

Frctn Loss (ft)	1.60	Cum Volume (acre-ft)	0.13	13.68	0.13
C & E Loss (ft)	0.24	Cum SA (acres)	0.11	5.51	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2823.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.28	Wt. n-Val.		0.013	
W.S. Elev (ft)	2819.44	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2820.78	Flow Area (sq ft)		50.00	
E.G. Slope (ft/ft)	0.008152	Area (sq ft)		50.00	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	22.91	Top Width (ft)		22.91	
Vel Total (ft/s)	16.60	Avg. Vel. (ft/s)		16.60	
Max Chl Dpth (ft)	2.64	Hydr. Depth (ft)		2.18	
Conv. Total (cfs)	9193.0	Conv. (cfs)		9193.0	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		24.51	
Min Ch El (ft)	2816.80	Shear (lb/sq ft)		1.04	
Alpha	1.00	Stream Power (lb/ft s)	415.47	242.00	281.00
Frctn Loss (ft)	1.83	Cum Volume (acre-ft)	0.08	10.85	0.08
C & E Loss (ft)	0.17	Cum SA (acres)	0.08	5.34	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2822.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.36	Wt. n-Val.		0.013	
W.S. Elev (ft)	2818.74	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2819.78	Flow Area (sq ft)		34.68	
E.G. Slope (ft/ft)	0.009011	Area (sq ft)		34.68	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	20.81	Top Width (ft)		20.81	
Vel Total (ft/s)	14.70	Avg. Vel. (ft/s)		14.70	
Max Chl Dpth (ft)	1.94	Hydr. Depth (ft)		1.67	
Conv. Total (cfs)	5372.5	Conv. (cfs)		5372.5	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		21.98	
Min Ch El (ft)	2816.80	Shear (lb/sq ft)		0.89	
Alpha	1.00	Stream Power (lb/ft s)	415.47	242.00	281.00
Frctn Loss (ft)	2.10	Cum Volume (acre-ft)	0.04	7.75	0.04
C & E Loss (ft)	0.09	Cum SA (acres)	0.06	5.11	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 8009.88*

INPUT
Description: 80+09 (interp)
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2827  109.97 2826.11  122.81  2825.2   123.1 2825.19  139.34 2824.29
  150.37 2823.42  152.88 2823.28  167.82 2822.51  185.37  2822.4     197  2822.4
     203  2819.4     216  2819.4     222  2822.4     242  2822.4     254  2814.4
     269  2814.4     281  2822.4     301  2822.4  314.54 2821.02  326.38  2820.6
  381.13 2821.43  414.91 2822.24

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     281    .016     301    .035
  414.91    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     281           209.88  209.88  209.88             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2823       T
     281  414.91    2823       T
Left Levee      Station=     242      Elevation=    2823
Right Levee     Station=     281      Elevation=    2823

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2827.07    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               7.43    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2819.64    Reach Len. (ft)           209.88     209.88     209.88
  Crit W.S. (ft)           2822.02    Flow Area (sq ft)                    119.78
  E.G. Slope (ft/ft)      0.006803    Area (sq ft)                         119.78
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             30.72    Top Width (ft)                        30.72
  Vel Total (ft/s)           21.87    Avg. Vel. (ft/s)                      21.87
  Max Chl Dpth (ft)           5.24    Hydr. Depth (ft)                       3.90
  Conv. Total (cfs)        31765.2    Conv. (cfs)                         31765.2
  Length Wtd. (ft)          209.88    Wetted Per. (ft)                      33.89
  Min Ch El (ft)           2814.40    Shear (lb/sq ft)                       1.50
  Alpha                       1.00    Stream Power (lb/ft s)    414.91     242.00     281.00
  Frctn Loss (ft)             1.56    Cum Volume (acre-ft)        0.35      23.07       0.34
  C & E Loss (ft)             0.25    Cum SA (acres)              0.20       5.91       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2827.25    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               7.51    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2819.74    Reach Len. (ft)           209.88     209.88     209.88
  Crit W.S. (ft)           2822.12    Flow Area (sq ft)                    122.79
  E.G. Slope (ft/ft)      0.006743    Area (sq ft)                         122.79
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             31.01    Top Width (ft)                        31.01
```

Vel Total (ft/s)	21.99	Avg. Vel. (ft/s)		21.99	
Max Chl Dpth (ft)	5.34	Hydr. Depth (ft)		3.96	
Conv. Total (cfs)	32881.2	Conv. (cfs)		32881.2	
Length Wtd. (ft)	209.88	Wetted Per. (ft)		34.24	
Min Ch El (ft)	2814.40	Shear (lb/sq ft)		1.51	
Alpha	1.00	Stream Power (lb/ft s)	414.91	242.00	281.00
Frctn Loss (ft)	1.54	Cum Volume (acre-ft)	0.28	19.95	0.27
C & E Loss (ft)	0.25	Cum SA (acres)	0.17	5.71	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2824.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.99	Wt. n-Val.		0.013	
W.S. Elev (ft)	2818.11	Reach Len. (ft)	209.88	209.88	209.88
Crit W.S. (ft)	2819.99	Flow Area (sq ft)		76.37	
E.G. Slope (ft/ft)	0.007891	Area (sq ft)		76.37	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	26.14	Top Width (ft)		26.14	
Vel Total (ft/s)	19.64	Avg. Vel. (ft/s)		19.64	
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)		2.92	
Conv. Total (cfs)	16886.0	Conv. (cfs)		16886.0	
Length Wtd. (ft)	209.88	Wetted Per. (ft)		28.39	
Min Ch El (ft)	2814.40	Shear (lb/sq ft)		1.33	
Alpha	1.00	Stream Power (lb/ft s)	414.91	242.00	281.00
Frctn Loss (ft)	1.83	Cum Volume (acre-ft)	0.13	13.19	0.13
C & E Loss (ft)	0.16	Cum SA (acres)	0.11	5.34	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2817.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.86	Wt. n-Val.		0.013	
W.S. Elev (ft)	2815.50	Reach Len. (ft)	209.88	209.88	209.88
Crit W.S. (ft)	2816.06	Flow Area (sq ft)		18.26	
E.G. Slope (ft/ft)	0.009654	Area (sq ft)		18.26	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.29	Top Width (ft)		18.29	
Vel Total (ft/s)	10.95	Avg. Vel. (ft/s)		10.95	
Max Chl Dpth (ft)	1.10	Hydr. Depth (ft)		1.00	
Conv. Total (cfs)	2035.6	Conv. (cfs)		2035.6	
Length Wtd. (ft)	209.88	Wetted Per. (ft)		18.96	
Min Ch El (ft)	2814.40	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)	414.91	242.00	281.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	0.01	3.45	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	4.63	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2823.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.49	Wt. n-Val.		0.013	
W.S. Elev (ft)	2817.68	Reach Len. (ft)	209.88	209.88	209.88
Crit W.S. (ft)	2819.41	Flow Area (sq ft)		65.42	
E.G. Slope (ft/ft)	0.008249	Area (sq ft)		65.42	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	24.85	Top Width (ft)		24.85	
Vel Total (ft/s)	18.80	Avg. Vel. (ft/s)		18.80	
Max Chl Dpth (ft)	3.28	Hydr. Depth (ft)		2.63	
Conv. Total (cfs)	13542.8	Conv. (cfs)		13542.8	
Length Wtd. (ft)	209.88	Wetted Per. (ft)		26.84	
Min Ch El (ft)	2814.40	Shear (lb/sq ft)		1.26	
Alpha	1.00	Stream Power (lb/ft s)	414.91	242.00	281.00
Frctn Loss (ft)	1.93	Cum Volume (acre-ft)	0.13	13.30	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	5.37	0.10

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2821.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.55	Wt. n-Val.		0.013	
W.S. Elev (ft)	2816.97	Reach Len. (ft)	209.88	209.88	209.88
Crit W.S. (ft)	2818.38	Flow Area (sq ft)		48.51	
E.G. Slope (ft/ft)	0.008903	Area (sq ft)		48.51	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	22.72	Top Width (ft)		22.72	
Vel Total (ft/s)	17.11	Avg. Vel. (ft/s)		17.11	
Max Chl Dpth (ft)	2.57	Hydr. Depth (ft)		2.14	
Conv. Total (cfs)	8796.7	Conv. (cfs)		8796.7	
Length Wtd. (ft)	209.88	Wetted Per. (ft)		24.27	
Min Ch El (ft)	2814.40	Shear (lb/sq ft)		1.11	
Alpha	1.00	Stream Power (lb/ft s)	414.91	242.00	281.00
Frctn Loss (ft)	2.12	Cum Volume (acre-ft)	0.08	10.57	0.08
C & E Loss (ft)	0.08	Cum SA (acres)	0.08	5.21	0.08

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2819.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.46	Wt. n-Val.		0.013	
W.S. Elev (ft)	2816.31	Reach Len. (ft)	209.88	209.88	209.88
Crit W.S. (ft)	2817.38	Flow Area (sq ft)		34.17	
E.G. Slope (ft/ft)	0.009418	Area (sq ft)		34.17	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	20.74	Top Width (ft)		20.74	

Vel Total (ft/s)	14.92	Avg. Vel. (ft/s)		14.92	
Max Chl Dpth (ft)	1.91	Hydr. Depth (ft)		1.65	
Conv. Total (cfs)	5255.1	Conv. (cfs)		5255.1	
Length Wtd. (ft)	209.88	Wetted Per. (ft)		21.90	
Min Ch El (ft)	2814.40	Shear (lb/sq ft)		0.92	
Alpha	1.00	Stream Power (lb/ft s)	414.91	242.00	281.00
Frctn Loss (ft)	2.29	Cum Volume (acre-ft)	0.04	7.56	0.04
C & E Loss (ft)	0.03	Cum SA (acres)	0.06	4.99	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7800

INPUT
Description: Section 78+00 (approach to Olalee Rd.)
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2825	109.97	2824	122.81	2823	139.34	2822	150.37	2821
167.82	2820.5	197	2820.5	203	2817	216	2817	222	2820.5
242	2820.5	243	2811.5	280	2811.5	281	2820.5	301	2820.5
326.19	2818	380.71	2819	414.35	2820				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	38.9	38.9	38.9	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
100	242	2820.5	F

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2824.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.99	Wt. n-Val.		0.013	
W.S. Elev (ft)	2814.27	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2816.87	Flow Area (sq ft)		103.28	
E.G. Slope (ft/ft)	0.015110	Area (sq ft)		103.28	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	37.62	Top Width (ft)		37.62	
Vel Total (ft/s)	25.37	Avg. Vel. (ft/s)		25.37	
Max Chl Dpth (ft)	2.77	Hydr. Depth (ft)		2.75	
Conv. Total (cfs)	21314.0	Conv. (cfs)		21314.0	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		42.57	
Min Ch El (ft)	2811.50	Shear (lb/sq ft)		2.29	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	2.05	Cum Volume (acre-ft)	0.35	22.53	0.34
C & E Loss (ft)	0.77	Cum SA (acres)	0.20	5.74	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2824.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.11	Wt. n-Val.		0.013	
W.S. Elev (ft)	2814.34	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2816.96	Flow Area (sq ft)		105.82	
E.G. Slope (ft/ft)	0.014860	Area (sq ft)		105.82	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	37.63	Top Width (ft)		37.63	
Vel Total (ft/s)	25.51	Avg. Vel. (ft/s)		25.51	
Max Chl Dpth (ft)	2.84	Hydr. Depth (ft)		2.81	
Conv. Total (cfs)	22149.1	Conv. (cfs)		22149.1	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		42.71	
Min Ch El (ft)	2811.50	Shear (lb/sq ft)		2.30	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	2.02	Cum Volume (acre-ft)	0.28	19.40	0.27
C & E Loss (ft)	0.78	Cum SA (acres)	0.17	5.54	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2821.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.78	Wt. n-Val.		0.013	
W.S. Elev (ft)	2813.30	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2815.19	Flow Area (sq ft)		67.01	
E.G. Slope (ft/ft)	0.019681	Area (sq ft)		67.01	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	37.40	Top Width (ft)		37.40	
Vel Total (ft/s)	22.39	Avg. Vel. (ft/s)		22.39	
Max Chl Dpth (ft)	1.80	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	10692.1	Conv. (cfs)		10692.1	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		40.62	
Min Ch El (ft)	2811.50	Shear (lb/sq ft)		2.03	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	2.48	Cum Volume (acre-ft)	0.13	12.85	0.13
C & E Loss (ft)	0.54	Cum SA (acres)	0.11	5.19	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2814.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.97	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2812.48	Flow Area (sq ft)		17.32	
E.G. Slope (ft/ft)	0.029020	Area (sq ft)		17.32	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	37.10	Top Width (ft)		37.10	
Vel Total (ft/s)	11.55	Avg. Vel. (ft/s)		11.55	
Max Chl Dpth (ft)	0.47	Hydr. Depth (ft)		0.47	
Conv. Total (cfs)	1174.0	Conv. (cfs)		1174.0	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		37.94	
Min Ch El (ft)	2811.50	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	3.26	Cum Volume (acre-ft)	0.01	3.36	0.01
C & E Loss (ft)	0.06	Cum SA (acres)	0.03	4.50	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2820.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.02	Wt. n-Val.		0.013	
W.S. Elev (ft)	2813.06	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2814.75	Flow Area (sq ft)		57.83	
E.G. Slope (ft/ft)	0.021275	Area (sq ft)		57.83	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	37.35	Top Width (ft)		37.35	
Vel Total (ft/s)	21.27	Avg. Vel. (ft/s)		21.27	
Max Chl Dpth (ft)	1.56	Hydr. Depth (ft)		1.55	
Conv. Total (cfs)	8432.8	Conv. (cfs)		8432.8	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		40.13	
Min Ch El (ft)	2811.50	Shear (lb/sq ft)		1.91	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	2.63	Cum Volume (acre-ft)	0.13	13.00	0.13
C & E Loss (ft)	0.46	Cum SA (acres)	0.11	5.22	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2818.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.62	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.68	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2813.99	Flow Area (sq ft)		43.61	

E.G. Slope (ft/ft)	0.024182	Area (sq ft)		43.61	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	37.26	Top Width (ft)		37.26	
Vel Total (ft/s)	19.03	Avg. Vel. (ft/s)		19.03	
Max Chl Dpth (ft)	1.17	Hydr. Depth (ft)		1.17	
Conv. Total (cfs)	5337.5	Conv. (cfs)		5337.5	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		39.36	
Min Ch El (ft)	2811.50	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	2.89	Cum Volume (acre-ft)	0.08	10.35	0.08
C & E Loss (ft)	0.32	Cum SA (acres)	0.08	5.06	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2816.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.11	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.35	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2813.30	Flow Area (sq ft)		31.34	
E.G. Slope (ft/ft)	0.026844	Area (sq ft)		31.34	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	37.19	Top Width (ft)		37.19	
Vel Total (ft/s)	16.27	Avg. Vel. (ft/s)		16.27	
Max Chl Dpth (ft)	0.84	Hydr. Depth (ft)		0.84	
Conv. Total (cfs)	3112.8	Conv. (cfs)		3112.8	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		38.70	
Min Ch El (ft)	2811.50	Shear (lb/sq ft)		1.36	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	3.12	Cum Volume (acre-ft)	0.04	7.40	0.04
C & E Loss (ft)	0.20	Cum SA (acres)	0.06	4.85	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7761.1

INPUT
Description: Section 77+61 (u/s face of Olalee Rd.)
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2825	109.97	2824	122.81	2823	139.34	2822	150.37	2821

```
  167.82    2820     197    2820     203    2817     216    2817     222    2820
     242    2820     242    2811     287    2811     287    2820  326.19    2818
  380.71    2819  414.35    2820

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     287             22.5    22.5    22.5             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2822       F
     287  414.35    2822       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2823.53    Element                    Left OB    Channel   Right OB
  Vel Head (ft)              10.26    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2813.27    Reach Len. (ft)             22.50     22.50      22.50
  Crit W.S. (ft)           2815.75    Flow Area (sq ft)                    101.92
  E.G. Slope (ft/ft)      0.019325    Area (sq ft)                         101.92
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)           25.71    Avg. Vel. (ft/s)                      25.71
  Max Chl Dpth (ft)           2.26    Hydr. Depth (ft)                       2.26
  Conv. Total (cfs)        18847.0    Conv. (cfs)                         18847.0
  Length Wtd. (ft)           22.50    Wetted Per. (ft)                      49.53
  Min Ch El (ft)           2811.00    Shear (lb/sq ft)                       2.48
  Alpha                       1.00    Stream Power (lb/ft s)    414.35       0.00       0.00
  Frctn Loss (ft)             0.66    Cum Volume (acre-ft)        0.35      22.44       0.34
  C & E Loss (ft)             0.08    Cum SA (acres)              0.20       5.71       0.17


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2823.71    Element                    Left OB    Channel   Right OB
  Vel Head (ft)              10.39    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2813.32    Reach Len. (ft)             22.50     22.50      22.50
  Crit W.S. (ft)           2815.83    Flow Area (sq ft)                    104.39
  E.G. Slope (ft/ft)      0.019004    Area (sq ft)                         104.39
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)           25.86    Avg. Vel. (ft/s)                      25.86
  Max Chl Dpth (ft)           2.32    Hydr. Depth (ft)                       2.32
  Conv. Total (cfs)        19586.0    Conv. (cfs)                         19586.0
  Length Wtd. (ft)           22.50    Wetted Per. (ft)                      49.64
  Min Ch El (ft)           2811.00    Shear (lb/sq ft)                       2.49
  Alpha                       1.00    Stream Power (lb/ft s)    414.35       0.00       0.00
  Frctn Loss (ft)             0.65    Cum Volume (acre-ft)        0.28      19.31       0.27
  C & E Loss (ft)             0.08    Cum SA (acres)              0.17       5.50       0.15


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2820.19    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               7.70    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2812.50    Reach Len. (ft)             22.50     22.50      22.50
  Crit W.S. (ft)           2814.27    Flow Area (sq ft)                     67.38
```

E.G. Slope (ft/ft)	0.024131	Area (sq ft)		67.38	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	22.26	Avg. Vel. (ft/s)		22.26	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		1.50	
Conv. Total (cfs)	9656.0	Conv. (cfs)		9656.0	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		47.99	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		2.12	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	0.85	Cum Volume (acre-ft)	0.13	12.79	0.13
C & E Loss (ft)	0.04	Cum SA (acres)	0.11	5.15	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2812.79	Element			
Vel Head (ft)	1.31	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.48	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2811.85	Flow Area (sq ft)		21.79	
E.G. Slope (ft/ft)	0.017458	Area (sq ft)		21.79	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	9.18	Avg. Vel. (ft/s)		9.18	
Max Chl Dpth (ft)	0.48	Hydr. Depth (ft)		0.48	
Conv. Total (cfs)	1513.7	Conv. (cfs)		1513.7	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		45.97	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.52	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	0.86	Cum Volume (acre-ft)	0.01	3.34	0.01
C & E Loss (ft)	0.38	Cum SA (acres)	0.03	4.46	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2819.05	Element			
Vel Head (ft)	6.73	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.31	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2813.87	Flow Area (sq ft)		59.06	
E.G. Slope (ft/ft)	0.024914	Area (sq ft)		59.06	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	20.83	Avg. Vel. (ft/s)		20.83	
Max Chl Dpth (ft)	1.31	Hydr. Depth (ft)		1.31	
Conv. Total (cfs)	7792.6	Conv. (cfs)		7792.6	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		47.63	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		1.93	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	0.89	Cum Volume (acre-ft)	0.13	12.95	0.13
C & E Loss (ft)	0.15	Cum SA (acres)	0.11	5.18	0.10

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2817.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.00	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.03	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2813.19	Flow Area (sq ft)		46.27	
E.G. Slope (ft/ft)	0.025181	Area (sq ft)		46.27	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	17.94	Avg. Vel. (ft/s)		17.94	
Max Chl Dpth (ft)	1.03	Hydr. Depth (ft)		1.03	
Conv. Total (cfs)	5230.5	Conv. (cfs)		5230.5	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		47.06	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		1.55	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	0.96	Cum Volume (acre-ft)	0.08	10.31	0.08
C & E Loss (ft)	0.31	Cum SA (acres)	0.08	5.02	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2815.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.28	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.78	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2812.59	Flow Area (sq ft)		35.09	
E.G. Slope (ft/ft)	0.023573	Area (sq ft)		35.09	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	14.53	Avg. Vel. (ft/s)		14.53	
Max Chl Dpth (ft)	0.78	Hydr. Depth (ft)		0.78	
Conv. Total (cfs)	3321.7	Conv. (cfs)		3321.7	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		46.56	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		1.11	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	0.98	Cum Volume (acre-ft)	0.04	7.37	0.04
C & E Loss (ft)	0.42	Cum SA (acres)	0.06	4.81	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 7749.9

INPUT
Description: Olalee Road

```
Distance from Upstream XS =      .4
Deck/Roadway Width        =      22
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     130  2822.5             200  2822.5             222  2822.5
     281  2822.5             350  2822.5             415  2822.5

Upstream Bridge Cross Section Data
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2825  109.97    2824  122.81    2823  139.34    2822  150.37    2821
  167.82    2820     197    2820     203    2817     216    2817     222    2820
     242    2820     242    2811     287    2811     287    2820  326.19    2818
  380.71    2819  414.35    2820

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           242     287             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2822       F
     287  414.35    2822       F

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     130  2822.5             200  2822.5             222  2822.5
     281  2822.5             350  2822.5             415  2822.5

Downstream Bridge Cross Section Data
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2825  109.97    2824  122.81    2823  139.34    2822  150.37    2821
  167.82    2820  185.05    2819     197    2819     203    2815     216    2815
     222    2819     242    2819     242    2811     287    2811     287    2819
  326.19    2818  380.71    2819  414.35    2820

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           242     287             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2822       T
     287  414.35    2822       T
Left Levee      Station=     242      Elevation=    2819
Right Levee     Station=     287      Elevation=    2819

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  2
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```
Culvert Name     Shape      Rise    Span
Culvert #1      Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .1    22.3     .013     .013        0                  .2                1
Upstream   Elevation =  2817
           Centerline Station =  209.5
Downstream Elevation =  2815
           Centerline Station =  209.5

Culvert Name     Shape      Rise    Span
Culvert #2           Box       7      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5      22     .013     .013        0                  .4                1
Number of Barrels =  3
Upstream   Elevation =  2811
Centerline Stations
    Sta.    Sta.    Sta.
   249.5   264.5   279.5
Downstream Elevation =  2811
Centerline Stations
    Sta.    Sta.    Sta.
   249.5   264.5   279.5

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                      1    Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2817.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2815.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                      1    Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2817.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2815.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
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  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2817.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2815.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2817.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2815.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
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  E.G. US. (ft)                        Culv Inv El Up (ft)      2817.00
  W.S. US. (ft)                        Culv Inv El Dn (ft)      2815.00
  E.G. DS (ft)                         Culv Frctn Ls (ft)
  W.S. DS (ft)                         Culv Exit Loss (ft)
  Delta EG (ft)                        Culv Entr Loss (ft)
  Delta WS (ft)                        Q Weir (cfs)
  E.G. IC (ft)                         Weir Sta Lft (ft)
  E.G. OC (ft)                         Weir Sta Rgt (ft)
  Culvert Control                      Weir Submerg
  Culv WS Inlet (ft)                   Weir Max Depth (ft)
  Culv WS Outlet (ft)                  Weir Avg Depth (ft)
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                  Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                   Culv Full Len (ft)
  # Barrels                      1     Culv Vel US (ft/s)
  Q Barrel (cfs)                       Culv Vel DS (ft/s)
  E.G. US. (ft)                        Culv Inv El Up (ft)      2817.00
  W.S. US. (ft)                        Culv Inv El Dn (ft)      2815.00
  E.G. DS (ft)                         Culv Frctn Ls (ft)
  W.S. DS (ft)                         Culv Exit Loss (ft)
  Delta EG (ft)                        Culv Entr Loss (ft)
  Delta WS (ft)                        Q Weir (cfs)
  E.G. IC (ft)                         Weir Sta Lft (ft)
  E.G. OC (ft)                         Weir Sta Rgt (ft)
  Culvert Control                      Weir Submerg
  Culv WS Inlet (ft)                   Weir Max Depth (ft)
  Culv WS Outlet (ft)                  Weir Avg Depth (ft)
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                  Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                   Culv Full Len (ft)
  # Barrels                      1     Culv Vel US (ft/s)
  Q Barrel (cfs)                       Culv Vel DS (ft/s)
  E.G. US. (ft)                        Culv Inv El Up (ft)      2817.00
  W.S. US. (ft)                        Culv Inv El Dn (ft)      2815.00
  E.G. DS (ft)                         Culv Frctn Ls (ft)
  W.S. DS (ft)                         Culv Exit Loss (ft)
  Delta EG (ft)                        Culv Entr Loss (ft)
  Delta WS (ft)                        Q Weir (cfs)
  E.G. IC (ft)                         Weir Sta Lft (ft)
  E.G. OC (ft)                         Weir Sta Rgt (ft)
  Culvert Control                      Weir Submerg
  Culv WS Inlet (ft)                   Weir Max Depth (ft)
  Culv WS Outlet (ft)                  Weir Avg Depth (ft)
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                  Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
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         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     3    Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2811.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2811.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #2

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     3    Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2811.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2811.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #2

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     3    Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2811.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2811.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
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  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #2

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     3     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2811.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2811.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     3     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2811.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2811.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     3     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2811.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2811.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
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  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     3     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2811.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2811.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2822.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 7738.6

INPUT
Description: Section 77+38.6 (d/s face of Olalee Rd.)
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2825  109.97    2824  122.81    2823  139.34    2822  150.37    2821
  167.82    2820  185.05    2819     197    2819     203    2815     216    2815
     222    2819     242    2819     242    2811     287    2811     287    2819
  326.19    2818  380.71    2819  414.35    2820

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     287             38.6    38.6    38.6             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2822       T
     287  414.35    2822       T
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Left Levee      Station=     242      Elevation=    2819
Right Levee     Station=     287      Elevation=    2819

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2818.08    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               2.34    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2815.75    Reach Len. (ft)            38.60      38.60      38.60
  Crit W.S. (ft)           2815.75    Flow Area (sq ft)                    213.55
  E.G. Slope (ft/ft)      0.002396    Area (sq ft)                         213.55
  Q Total (cfs)            2970.00    Flow (cfs)                          2620.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)           12.27    Avg. Vel. (ft/s)                      12.27
  Max Chl Dpth (ft)           4.75    Hydr. Depth (ft)                       4.75
  Conv. Total (cfs)        60674.7    Conv. (cfs)                         60674.7
  Length Wtd. (ft)           38.60    Wetted Per. (ft)                      54.49
  Min Ch El (ft)           2811.00    Shear (lb/sq ft)                       0.59
  Alpha                       1.00    Stream Power (lb/ft s)    414.35     242.00     287.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.35      22.44       0.34
  C & E Loss (ft)                     Cum SA (acres)              0.20       5.68       0.17


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2818.23    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               2.42    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2815.81    Reach Len. (ft)            38.60      38.60      38.60
  Crit W.S. (ft)           2815.81    Flow Area (sq ft)                    216.44
  E.G. Slope (ft/ft)      0.001899    Area (sq ft)                         216.44
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)           12.47    Avg. Vel. (ft/s)                      12.47
  Max Chl Dpth (ft)           4.81    Hydr. Depth (ft)                       4.81
  Conv. Total (cfs)        61951.8    Conv. (cfs)                         61951.8
  Length Wtd. (ft)           38.60    Wetted Per. (ft)                      54.62
  Min Ch El (ft)           2811.00    Shear (lb/sq ft)                       0.47
  Alpha                       1.00    Stream Power (lb/ft s)    414.35     242.00     287.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.28      19.31       0.27
  C & E Loss (ft)                     Cum SA (acres)              0.17       5.48       0.15


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2815.88    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.61    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2814.28    Reach Len. (ft)            38.60      38.60      38.60
  Crit W.S. (ft)           2814.28    Flow Area (sq ft)                    147.46
  E.G. Slope (ft/ft)      0.001951    Area (sq ft)                         147.46
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)           10.17    Avg. Vel. (ft/s)                      10.17
  Max Chl Dpth (ft)           3.28    Hydr. Depth (ft)                       3.28
  Conv. Total (cfs)        33962.1    Conv. (cfs)                         33962.1
  Length Wtd. (ft)           38.60    Wetted Per. (ft)                      51.55
  Min Ch El (ft)           2811.00    Shear (lb/sq ft)                       0.35
  Alpha                       1.00    Stream Power (lb/ft s)    414.35     242.00     287.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.13      12.79       0.13
  C & E Loss (ft)                     Cum SA (acres)              0.11       5.13       0.10
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2812.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.85	Reach Len. (ft)	38.60	38.60	38.60
Crit W.S. (ft)	2811.85	Flow Area (sq ft)		38.30	
E.G. Slope (ft/ft)	0.002719	Area (sq ft)		38.30	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	5.22	Avg. Vel. (ft/s)		5.22	
Max Chl Dpth (ft)	0.85	Hydr. Depth (ft)		0.85	
Conv. Total (cfs)	3835.3	Conv. (cfs)		3835.3	
Length Wtd. (ft)	38.60	Wetted Per. (ft)		46.70	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	414.35	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	3.34	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	4.44	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2815.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.41	Wt. n-Val.		0.013	
W.S. Elev (ft)	2813.87	Reach Len. (ft)	38.60	38.60	38.60
Crit W.S. (ft)	2813.87	Flow Area (sq ft)		129.13	
E.G. Slope (ft/ft)	0.002589	Area (sq ft)		129.13	
Q Total (cfs)	1400.00	Flow (cfs)		1230.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	9.53	Avg. Vel. (ft/s)		9.53	
Max Chl Dpth (ft)	2.87	Hydr. Depth (ft)		2.87	
Conv. Total (cfs)	27513.9	Conv. (cfs)		27513.9	
Length Wtd. (ft)	38.60	Wetted Per. (ft)		50.74	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)	414.35	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	12.95	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	5.16	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2814.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2813.21	Reach Len. (ft)	38.60	38.60	38.60
Crit W.S. (ft)	2813.21	Flow Area (sq ft)		99.27	
E.G. Slope (ft/ft)	0.002650	Area (sq ft)		99.27	
Q Total (cfs)	930.00	Flow (cfs)		830.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	8.36	Avg. Vel. (ft/s)		8.36	
Max Chl Dpth (ft)	2.21	Hydr. Depth (ft)		2.21	
Conv. Total (cfs)	18066.7	Conv. (cfs)		18066.7	
Length Wtd. (ft)	38.60	Wetted Per. (ft)		49.41	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	414.35	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	10.31	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	5.00	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2813.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.79	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.59	Reach Len. (ft)	38.60	38.60	38.60
Crit W.S. (ft)	2812.59	Flow Area (sq ft)		71.71	
E.G. Slope (ft/ft)	0.002847	Area (sq ft)		71.71	
Q Total (cfs)	570.00	Flow (cfs)		510.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	7.11	Avg. Vel. (ft/s)		7.11	
Max Chl Dpth (ft)	1.59	Hydr. Depth (ft)		1.59	
Conv. Total (cfs)	10683.4	Conv. (cfs)		10683.4	
Length Wtd. (ft)	38.60	Wetted Per. (ft)		48.19	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)	414.35	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	7.37	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	4.79	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7700

INPUT
Description: Section 77+00 (exit of Olalee Rd.)
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2825	109.97	2824	122.81	2823	139.34	2822	150.37	2821
167.82	2820	185.05	2819	197	2818.6	203	2815	216	2815
222	2818.6	242	2818.6	242	2810.6	281	2810.6	281	2818.6
326.19	2818	380.71	2819	414.35	2820				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	200	200	200	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2819.5	T
281	414.35	2819.5	T

Left Levee Station= 242 Elevation= 2819.5
Right Levee Station= 281 Elevation= 2819.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2819.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.81	Wt. n-Val.		0.013	
W.S. Elev (ft)	2816.26	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2816.26	Flow Area (sq ft)		220.65	
E.G. Slope (ft/ft)	0.001932	Area (sq ft)		220.65	
Q Total (cfs)	2970.00	Flow (cfs)		2970.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	13.46	Avg. Vel. (ft/s)		13.46	

Max Chl Dpth (ft)	5.66	Hydr. Depth (ft)		5.66	
Conv. Total (cfs)	67571.0	Conv. (cfs)		67571.0	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		50.32	
Min Ch El (ft)	2810.60	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)	414.35	242.00	281.00
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	0.35	22.25	0.34
C & E Loss (ft)	0.07	Cum SA (acres)	0.20	5.65	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2818.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.64	Wt. n-Val.		0.013	
W.S. Elev (ft)	2815.91	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2815.91	Flow Area (sq ft)		207.24	
E.G. Slope (ft/ft)	0.001932	Area (sq ft)		207.24	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	13.03	Avg. Vel. (ft/s)		13.03	
Max Chl Dpth (ft)	5.31	Hydr. Depth (ft)		5.31	
Conv. Total (cfs)	61424.7	Conv. (cfs)		61424.7	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		49.63	
Min Ch El (ft)	2810.60	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	414.35	242.00	281.00
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.28	19.12	0.27
C & E Loss (ft)	0.04	Cum SA (acres)	0.17	5.44	0.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2815.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.77	Wt. n-Val.		0.013	
W.S. Elev (ft)	2814.20	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2814.20	Flow Area (sq ft)		140.37	
E.G. Slope (ft/ft)	0.001986	Area (sq ft)		140.37	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	

Vel Total (ft/s)	10.69	Avg. Vel. (ft/s)		10.69	
Max Chl Dpth (ft)	3.60	Hydr. Depth (ft)		3.60	
Conv. Total (cfs)	33656.6	Conv. (cfs)		33656.6	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		46.20	
Min Ch El (ft)	2810.60	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)	414.35	242.00	281.00
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.13	12.66	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	5.09	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2812.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.54	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2811.54	Flow Area (sq ft)		36.75	
E.G. Slope (ft/ft)	0.002613	Area (sq ft)		36.75	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	5.44	Avg. Vel. (ft/s)		5.44	
Max Chl Dpth (ft)	0.94	Hydr. Depth (ft)		0.94	
Conv. Total (cfs)	3912.9	Conv. (cfs)		3912.9	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		40.88	
Min Ch El (ft)	2810.60	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	414.35	242.00	281.00
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)	0.01	3.31	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	4.40	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2815.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.69	Wt. n-Val.		0.013	
W.S. Elev (ft)	2814.04	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2814.04	Flow Area (sq ft)		134.10	
E.G. Slope (ft/ft)	0.001996	Area (sq ft)		134.10	
Q Total (cfs)	1400.00	Flow (cfs)		1400.00	

Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	10.44	Avg. Vel. (ft/s)		10.44	
Max Chl Dpth (ft)	3.44	Hydr. Depth (ft)		3.44	
Conv. Total (cfs)	31335.7	Conv. (cfs)		31335.7	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		45.88	
Min Ch El (ft)	2810.60	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)	414.35	242.00	281.00
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.13	12.83	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	5.12	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2814.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2813.22	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2813.22	Flow Area (sq ft)		102.17	
E.G. Slope (ft/ft)	0.002078	Area (sq ft)		102.17	
Q Total (cfs)	930.00	Flow (cfs)		930.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	9.10	Avg. Vel. (ft/s)		9.10	
Max Chl Dpth (ft)	2.62	Hydr. Depth (ft)		2.62	
Conv. Total (cfs)	20402.7	Conv. (cfs)		20402.7	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		44.24	
Min Ch El (ft)	2810.60	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)	414.35	242.00	281.00
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	0.08	10.22	0.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.08	4.96	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2813.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.94	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.48	Reach Len. (ft)	200.00	200.00	200.00
Crit W.S. (ft)	2812.48	Flow Area (sq ft)		73.13	
E.G. Slope (ft/ft)	0.002272	Area (sq ft)		73.13	

Q Total (cfs)	570.00	Flow (cfs)		570.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	7.79	Avg. Vel. (ft/s)		7.79	
Max Chl Dpth (ft)	1.88	Hydr. Depth (ft)		1.88	
Conv. Total (cfs)	11957.2	Conv. (cfs)		11957.2	
Length Wtd. (ft)	200.00	Wetted Per. (ft)		42.75	
Min Ch El (ft)	2810.60	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)	414.35	242.00	281.00
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	0.04	7.30	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	4.75	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7500.*

INPUT
Description: 75+00 (interp)
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2822	110	2822	123	2821	139	2821	150	2820
168	2819	185	2818	197	2817	203	2814	216	2814
222	2817	242	2817	242	2809	281	2809	281	2817
301	2817	324	2818	329	2818	377	2819	409	2819

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.016	301	.035
409	.035								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	195	195	195	.3	.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2818.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.56	Wt. n-Val.		0.013	
W.S. Elev (ft)	2813.44	Reach Len. (ft)	195.00	195.00	195.00
Crit W.S. (ft)	2814.77	Flow Area (sq ft)		173.29	
E.G. Slope (ft/ft)	0.004047	Area (sq ft)		173.29	
Q Total (cfs)	2970.00	Flow (cfs)		2970.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	17.14	Avg. Vel. (ft/s)		17.14	
Max Chl Dpth (ft)	4.44	Hydr. Depth (ft)		4.44	
Conv. Total (cfs)	46687.6	Conv. (cfs)		46687.6	
Length Wtd. (ft)	195.00	Wetted Per. (ft)		47.89	
Min Ch El (ft)	2809.00	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)	409.00	0.00	0.00
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)	0.35	21.34	0.34

C & E Loss (ft)	0.52	Cum SA (acres)	0.20	5.47	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2817.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.35	Wt. n-Val.		0.013	
W.S. Elev (ft)	2813.14	Reach Len. (ft)	195.00	195.00	195.00
Crit W.S. (ft)	2814.38	Flow Area (sq ft)		161.31	
E.G. Slope (ft/ft)	0.004174	Area (sq ft)		161.31	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	16.74	Avg. Vel. (ft/s)		16.74	
Max Chl Dpth (ft)	4.14	Hydr. Depth (ft)		4.14	
Conv. Total (cfs)	41792.2	Conv. (cfs)		41792.2	
Length Wtd. (ft)	195.00	Wetted Per. (ft)		47.27	
Min Ch El (ft)	2809.00	Shear (lb/sq ft)		0.89	
Alpha	1.00	Stream Power (lb/ft s)	409.00	0.00	0.00
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)	0.28	18.27	0.27
C & E Loss (ft)	0.51	Cum SA (acres)	0.17	5.27	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2814.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.26	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.65	Reach Len. (ft)	195.00	195.00	195.00
Crit W.S. (ft)	2812.57	Flow Area (sq ft)		103.46	
E.G. Slope (ft/ft)	0.005193	Area (sq ft)		103.46	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	14.50	Avg. Vel. (ft/s)		14.50	
Max Chl Dpth (ft)	2.65	Hydr. Depth (ft)		2.65	
Conv. Total (cfs)	20814.7	Conv. (cfs)		20814.7	
Length Wtd. (ft)	195.00	Wetted Per. (ft)		44.31	
Min Ch El (ft)	2809.00	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)	409.00	0.00	0.00
Frctn Loss (ft)	0.61	Cum Volume (acre-ft)	0.13	12.10	0.13
C & E Loss (ft)	0.45	Cum SA (acres)	0.11	4.91	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2810.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.58	Reach Len. (ft)	195.00	195.00	195.00
Crit W.S. (ft)	2809.94	Flow Area (sq ft)		22.70	
E.G. Slope (ft/ft)	0.012717	Area (sq ft)		22.70	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	8.81	Avg. Vel. (ft/s)		8.81	
Max Chl Dpth (ft)	0.58	Hydr. Depth (ft)		0.58	
Conv. Total (cfs)	1773.6	Conv. (cfs)		1773.6	
Length Wtd. (ft)	195.00	Wetted Per. (ft)		40.16	
Min Ch El (ft)	2809.00	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)	409.00	0.00	0.00
Frctn Loss (ft)	0.99	Cum Volume (acre-ft)	0.01	3.17	0.01
C & E Loss (ft)	0.22	Cum SA (acres)	0.03	4.22	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2814.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.16	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.52	Reach Len. (ft)	195.00	195.00	195.00
Crit W.S. (ft)	2812.41	Flow Area (sq ft)		98.18	
E.G. Slope (ft/ft)	0.005344	Area (sq ft)		98.18	
Q Total (cfs)	1400.00	Flow (cfs)		1400.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	14.26	Avg. Vel. (ft/s)		14.26	
Max Chl Dpth (ft)	2.52	Hydr. Depth (ft)		2.52	
Conv. Total (cfs)	19151.3	Conv. (cfs)		19151.3	
Length Wtd. (ft)	195.00	Wetted Per. (ft)		44.03	
Min Ch El (ft)	2809.00	Shear (lb/sq ft)		0.74	
Alpha	1.00	Stream Power (lb/ft s)	409.00	0.00	0.00
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)	0.13	12.30	0.13
C & E Loss (ft)	0.44	Cum SA (acres)	0.11	4.94	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2813.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.59	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.85	Reach Len. (ft)	195.00	195.00	195.00
Crit W.S. (ft)	2811.60	Flow Area (sq ft)		72.04	
E.G. Slope (ft/ft)	0.006350	Area (sq ft)		72.04	
Q Total (cfs)	930.00	Flow (cfs)		930.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	12.91	Avg. Vel. (ft/s)		12.91	
Max Chl Dpth (ft)	1.85	Hydr. Depth (ft)		1.85	
Conv. Total (cfs)	11670.5	Conv. (cfs)		11670.5	
Length Wtd. (ft)	195.00	Wetted Per. (ft)		42.69	
Min Ch El (ft)	2809.00	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)	409.00	0.00	0.00
Frctn Loss (ft)	0.67	Cum Volume (acre-ft)	0.08	9.82	0.08
C & E Loss (ft)	0.39	Cum SA (acres)	0.08	4.78	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2812.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.27	Reach Len. (ft)	195.00	195.00	195.00
Crit W.S. (ft)	2810.87	Flow Area (sq ft)		49.69	
E.G. Slope (ft/ft)	0.007933	Area (sq ft)		49.69	
Q Total (cfs)	570.00	Flow (cfs)		570.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	11.47	Avg. Vel. (ft/s)		11.47	
Max Chl Dpth (ft)	1.27	Hydr. Depth (ft)		1.27	
Conv. Total (cfs)	6399.8	Conv. (cfs)		6399.8	
Length Wtd. (ft)	195.00	Wetted Per. (ft)		41.55	
Min Ch El (ft)	2809.00	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)	409.00	0.00	0.00
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	0.04	7.02	0.04
C & E Loss (ft)	0.33	Cum SA (acres)	0.06	4.57	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7305

INPUT
Description: Section 73+05 (approach to Kasota Rd.)
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2820	138.63	2820	197	2816.3	203	2813	216	2813
222	2816.3	242	2816.3	242	2807.3	281	2807.3	281	2816.3
288.85	2817	326.77	2818	403.98	2819				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	38.1	38.1	38.1	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2818.5	T
281	403.98	2818.5	T

Left Levee Station= 242 Elevation= 2818.5
Right Levee Station= 281 Elevation= 2818.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2816.57	Element			
Vel Head (ft)	1.49	Wt. n-Val.		0.013	
W.S. Elev (ft)	2815.08	Reach Len. (ft)	38.10	38.10	38.10
Crit W.S. (ft)	2812.97	Flow Area (sq ft)		303.31	
E.G. Slope (ft/ft)	0.000745	Area (sq ft)		303.31	
Q Total (cfs)	2970.00	Flow (cfs)		2970.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	9.79	Avg. Vel. (ft/s)		9.79	
Max Chl Dpth (ft)	7.78	Hydr. Depth (ft)		7.78	
Conv. Total (cfs)	108802.0	Conv. (cfs)		108802.0	
Length Wtd. (ft)	38.10	Wetted Per. (ft)		54.55	
Min Ch El (ft)	2807.30	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.35	20.28	0.34
C & E Loss (ft)	0.16	Cum SA (acres)	0.20	5.29	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2816.29	Element			
Vel Head (ft)	5.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.08	Reach Len. (ft)	38.10	38.10	38.10
Crit W.S. (ft)	2812.62	Flow Area (sq ft)		147.39	
E.G. Slope (ft/ft)	0.005526	Area (sq ft)		147.39	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	18.32	Avg. Vel. (ft/s)		18.32	

Max Chl Dpth (ft)	3.78	Hydr. Depth (ft)		3.78	
Conv. Total (cfs)	36322.7	Conv. (cfs)		36322.7	
Length Wtd. (ft)	38.10	Wetted Per. (ft)		46.56	
Min Ch El (ft)	2807.30	Shear (lb/sq ft)		1.09	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.93	Cum Volume (acre-ft)	0.28	17.58	0.27
C & E Loss (ft)	0.26	Cum SA (acres)	0.17	5.09	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2813.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.85	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.74	Reach Len. (ft)	38.10	38.10	38.10
Crit W.S. (ft)	2810.90	Flow Area (sq ft)		95.29	
E.G. Slope (ft/ft)	0.006746	Area (sq ft)		95.29	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	15.74	Avg. Vel. (ft/s)		15.74	
Max Chl Dpth (ft)	2.44	Hydr. Depth (ft)		2.44	
Conv. Total (cfs)	18263.5	Conv. (cfs)		18263.5	
Length Wtd. (ft)	38.10	Wetted Per. (ft)		43.89	
Min Ch El (ft)	2807.30	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	1.15	Cum Volume (acre-ft)	0.13	11.66	0.13
C & E Loss (ft)	0.18	Cum SA (acres)	0.11	4.74	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2808.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.82	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.00	Reach Len. (ft)	38.10	38.10	38.10
Crit W.S. (ft)	2808.21	Flow Area (sq ft)		27.44	
E.G. Slope (ft/ft)	0.006811	Area (sq ft)		27.44	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	7.29	Avg. Vel. (ft/s)		7.29	
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)		0.70	
Conv. Total (cfs)	2423.3	Conv. (cfs)		2423.3	
Length Wtd. (ft)	38.10	Wetted Per. (ft)		40.41	
Min Ch El (ft)	2807.30	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	1.77	Cum Volume (acre-ft)	0.01	3.06	0.01
C & E Loss (ft)	0.19	Cum SA (acres)	0.03	4.05	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2813.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.70	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.62	Reach Len. (ft)	38.10	38.10	38.10
Crit W.S. (ft)	2810.74	Flow Area (sq ft)		90.64	
E.G. Slope (ft/ft)	0.006891	Area (sq ft)		90.64	
Q Total (cfs)	1400.00	Flow (cfs)		1400.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	15.44	Avg. Vel. (ft/s)		15.44	
Max Chl Dpth (ft)	2.32	Hydr. Depth (ft)		2.32	
Conv. Total (cfs)	16864.6	Conv. (cfs)		16864.6	
Length Wtd. (ft)	38.10	Wetted Per. (ft)		43.65	
Min Ch El (ft)	2807.30	Shear (lb/sq ft)		0.89	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	1.18	Cum Volume (acre-ft)	0.13	11.88	0.13
C & E Loss (ft)	0.16	Cum SA (acres)	0.11	4.77	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2811.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.93	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.04	Reach Len. (ft)	38.10	38.10	38.10
Crit W.S. (ft)	2809.92	Flow Area (sq ft)		67.71	
E.G. Slope (ft/ft)	0.007754	Area (sq ft)		67.71	
Q Total (cfs)	930.00	Flow (cfs)		930.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	13.74	Avg. Vel. (ft/s)		13.74	
Max Chl Dpth (ft)	1.74	Hydr. Depth (ft)		1.74	
Conv. Total (cfs)	10561.1	Conv. (cfs)		10561.1	
Length Wtd. (ft)	38.10	Wetted Per. (ft)		42.47	
Min Ch El (ft)	2807.30	Shear (lb/sq ft)		0.77	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	1.36	Cum Volume (acre-ft)	0.08	9.51	0.08
C & E Loss (ft)	0.10	Cum SA (acres)	0.08	4.61	0.08

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2810.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.55	Reach Len. (ft)	38.10	38.10	38.10
Crit W.S. (ft)	2809.18	Flow Area (sq ft)		48.61	
E.G. Slope (ft/ft)	0.008523	Area (sq ft)		48.61	
Q Total (cfs)	570.00	Flow (cfs)		570.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	

Vel Total (ft/s)	11.73	Avg. Vel. (ft/s)		11.73	
Max Chl Dpth (ft)	1.25	Hydr. Depth (ft)		1.25	
Conv. Total (cfs)	6174.1	Conv. (cfs)		6174.1	
Length Wtd. (ft)	38.10	Wetted Per. (ft)		41.49	
Min Ch El (ft)	2807.30	Shear (lb/sq ft)		0.62	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	1.60	Cum Volume (acre-ft)	0.04	6.80	0.04
C & E Loss (ft)	0.03	Cum SA (acres)	0.06	4.40	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7266.9

INPUT
Description: Section 72+66.9 (u/s face Kasota Rd.)
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2819	138.63	2819	197	2814	203	2811	216	2811
222	2815	242	2815	242	2807	287	2807	287	2815
307	2815	326.77	2817	403.98	2818				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	287	.035	307	.016

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	287	35.6	35.6	35.6	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2819	T
287	403.98	2819	T

Left Levee Station= 242 Elevation= 2818.5
Right Levee Station= 287 Elevation= 2818.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

				Left OB	Channel	Right OB
E.G. Elev (ft)	2816.38	Element				
Vel Head (ft)	0.95	Wt. n-Val.			0.013	
W.S. Elev (ft)	2815.43	Reach Len. (ft)		35.60	35.60	35.60
Crit W.S. (ft)	2812.15	Flow Area (sq ft)			379.35	
E.G. Slope (ft/ft)	0.000418	Area (sq ft)			379.35	
Q Total (cfs)	2970.00	Flow (cfs)			2970.00	
Top Width (ft)	45.00	Top Width (ft)			45.00	
Vel Total (ft/s)	7.83	Avg. Vel. (ft/s)			7.83	
Max Chl Dpth (ft)	8.43	Hydr. Depth (ft)			8.43	
Conv. Total (cfs)	145269.2	Conv. (cfs)			145269.2	
Length Wtd. (ft)	35.60	Wetted Per. (ft)			61.86	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)			0.16	
Alpha	1.00	Stream Power (lb/ft s)		403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)		0.35	19.98	0.34
C & E Loss (ft)		Cum SA (acres)		0.20	5.26	0.17

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2815.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.94	Wt. n-Val.		0.013	
W.S. Elev (ft)	2814.69	Reach Len. (ft)	35.60	35.60	35.60
Crit W.S. (ft)	2811.83	Flow Area (sq ft)		346.12	
E.G. Slope (ft/ft)	0.000454	Area (sq ft)		346.12	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	7.80	Avg. Vel. (ft/s)		7.80	
Max Chl Dpth (ft)	7.69	Hydr. Depth (ft)		7.69	
Conv. Total (cfs)	126714.8	Conv. (cfs)		126714.8	
Length Wtd. (ft)	35.60	Wetted Per. (ft)		60.38	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.28	17.36	0.27
C & E Loss (ft)		Cum SA (acres)	0.17	5.05	0.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2812.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.10	Reach Len. (ft)	35.60	35.60	35.60
Crit W.S. (ft)	2810.28	Flow Area (sq ft)		229.53	
E.G. Slope (ft/ft)	0.000489	Area (sq ft)		229.53	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	6.54	Avg. Vel. (ft/s)		6.54	
Max Chl Dpth (ft)	5.10	Hydr. Depth (ft)		5.10	
Conv. Total (cfs)	67838.1	Conv. (cfs)		67838.1	
Length Wtd. (ft)	35.60	Wetted Per. (ft)		55.20	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	11.51	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	4.70	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2808.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.26	Reach Len. (ft)	35.60	35.60	35.60
Crit W.S. (ft)	2807.86	Flow Area (sq ft)		56.81	
E.G. Slope (ft/ft)	0.000748	Area (sq ft)		56.81	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	3.52	Avg. Vel. (ft/s)		3.52	
Max Chl Dpth (ft)	1.26	Hydr. Depth (ft)		1.26	
Conv. Total (cfs)	7313.9	Conv. (cfs)		7313.9	
Length Wtd. (ft)	35.60	Wetted Per. (ft)		47.52	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	3.02	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	4.01	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2812.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.00	Reach Len. (ft)	35.60	35.60	35.60
Crit W.S. (ft)	2810.11	Flow Area (sq ft)		224.81	
E.G. Slope (ft/ft)	0.000454	Area (sq ft)		224.81	
Q Total (cfs)	1400.00	Flow (cfs)		1400.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	6.23	Avg. Vel. (ft/s)		6.23	
Max Chl Dpth (ft)	5.00	Hydr. Depth (ft)		5.00	
Conv. Total (cfs)	65698.7	Conv. (cfs)		65698.7	
Length Wtd. (ft)	35.60	Wetted Per. (ft)		54.99	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	11.74	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	4.73	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2811.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.62	Reach Len. (ft)	35.60	35.60	35.60
Crit W.S. (ft)	2809.38	Flow Area (sq ft)		163.00	
E.G. Slope (ft/ft)	0.000546	Area (sq ft)		163.00	
Q Total (cfs)	930.00	Flow (cfs)		930.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	5.71	Avg. Vel. (ft/s)		5.71	
Max Chl Dpth (ft)	3.62	Hydr. Depth (ft)		3.62	
Conv. Total (cfs)	39782.2	Conv. (cfs)		39782.2	
Length Wtd. (ft)	35.60	Wetted Per. (ft)		52.24	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	9.41	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	4.57	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2810.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.25	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.05	Reach Len. (ft)	35.60	35.60	35.60
Crit W.S. (ft)	2808.71	Flow Area (sq ft)		47.34	
E.G. Slope (ft/ft)	0.011023	Area (sq ft)		47.34	
Q Total (cfs)	570.00	Flow (cfs)		570.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	12.04	Avg. Vel. (ft/s)		12.04	
Max Chl Dpth (ft)	1.05	Hydr. Depth (ft)		1.05	
Conv. Total (cfs)	5429.1	Conv. (cfs)		5429.1	
Length Wtd. (ft)	35.60	Wetted Per. (ft)		47.10	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.69	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00

```
  Frctn Loss (ft)             0.37    Cum Volume (acre-ft)        0.04       6.76       0.04
  C & E Loss (ft)             0.01    Cum SA (acres)              0.06       4.36       0.06


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CULVERT


RIVER: Desert Knolls Wa
REACH: Main               RS: 7249.1

INPUT
Description: Kasota Road
Distance from Upstream XS =      .5
Deck/Roadway Width        =      35
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100    2819             180    2819             222    2819
     250    2819             315    2819             320    2819
     380    2819             404    2819

Upstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2819  138.63    2819     197    2814     203    2811     216    2811
     222    2815     242    2815     242    2807     287    2807     287    2815
     307    2815  326.77    2817  403.98    2818

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .035     307    .016

Bank Sta: Left   Right    Coeff Contr.   Expan.
           242     287             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2819       T
     287  403.98    2819       T
Left Levee      Station=     242      Elevation=  2818.5
Right Levee     Station=     287      Elevation=  2818.5

Downstream  Deck/Roadway Coordinates
    num=       7
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100    2819             180    2819             222    2819
     250    2819             315    2819             320    2819
     404    2819

Downstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2819  138.63    2819     197    2814     203    2811     216    2811
     222    2815     242    2815     242    2807     287    2807     287    2815
     307    2815  326.77    2817  403.98    2818

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .035     307    .016

Bank Sta: Left   Right    Coeff Contr.   Expan.
           242     287             .3       .5
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```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2819       T
     287  403.98    2819       T
Left Levee      Station=     242      Elevation=    2818
Right Levee     Station=     287      Elevation=    2818

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  2

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .6      35     .013     .013        0                  .2                1
Upstream   Elevation =  2811
           Centerline Station =  209.5
Downstream Elevation =  2811
           Centerline Station =  209.5

Culvert Name     Shape      Rise    Span
Culvert #2           Box       9      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .6      35     .013     .013        0                  .2                1
Number of Barrels =  3
Upstream   Elevation =  2807
Centerline Stations
    Sta.    Sta.    Sta.
   249.5   264.5   279.5
Downstream Elevation =  2807
Centerline Stations
    Sta.    Sta.    Sta.
   249.5   264.5   279.5

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)         11.94    Culv Full Len (ft)         35.00
  # Barrels                      1    Culv Vel US (ft/s)          3.80
  Q Barrel (cfs)             11.94    Culv Vel DS (ft/s)          3.80
  E.G. US. (ft)            2816.38    Culv Inv El Up (ft)      2811.00
  W.S. US. (ft)            2815.43    Culv Inv El Dn (ft)      2811.00
  E.G. DS (ft)             2816.08    Culv Frctn Ls (ft)          0.25
  W.S. DS (ft)             2814.85    Culv Exit Loss (ft)         0.00
  Delta EG (ft)               0.30    Culv Entr Loss (ft)         0.04
  Delta WS (ft)               0.58    Q Weir (cfs)
  E.G. IC (ft)             2812.91    Weir Sta Lft (ft)
  E.G. OC (ft)             2816.23    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2813.00    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2813.00    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.24    Min El Weir Flow (ft)    2819.01
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CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	11.36	Culv Full Len (ft)	35.00
# Barrels	1	Culv Vel US (ft/s)	3.62
Q Barrel (cfs)	11.36	Culv Vel DS (ft/s)	3.62
E.G. US. (ft)	2815.64	Culv Inv El Up (ft)	2811.00
W.S. US. (ft)	2814.69	Culv Inv El Dn (ft)	2811.00
E.G. DS (ft)	2815.19	Culv Frctn Ls (ft)	0.40
W.S. DS (ft)	2814.08	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.44	Culv Entr Loss (ft)	0.04
Delta WS (ft)	0.62	Q Weir (cfs)	
E.G. IC (ft)	2812.85	Weir Sta Lft (ft)	
E.G. OC (ft)	2815.32	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2813.00	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2813.00	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.21	Min El Weir Flow (ft)	2819.01

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	9.53	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	4.04
Q Barrel (cfs)	9.53	Culv Vel DS (ft/s)	5.36
E.G. US. (ft)	2812.77	Culv Inv El Up (ft)	2811.00
W.S. US. (ft)	2812.10	Culv Inv El Dn (ft)	2811.00
E.G. DS (ft)	2812.44	Culv Frctn Ls (ft)	0.11
W.S. DS (ft)	2811.64	Culv Exit Loss (ft)	0.11
Delta EG (ft)	0.32	Culv Entr Loss (ft)	0.05
Delta WS (ft)	0.46	Q Weir (cfs)	
E.G. IC (ft)	2812.64	Weir Sta Lft (ft)	
E.G. OC (ft)	2812.71	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2812.41	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2812.10	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.10	Min El Weir Flow (ft)	2819.01

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)	2808.46	Culv Inv El Up (ft)	2811.00
W.S. US. (ft)	2808.26	Culv Inv El Dn (ft)	2811.00
E.G. DS (ft)	2808.27	Culv Frctn Ls (ft)	
W.S. DS (ft)	2807.85	Culv Exit Loss (ft)	
Delta EG (ft)	0.18	Culv Entr Loss (ft)	
Delta WS (ft)	0.41	Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2819.01

Warning: For this profile, the culvert is located in an ineffective flow region.

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	4.37	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	1.94
Q Barrel (cfs)	4.37	Culv Vel DS (ft/s)	1.97
E.G. US. (ft)	2812.60	Culv Inv El Up (ft)	2811.00
W.S. US. (ft)	2812.00	Culv Inv El Dn (ft)	2811.00
E.G. DS (ft)	2812.39	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2811.59	Culv Exit Loss (ft)	0.00
Delta EG (ft)	0.21	Culv Entr Loss (ft)	0.01
Delta WS (ft)	0.41	Q Weir (cfs)	
E.G. IC (ft)	2812.02	Weir Sta Lft (ft)	
E.G. OC (ft)	2812.42	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2812.35	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2812.33	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.73	Min El Weir Flow (ft)	2819.01

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	0.00	Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	0.10
Q Barrel (cfs)	0.00	Culv Vel DS (ft/s)	0.51
E.G. US. (ft)	2811.13	Culv Inv El Up (ft)	2811.00
W.S. US. (ft)	2810.62	Culv Inv El Dn (ft)	2811.00
E.G. DS (ft)	2810.93	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2810.20	Culv Exit Loss (ft)	0.08
Delta EG (ft)	0.19	Culv Entr Loss (ft)	0.00
Delta WS (ft)	0.42	Q Weir (cfs)	
E.G. IC (ft)	2811.02	Weir Sta Lft (ft)	
E.G. OC (ft)	2811.04	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2811.04	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2811.01	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.01	Min El Weir Flow (ft)	2819.01

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	1	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2811.00
W.S. US. (ft)		Culv Inv El Dn (ft)	2811.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2819.01

Warning: The program cannot perform supercritical flow through multiple culverts. The program sets the water surface to critical
depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT Profile #100-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)	2958.06	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	8.91
Q Barrel (cfs)	986.02	Culv Vel DS (ft/s)	8.97
E.G. US. (ft)	2816.38	Culv Inv El Up (ft)	2807.00
W.S. US. (ft)	2815.43	Culv Inv El Dn (ft)	2807.00
E.G. DS (ft)	2816.08	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2814.85	Culv Exit Loss (ft)	0.02
Delta EG (ft)	0.30	Culv Entr Loss (ft)	0.25
Delta WS (ft)	0.58	Q Weir (cfs)	
E.G. IC (ft)	2815.65	Weir Sta Lft (ft)	
E.G. OC (ft)	2816.38	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2814.90	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2814.85	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.36	Min El Weir Flow (ft)	2819.01

CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	2688.64	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	8.97
Q Barrel (cfs)	896.21	Culv Vel DS (ft/s)	9.05
E.G. US. (ft)	2815.64	Culv Inv El Up (ft)	2807.00
W.S. US. (ft)	2814.69	Culv Inv El Dn (ft)	2807.00
E.G. DS (ft)	2815.19	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2814.08	Culv Exit Loss (ft)	0.15
Delta EG (ft)	0.44	Culv Entr Loss (ft)	0.25
Delta WS (ft)	0.62	Q Weir (cfs)	
E.G. IC (ft)	2815.10	Weir Sta Lft (ft)	
E.G. OC (ft)	2815.64	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2814.14	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2814.08	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.03	Min El Weir Flow (ft)	2819.01

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	1490.47	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	7.54
Q Barrel (cfs)	496.82	Culv Vel DS (ft/s)	7.65
E.G. US. (ft)	2812.77	Culv Inv El Up (ft)	2807.00
W.S. US. (ft)	2812.10	Culv Inv El Dn (ft)	2807.00
E.G. DS (ft)	2812.44	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2811.64	Culv Exit Loss (ft)	0.11
Delta EG (ft)	0.32	Culv Entr Loss (ft)	0.18
Delta WS (ft)	0.46	Q Weir (cfs)	
E.G. IC (ft)	2812.40	Weir Sta Lft (ft)	
E.G. OC (ft)	2812.77	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2811.70	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2811.64	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.39	Min El Weir Flow (ft)	2819.01

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	200.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	4.26
Q Barrel (cfs)	66.67	Culv Vel DS (ft/s)	5.35
E.G. US. (ft)	2808.46	Culv Inv El Up (ft)	2807.00
W.S. US. (ft)	2808.26	Culv Inv El Dn (ft)	2807.00
E.G. DS (ft)	2808.27	Culv Frctn Ls (ft)	0.06
W.S. DS (ft)	2807.85	Culv Exit Loss (ft)	0.06
Delta EG (ft)	0.18	Culv Entr Loss (ft)	0.06
Delta WS (ft)	0.41	Q Weir (cfs)	
E.G. IC (ft)	2808.38	Weir Sta Lft (ft)	
E.G. OC (ft)	2808.46	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2808.12	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2807.89	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.89	Min El Weir Flow (ft)	2819.01

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)	1395.63	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	7.15
Q Barrel (cfs)	465.21	Culv Vel DS (ft/s)	7.24
E.G. US. (ft)	2812.60	Culv Inv El Up (ft)	2807.00
W.S. US. (ft)	2812.00	Culv Inv El Dn (ft)	2807.00
E.G. DS (ft)	2812.39	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2811.59	Culv Exit Loss (ft)	0.02
Delta EG (ft)	0.21	Culv Entr Loss (ft)	0.16
Delta WS (ft)	0.41	Q Weir (cfs)	
E.G. IC (ft)	2812.16	Weir Sta Lft (ft)	
E.G. OC (ft)	2812.60	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2811.65	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2811.59	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.25	Min El Weir Flow (ft)	2819.01

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)	930.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	6.75
Q Barrel (cfs)	310.00	Culv Vel DS (ft/s)	6.92
E.G. US. (ft)	2811.13	Culv Inv El Up (ft)	2807.00
W.S. US. (ft)	2810.62	Culv Inv El Dn (ft)	2807.00
E.G. DS (ft)	2810.93	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2810.20	Culv Exit Loss (ft)	0.01
Delta EG (ft)	0.19	Culv Entr Loss (ft)	0.14
Delta WS (ft)	0.42	Q Weir (cfs)	
E.G. IC (ft)	2810.91	Weir Sta Lft (ft)	
E.G. OC (ft)	2811.13	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2810.28	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2810.20	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.48	Min El Weir Flow (ft)	2819.01

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CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     3     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2807.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2807.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2819.01


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 7231.3

INPUT
Description: Section 72+31.3 (d/s face Kasota Rd.)
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2819  138.63    2819     197    2814     203    2811     216    2811
     222    2815     242    2815     242    2807     287    2807     287    2815
     307    2815  326.77    2817  403.98    2818

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .035     307    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     287             44.2    44.2    44.2             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2819       T
     287  403.98    2819       T
Left Levee      Station=     242      Elevation=    2818
Right Levee     Station=     287      Elevation=    2818

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2816.08    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.24    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2814.85    Reach Len. (ft)            44.20      44.20      44.20
  Crit W.S. (ft)           2812.36    Flow Area (sq ft)                    353.13
  E.G. Slope (ft/ft)      0.000582    Area (sq ft)                         353.13
  Q Total (cfs)            3150.00    Flow (cfs)                          3150.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)            8.92    Avg. Vel. (ft/s)                       8.92
  Max Chl Dpth (ft)           7.85    Hydr. Depth (ft)                       7.85
  Conv. Total (cfs)       130571.7    Conv. (cfs)                        130571.7
  Length Wtd. (ft)           44.20    Wetted Per. (ft)                      60.69
```

Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.35	19.88	0.34
C & E Loss (ft)	0.18	Cum SA (acres)	0.20	5.22	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2815.19	Element			
Vel Head (ft)	1.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	2814.08	Reach Len. (ft)	44.20	44.20	44.20
Crit W.S. (ft)	2811.83	Flow Area (sq ft)		318.44	
E.G. Slope (ft/ft)	0.000583	Area (sq ft)		318.44	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	8.48	Avg. Vel. (ft/s)		8.48	
Max Chl Dpth (ft)	7.08	Hydr. Depth (ft)		7.08	
Conv. Total (cfs)	111800.7	Conv. (cfs)		111800.7	
Length Wtd. (ft)	44.20	Wetted Per. (ft)		59.15	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.28	17.28	0.27
C & E Loss (ft)	0.15	Cum SA (acres)	0.17	5.02	0.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2812.44	Element			
Vel Head (ft)	0.80	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.64	Reach Len. (ft)	44.20	44.20	44.20
Crit W.S. (ft)	2810.21	Flow Area (sq ft)		208.83	
E.G. Slope (ft/ft)	0.000655	Area (sq ft)		208.83	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	7.18	Avg. Vel. (ft/s)		7.18	
Max Chl Dpth (ft)	4.64	Hydr. Depth (ft)		4.64	
Conv. Total (cfs)	58604.9	Conv. (cfs)		58604.9	
Length Wtd. (ft)	44.20	Wetted Per. (ft)		54.28	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.13	11.46	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	4.67	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2808.27	Element			
Vel Head (ft)	0.43	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.85	Reach Len. (ft)	44.20	44.20	44.20
Crit W.S. (ft)	2807.85	Flow Area (sq ft)		38.21	
E.G. Slope (ft/ft)	0.002740	Area (sq ft)		38.21	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	5.23	Avg. Vel. (ft/s)		5.23	

Max Chl Dpth (ft)	0.85	Hydr. Depth (ft)		0.85	
Conv. Total (cfs)	3820.8	Conv. (cfs)		3820.8	
Length Wtd. (ft)	44.20	Wetted Per. (ft)		46.70	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.01	3.01	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	3.97	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2812.39	Element			
Vel Head (ft)	0.80	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.59	Reach Len. (ft)	44.20	44.20	44.20
Crit W.S. (ft)	2810.23	Flow Area (sq ft)		206.59	
E.G. Slope (ft/ft)	0.000659	Area (sq ft)		206.59	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	7.16	Avg. Vel. (ft/s)		7.16	
Max Chl Dpth (ft)	4.59	Hydr. Depth (ft)		4.59	
Conv. Total (cfs)	57630.9	Conv. (cfs)		57630.9	
Length Wtd. (ft)	44.20	Wetted Per. (ft)		54.18	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.13	11.68	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	4.69	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2810.93	Element			
Vel Head (ft)	0.73	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.20	Reach Len. (ft)	44.20	44.20	44.20
Crit W.S. (ft)	2809.48	Flow Area (sq ft)		144.03	
E.G. Slope (ft/ft)	0.000915	Area (sq ft)		144.03	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	6.87	Avg. Vel. (ft/s)		6.87	
Max Chl Dpth (ft)	3.20	Hydr. Depth (ft)		3.20	
Conv. Total (cfs)	32721.1	Conv. (cfs)		32721.1	
Length Wtd. (ft)	44.20	Wetted Per. (ft)		51.40	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.08	9.37	0.08
C & E Loss (ft)	0.05	Cum SA (acres)	0.08	4.54	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2809.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.72	Reach Len. (ft)	44.20	44.20	44.20
Crit W.S. (ft)	2808.72	Flow Area (sq ft)		77.30	
E.G. Slope (ft/ft)	0.002556	Area (sq ft)		77.30	
Q Total (cfs)	610.00	Flow (cfs)		570.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	7.37	Avg. Vel. (ft/s)		7.37	
Max Chl Dpth (ft)	1.72	Hydr. Depth (ft)		1.72	
Conv. Total (cfs)	12066.3	Conv. (cfs)		12066.3	
Length Wtd. (ft)	44.20	Wetted Per. (ft)		48.44	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	6.76	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	4.33	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7187.1

INPUT
Description: Section 71+87
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2819	138.63	2819	197	2813.7	203	2811	216	2811
222	2814.6	242	2814.6	242	2806.6	281	2806.6	281	2814.6
288.85	2816	326.77	2817	403.98	2818				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	62.1	62.1	62.1	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2817.5	T
281	403.98	2817.5	T

Left Levee Station= 242 Elevation= 2817.5
Right Levee Station= 281 Elevation= 2817.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2815.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.83	Wt. n-Val.		0.013	
W.S. Elev (ft)	2814.04	Reach Len. (ft)	62.10	62.10	62.10
Crit W.S. (ft)	2812.49	Flow Area (sq ft)		289.95	
E.G. Slope (ft/ft)	0.000958	Area (sq ft)		289.95	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	10.86	Avg. Vel. (ft/s)		10.86	
Max Chl Dpth (ft)	7.43	Hydr. Depth (ft)		7.43	
Conv. Total (cfs)	101787.1	Conv. (cfs)		101787.1	
Length Wtd. (ft)	62.10	Wetted Per. (ft)		53.87	
Min Ch El (ft)	2806.60	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.35	19.55	0.34
C & E Loss (ft)	0.03	Cum SA (acres)	0.20	5.18	0.17

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2815.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.61	Wt. n-Val.		0.013	
W.S. Elev (ft)	2813.40	Reach Len. (ft)	62.10	62.10	62.10
Crit W.S. (ft)	2811.91	Flow Area (sq ft)		265.34	
E.G. Slope (ft/ft)	0.000916	Area (sq ft)		265.34	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	10.18	Avg. Vel. (ft/s)		10.18	
Max Chl Dpth (ft)	6.80	Hydr. Depth (ft)		6.80	
Conv. Total (cfs)	89201.3	Conv. (cfs)		89201.3	
Length Wtd. (ft)	62.10	Wetted Per. (ft)		52.61	
Min Ch El (ft)	2806.60	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.28	16.98	0.27
C & E Loss (ft)	0.01	Cum SA (acres)	0.17	4.97	0.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2812.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.29	Reach Len. (ft)	62.10	62.10	62.10
Crit W.S. (ft)	2810.20	Flow Area (sq ft)		182.99	
E.G. Slope (ft/ft)	0.000873	Area (sq ft)		182.99	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	8.20	Avg. Vel. (ft/s)		8.20	
Max Chl Dpth (ft)	4.69	Hydr. Depth (ft)		4.69	
Conv. Total (cfs)	50774.0	Conv. (cfs)		50774.0	
Length Wtd. (ft)	62.10	Wetted Per. (ft)		48.38	
Min Ch El (ft)	2806.60	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.13	11.26	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	4.62	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2808.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.39	Reach Len. (ft)	62.10	62.10	62.10
Crit W.S. (ft)	2807.53	Flow Area (sq ft)		30.60	
E.G. Slope (ft/ft)	0.004761	Area (sq ft)		30.60	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	6.54	Avg. Vel. (ft/s)		6.54	
Max Chl Dpth (ft)	0.78	Hydr. Depth (ft)		0.78	
Conv. Total (cfs)	2898.5	Conv. (cfs)		2898.5	
Length Wtd. (ft)	62.10	Wetted Per. (ft)		40.57	
Min Ch El (ft)	2806.60	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.01	2.98	0.01

C & E Loss (ft)	0.07	Cum SA (acres)	0.03	3.93	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2812.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.25	Reach Len. (ft)	62.10	62.10	62.10
Crit W.S. (ft)	2810.17	Flow Area (sq ft)		181.24	
E.G. Slope (ft/ft)	0.000875	Area (sq ft)		181.24	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	8.17	Avg. Vel. (ft/s)		8.17	
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)		4.65	
Conv. Total (cfs)	50028.4	Conv. (cfs)		50028.4	
Length Wtd. (ft)	62.10	Wetted Per. (ft)		48.29	
Min Ch El (ft)	2806.60	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.13	11.48	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	4.65	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2810.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.89	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.95	Reach Len. (ft)	62.10	62.10	62.10
Crit W.S. (ft)	2809.33	Flow Area (sq ft)		130.57	
E.G. Slope (ft/ft)	0.001085	Area (sq ft)		130.57	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	7.58	Avg. Vel. (ft/s)		7.58	
Max Chl Dpth (ft)	3.35	Hydr. Depth (ft)		3.35	
Conv. Total (cfs)	30051.3	Conv. (cfs)		30051.3	
Length Wtd. (ft)	62.10	Wetted Per. (ft)		45.70	
Min Ch El (ft)	2806.60	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.08	9.23	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	4.49	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2809.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.93	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.62	Reach Len. (ft)	62.10	62.10	62.10
Crit W.S. (ft)	2808.57	Flow Area (sq ft)		78.84	
E.G. Slope (ft/ft)	0.002045	Area (sq ft)		78.84	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	7.74	Avg. Vel. (ft/s)		7.74	
Max Chl Dpth (ft)	2.02	Hydr. Depth (ft)		2.02	
Conv. Total (cfs)	13489.9	Conv. (cfs)		13489.9	
Length Wtd. (ft)	62.10	Wetted Per. (ft)		43.04	

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  Min Ch El (ft)           2806.60    Shear (lb/sq ft)                        0.23
  Alpha                       1.00    Stream Power (lb/ft s)    403.98     242.00     281.00
  Frctn Loss (ft)             0.08    Cum Volume (acre-ft)        0.04       6.68       0.04
  C & E Loss (ft)             0.07    Cum SA (acres)              0.06       4.28       0.06


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 7125

INPUT
Description: Section 71+25 Chute (U/S)
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     222  2813.1     242  2813.1     254  2805.1     274  2805.1     286  2813.1
  288.85    2816  326.77    2817  403.98    2818

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     222    .016     242    .013     286    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     286                8       8       8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     222     242  2817.5       T
  288.85  403.98  2817.5       T
Left Levee      Station=     242      Elevation=  2817.5
Right Levee     Station=  288.85      Elevation=  2817.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2815.79    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.74    Wt. n-Val.                           0.013      0.035
  W.S. Elev (ft)           2814.05    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2812.64    Flow Area (sq ft)                    297.86       0.44
  E.G. Slope (ft/ft)      0.000788    Area (sq ft)                         297.86       0.44
  Q Total (cfs)            3150.00    Flow (cfs)                          3149.75       0.25
  Top Width (ft)             44.94    Top Width (ft)                        44.00       0.94
  Vel Total (ft/s)           10.56    Avg. Vel. (ft/s)                      10.57       0.57
  Max Chl Dpth (ft)           8.95    Hydr. Depth (ft)                       6.77       0.48
  Conv. Total (cfs)       112197.8    Conv. (cfs)                        112188.7        9.1
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      49.80       1.33
  Min Ch El (ft)           2805.10    Shear (lb/sq ft)                       0.29       0.02
  Alpha                       1.00    Stream Power (lb/ft s)    403.98     242.00     288.85
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.35      19.13       0.34
  C & E Loss (ft)             0.20    Cum SA (acres)              0.20       5.12       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.
```

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2814.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.58	Wt. n-Val.		0.013	0.035
W.S. Elev (ft)	2813.38	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2812.02	Flow Area (sq ft)		268.09	0.04
E.G. Slope (ft/ft)	0.000808	Area (sq ft)		268.09	0.04
Q Total (cfs)	2700.00	Flow (cfs)		2699.99	0.01
Top Width (ft)	44.27	Top Width (ft)		44.00	0.27
Vel Total (ft/s)	10.07	Avg. Vel. (ft/s)		10.07	0.25
Max Chl Dpth (ft)	8.27	Hydr. Depth (ft)		6.09	0.14
Conv. Total (cfs)	94989.1	Conv. (cfs)		94988.8	0.3
Length Wtd. (ft)	8.00	Wetted Per. (ft)		49.12	0.39
Min Ch El (ft)	2805.10	Shear (lb/sq ft)		0.28	0.00
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.28	16.60	0.27
C & E Loss (ft)	0.19	Cum SA (acres)	0.17	4.92	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2812.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.13	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2810.02	Flow Area (sq ft)		175.13	
E.G. Slope (ft/ft)	0.000830	Area (sq ft)		175.13	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	38.09	Top Width (ft)		38.09	
Vel Total (ft/s)	8.56	Avg. Vel. (ft/s)		8.56	
Max Chl Dpth (ft)	6.03	Hydr. Depth (ft)		4.60	
Conv. Total (cfs)	52074.6	Conv. (cfs)		52074.6	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		41.74	
Min Ch El (ft)	2805.10	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	11.00	0.13
C & E Loss (ft)	0.18	Cum SA (acres)	0.11	4.57	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2807.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.53	Wt. n-Val.		0.013	
W.S. Elev (ft)	2806.04	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2806.52	Flow Area (sq ft)		20.16	
E.G. Slope (ft/ft)	0.009182	Area (sq ft)		20.16	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	22.82	Top Width (ft)		22.82	
Vel Total (ft/s)	9.92	Avg. Vel. (ft/s)		9.92	
Max Chl Dpth (ft)	0.94	Hydr. Depth (ft)		0.88	

Conv. Total (cfs)	2087.2	Conv. (cfs)		2087.2	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		23.40	
Min Ch El (ft)	2805.10	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.01	2.94	0.01
C & E Loss (ft)	0.09	Cum SA (acres)	0.03	3.89	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2812.22	Element			
Vel Head (ft)	1.13	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.09	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2809.98	Flow Area (sq ft)		173.43	
E.G. Slope (ft/ft)	0.000830	Area (sq ft)		173.43	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	37.96	Top Width (ft)		37.96	
Vel Total (ft/s)	8.53	Avg. Vel. (ft/s)		8.53	
Max Chl Dpth (ft)	5.99	Hydr. Depth (ft)		4.57	
Conv. Total (cfs)	51367.7	Conv. (cfs)		51367.7	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		41.58	
Min Ch El (ft)	2805.10	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	11.23	0.13
C & E Loss (ft)	0.17	Cum SA (acres)	0.11	4.60	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2810.78	Element			
Vel Head (ft)	0.91	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.87	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2808.94	Flow Area (sq ft)		129.67	
E.G. Slope (ft/ft)	0.000845	Area (sq ft)		129.67	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	34.32	Top Width (ft)		34.32	
Vel Total (ft/s)	7.63	Avg. Vel. (ft/s)		7.63	
Max Chl Dpth (ft)	4.77	Hydr. Depth (ft)		3.78	
Conv. Total (cfs)	34066.8	Conv. (cfs)		34066.8	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		37.21	
Min Ch El (ft)	2805.10	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	9.04	0.08
C & E Loss (ft)	0.16	Cum SA (acres)	0.08	4.44	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2809.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.69	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.71	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2807.96	Flow Area (sq ft)		91.77	
E.G. Slope (ft/ft)	0.000865	Area (sq ft)		91.77	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	30.83	Top Width (ft)		30.83	
Vel Total (ft/s)	6.65	Avg. Vel. (ft/s)		6.65	
Max Chl Dpth (ft)	3.61	Hydr. Depth (ft)		2.98	
Conv. Total (cfs)	20736.8	Conv. (cfs)		20736.8	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		33.02	
Min Ch El (ft)	2805.10	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	6.56	0.04
C & E Loss (ft)	0.14	Cum SA (acres)	0.06	4.23	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7117

INPUT
Description: Section 71+13 Chute Sag
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
222	2813.1	242	2813.1	254	2803.2	274	2803.2	286	2813.1
288.85	2816	326.77	2817	403.98	2818				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
222	.016	242	.013	286	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	286	4	4	4	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
222	242	2818	T
288.85	403.98	2818	T

Left Levee Station= 242 Elevation= 2818
Right Levee Station= 288.85 Elevation= 2818

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2815.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.07	Wt. n-Val.		0.013	0.035
W.S. Elev (ft)	2814.51	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2811.00	Flow Area (sq ft)		378.81	0.98
E.G. Slope (ft/ft)	0.000380	Area (sq ft)		378.81	0.98
Q Total (cfs)	3150.00	Flow (cfs)		3149.50	0.50
Top Width (ft)	45.38	Top Width (ft)		44.00	1.38
Vel Total (ft/s)	8.29	Avg. Vel. (ft/s)		8.31	0.52
Max Chl Dpth (ft)	11.31	Hydr. Depth (ft)		8.61	0.70

Conv. Total (cfs)	161655.2	Conv. (cfs)		161629.3	25.9
Length Wtd. (ft)	4.00	Wetted Per. (ft)		52.52	1.98
Min Ch El (ft)	2803.20	Shear (lb/sq ft)		0.17	0.01
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.35	19.07	0.34
C & E Loss (ft)	0.00	Cum SA (acres)	0.20	5.11	0.17

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2814.75	Element			
Vel Head (ft)	0.93	Wt. n-Val.		0.013	0.035
W.S. Elev (ft)	2813.82	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2810.34	Flow Area (sq ft)		348.39	0.25
E.G. Slope (ft/ft)	0.000362	Area (sq ft)		348.39	0.25
Q Total (cfs)	2700.00	Flow (cfs)		2699.92	0.08
Top Width (ft)	44.71	Top Width (ft)		44.00	0.71
Vel Total (ft/s)	7.74	Avg. Vel. (ft/s)		7.75	0.32
Max Chl Dpth (ft)	10.62	Hydr. Depth (ft)		7.92	0.36
Conv. Total (cfs)	141831.5	Conv. (cfs)		141827.3	4.3
Length Wtd. (ft)	4.00	Wetted Per. (ft)		51.83	1.01
Min Ch El (ft)	2803.20	Shear (lb/sq ft)		0.15	0.01
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.28	16.54	0.27
C & E Loss (ft)	0.00	Cum SA (acres)	0.17	4.91	0.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2812.09	Element			
Vel Head (ft)	0.56	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.53	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2808.24	Flow Area (sq ft)		250.78	
E.G. Slope (ft/ft)	0.000287	Area (sq ft)		250.78	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	40.20	Top Width (ft)		40.20	
Vel Total (ft/s)	5.98	Avg. Vel. (ft/s)		5.98	
Max Chl Dpth (ft)	8.33	Hydr. Depth (ft)		6.24	
Conv. Total (cfs)	88553.1	Conv. (cfs)		88553.1	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		46.18	
Min Ch El (ft)	2803.20	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	10.96	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	4.56	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2807.21	Element			
Vel Head (ft)	0.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.14	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2804.62	Flow Area (sq ft)		97.74	
E.G. Slope (ft/ft)	0.000074	Area (sq ft)		97.74	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	29.56	Top Width (ft)		29.56	
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)		2.05	

Max Chl Dpth (ft)	3.94	Hydr. Depth (ft)		3.31	
Conv. Total (cfs)	23325.5	Conv. (cfs)		23325.5	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		32.40	
Min Ch El (ft)	2803.20	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	2.93	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	3.88	0.03

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2812.04	Element			
Vel Head (ft)	0.55	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.49	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2808.20	Flow Area (sq ft)		248.94	
E.G. Slope (ft/ft)	0.000285	Area (sq ft)		248.94	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	40.09	Top Width (ft)		40.09	
Vel Total (ft/s)	5.95	Avg. Vel. (ft/s)		5.95	
Max Chl Dpth (ft)	8.29	Hydr. Depth (ft)		6.21	
Conv. Total (cfs)	87654.0	Conv. (cfs)		87654.0	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		46.04	
Min Ch El (ft)	2803.20	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	11.19	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	4.59	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2810.62	Element			
Vel Head (ft)	0.38	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.24	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2807.10	Flow Area (sq ft)		200.89	
E.G. Slope (ft/ft)	0.000232	Area (sq ft)		200.89	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	37.07	Top Width (ft)		37.07	
Vel Total (ft/s)	4.93	Avg. Vel. (ft/s)		4.93	
Max Chl Dpth (ft)	7.04	Hydr. Depth (ft)		5.42	
Conv. Total (cfs)	65056.5	Conv. (cfs)		65056.5	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		42.13	
Min Ch El (ft)	2803.20	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	9.01	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	4.43	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2809.26	Element			
Vel Head (ft)	0.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.03	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2806.10	Flow Area (sq ft)		157.65	
E.G. Slope (ft/ft)	0.000174	Area (sq ft)		157.65	
Q Total (cfs)	610.00	Flow (cfs)		610.00	

Top Width (ft)	34.12	Top Width (ft)		34.12	
Vel Total (ft/s)	3.87	Avg. Vel. (ft/s)		3.87	
Max Chl Dpth (ft)	5.83	Hydr. Depth (ft)		4.62	
Conv. Total (cfs)	46275.2	Conv. (cfs)		46275.2	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		38.31	
Min Ch El (ft)	2803.20	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	6.54	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	4.23	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

LATERAL STRUCTURE

RIVER: Desert Knolls Wa
REACH: Main RS: 7115

INPUT
Description: Reach 3 Diversion Chute #1
Lateral structure position = Left overbank
Distance from Upstream XS =
Deck/Roadway Width = 20
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2813	4	2813	10	2813	11.45	2813	275	2811.3

Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Circular	2	

FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	380	.013	.013	0	.5	1

Upstream Elevation = 2803.2
Centerline Station = 2
Downstream Elevation = 2803
Centerline Station = 2

LATERAL STRUCTURE OUTPUT Profile #100-yr SBCFCD Culv Group: Culvert #1

E.G. US. (ft)	2815.58	Weir Sta US (ft)	0.00
W.S. US. (ft)	2814.51	Weir Sta DS (ft)	10.00
E.G. DS (ft)	2814.22	Min El Weir Flow (ft)	2811.30
W.S. DS (ft)	2807.27	Wr Top Wdth (ft)	8.80
Q US (cfs)	3150.00	Weir Max Depth (ft)	1.51
Q Leaving Total (cfs)	53.07	Weir Avg Depth (ft)	1.10
Q DS (cfs)	3150.00	Weir Flow Area (sq ft)	9.65
Perc Q Leaving	1.68	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	21.93	Weir Submerg	0.00
Q Gates (cfs)		Q Culv Group (cfs)	31.14
Q Culv (cfs)	31.14	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	380.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2803.20
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2803.00

```
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2814.75    Weir Sta US (ft)                0.00
  W.S. US. (ft)                2813.82    Weir Sta DS (ft)                4.00
  E.G. DS (ft)                 2813.35    Min El Weir Flow (ft)        2811.30
  W.S. DS (ft)                 2806.82    Wr Top Wdth (ft)                4.00
  Q US (cfs)                   2700.00    Weir Max Depth (ft)             0.82
  Q Leaving Total (cfs)          35.97    Weir Avg Depth (ft)             0.82
  Q DS (cfs)                   2700.00    Weir Flow Area (sq ft)          3.27
  Perc Q Leaving                  1.33    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    5.91    Weir Submerg                    0.00
  Q Gates (cfs)                           Q Culv Group (cfs)             30.07
  Q Culv (cfs)                   30.07    # Barrels                           1
  Q Lat RC (cfs)                          Culv Length (ft)              380.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2803.20
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2803.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2812.09    Weir Sta US (ft)
  W.S. US. (ft)                2811.53    Weir Sta DS (ft)
  E.G. DS (ft)                 2810.55    Min El Weir Flow (ft)        2811.30
  W.S. DS (ft)                 2805.54    Wr Top Wdth (ft)
  Q US (cfs)                   1500.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          25.95    Weir Avg Depth (ft)
  Q DS (cfs)                   1500.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  1.73    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             25.95
  Q Culv (cfs)                   25.95    # Barrels                           1
  Q Lat RC (cfs)                          Culv Length (ft)              380.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2803.20
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2803.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2807.21    Weir Sta US (ft)
  W.S. US. (ft)                2807.14    Weir Sta DS (ft)
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  E.G. DS (ft)                  2805.42    Min El Weir Flow (ft)        2811.30
  W.S. DS (ft)                  2803.83    Wr Top Wdth (ft)
  Q US (cfs)                     200.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)           15.81    Weir Avg Depth (ft)
  Q DS (cfs)                     200.00    Weir Flow Area (sq ft)
  Perc Q Leaving                   7.91    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                     0.00    Weir Submerg
  Q Gates (cfs)                            Q Culv Group (cfs)             15.81
  Q Culv (cfs)                    15.81    # Barrels                           1
  Q Lat RC (cfs)                           Culv Length (ft)              380.00
                                           Culv Depth Blocked (ft)
  Q Breach (cfs)                           Culv Inv El Up (ft)          2803.20
  Breach Avg Velocity (ft/s)               Culv Inv El Dn (ft)          2803.00
  Breach Flow Area (sq ft)


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

LATERAL STRUCTURE OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                 2812.04    Weir Sta US (ft)
  W.S. US. (ft)                 2811.49    Weir Sta DS (ft)
  E.G. DS (ft)                  2810.50    Min El Weir Flow (ft)        2811.30
  W.S. DS (ft)                  2805.52    Wr Top Wdth (ft)
  Q US (cfs)                   1480.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)           25.89    Weir Avg Depth (ft)
  Q DS (cfs)                   1480.00    Weir Flow Area (sq ft)
  Perc Q Leaving                   1.75    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                     0.00    Weir Submerg
  Q Gates (cfs)                            Q Culv Group (cfs)             25.89
  Q Culv (cfs)                    25.89    # Barrels                           1
  Q Lat RC (cfs)                           Culv Length (ft)              380.00
                                           Culv Depth Blocked (ft)
  Q Breach (cfs)                           Culv Inv El Up (ft)          2803.20
  Breach Avg Velocity (ft/s)               Culv Inv El Dn (ft)          2803.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                 2810.62    Weir Sta US (ft)
  W.S. US. (ft)                 2810.24    Weir Sta DS (ft)
  E.G. DS (ft)                  2809.01    Min El Weir Flow (ft)        2811.30
  W.S. DS (ft)                  2804.95    Wr Top Wdth (ft)
  Q US (cfs)                     990.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)           23.38    Weir Avg Depth (ft)
  Q DS (cfs)                     990.00    Weir Flow Area (sq ft)
  Perc Q Leaving                   2.36    Weir Coef (ft^1/2)             2.000
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  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)            23.38
  Q Culv (cfs)                   23.38    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)             380.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)         2803.20
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)         2803.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2809.26    Weir Sta US (ft)
  W.S. US. (ft)                2809.03    Weir Sta DS (ft)
  E.G. DS (ft)                 2807.55    Min El Weir Flow (ft)       2811.30
  W.S. DS (ft)                 2804.46    Wr Top Wdth (ft)
  Q US (cfs)                    610.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          20.68    Weir Avg Depth (ft)
  Q DS (cfs)                    610.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  3.39    Weir Coef (ft^1/2)            2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)            20.68
  Q Culv (cfs)                   20.68    # Barrels                         1
  Q Lat RC (cfs)                          Culv Length (ft)             380.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)         2803.20
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)         2803.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 7113

INPUT
Description: Section 71+13 Chute Sag
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     222  2813.1     242  2813.1     254  2803.2     274  2803.2     286  2813.1
  288.85    2816  326.77    2817  403.98    2818

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     222    .016     242    .013     286    .035
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Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     286                8       8       8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     222     242    2818       T
  288.85  403.98    2818       T
Left Levee      Station=     242      Elevation=    2818
Right Levee     Station=  288.85      Elevation=    2818

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2815.58    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.07    Wt. n-Val.                            0.013      0.035
  W.S. Elev (ft)           2814.51    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2811.00    Flow Area (sq ft)                    378.71       0.97
  E.G. Slope (ft/ft)      0.000380    Area (sq ft)                         378.71       0.97
  Q Total (cfs)            3150.00    Flow (cfs)                          3149.50       0.50
  Top Width (ft)             45.38    Top Width (ft)                        44.00       1.38
  Vel Total (ft/s)            8.30    Avg. Vel. (ft/s)                       8.32       0.52
  Max Chl Dpth (ft)          11.31    Hydr. Depth (ft)                       8.61       0.70
  Conv. Total (cfs)       161590.8    Conv. (cfs)                        161565.1       25.8
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      52.52       1.97
  Min Ch El (ft)           2803.20    Shear (lb/sq ft)                       0.17       0.01
  Alpha                       1.00    Stream Power (lb/ft s)    403.98     242.00     288.85
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.35      19.04       0.34
  C & E Loss (ft)             0.17    Cum SA (acres)              0.20       5.11       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2814.75    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.93    Wt. n-Val.                            0.013      0.035
  W.S. Elev (ft)           2813.82    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2810.34    Flow Area (sq ft)                    348.29       0.25
  E.G. Slope (ft/ft)      0.000363    Area (sq ft)                         348.29       0.25
  Q Total (cfs)            2700.00    Flow (cfs)                          2699.92       0.08
  Top Width (ft)             44.70    Top Width (ft)                        44.00       0.70
  Vel Total (ft/s)            7.75    Avg. Vel. (ft/s)                       7.75       0.32
  Max Chl Dpth (ft)          10.62    Hydr. Depth (ft)                       7.92       0.36
  Conv. Total (cfs)       141769.9    Conv. (cfs)                        141765.7        4.2
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      51.83       1.00
  Min Ch El (ft)           2803.20    Shear (lb/sq ft)                       0.15       0.01
  Alpha                       1.00    Stream Power (lb/ft s)    403.98     242.00     288.85
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.28      16.51       0.27
  C & E Loss (ft)             0.16    Cum SA (acres)              0.17       4.90       0.15


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS
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E.G. Elev (ft)	2812.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.53	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2808.24	Flow Area (sq ft)		250.71	
E.G. Slope (ft/ft)	0.000287	Area (sq ft)		250.71	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	40.19	Top Width (ft)		40.19	
Vel Total (ft/s)	5.98	Avg. Vel. (ft/s)		5.98	
Max Chl Dpth (ft)	8.33	Hydr. Depth (ft)		6.24	
Conv. Total (cfs)	88519.5	Conv. (cfs)		88519.5	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		46.18	
Min Ch El (ft)	2803.20	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	10.94	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	4.56	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2807.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.14	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2804.62	Flow Area (sq ft)		97.73	
E.G. Slope (ft/ft)	0.000074	Area (sq ft)		97.73	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	29.56	Top Width (ft)		29.56	
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)		2.05	
Max Chl Dpth (ft)	3.94	Hydr. Depth (ft)		3.31	
Conv. Total (cfs)	23323.0	Conv. (cfs)		23323.0	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		32.39	
Min Ch El (ft)	2803.20	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	2.92	0.01
C & E Loss (ft)	0.06	Cum SA (acres)	0.03	3.88	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2812.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.48	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2808.20	Flow Area (sq ft)		248.88	
E.G. Slope (ft/ft)	0.000285	Area (sq ft)		248.88	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	40.08	Top Width (ft)		40.08	
Vel Total (ft/s)	5.95	Avg. Vel. (ft/s)		5.95	
Max Chl Dpth (ft)	8.28	Hydr. Depth (ft)		6.21	
Conv. Total (cfs)	87625.4	Conv. (cfs)		87625.4	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		46.04	

Min Ch El (ft)	2803.20	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	11.17	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	4.59	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2810.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.24	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2807.10	Flow Area (sq ft)		200.85	
E.G. Slope (ft/ft)	0.000232	Area (sq ft)		200.85	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	37.06	Top Width (ft)		37.06	
Vel Total (ft/s)	4.93	Avg. Vel. (ft/s)		4.93	
Max Chl Dpth (ft)	7.04	Hydr. Depth (ft)		5.42	
Conv. Total (cfs)	65036.0	Conv. (cfs)		65036.0	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		42.12	
Min Ch El (ft)	2803.20	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	8.99	0.08
C & E Loss (ft)	0.12	Cum SA (acres)	0.08	4.43	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2809.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.03	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2806.10	Flow Area (sq ft)		157.62	
E.G. Slope (ft/ft)	0.000174	Area (sq ft)		157.62	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	34.12	Top Width (ft)		34.12	
Vel Total (ft/s)	3.87	Avg. Vel. (ft/s)		3.87	
Max Chl Dpth (ft)	5.82	Hydr. Depth (ft)		4.62	
Conv. Total (cfs)	46261.3	Conv. (cfs)		46261.3	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		38.31	
Min Ch El (ft)	2803.20	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	6.52	0.04
C & E Loss (ft)	0.10	Cum SA (acres)	0.06	4.22	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7105

INPUT
Description: Section 71+05 Chute (D/S)
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
222	2813.1	242	2813.1	254	2805.1	274	2805.1	286	2813.1
288.85	2816	326.77	2817	403.98	2818				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
222	.016	242	.013	286	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	286	91.45	91.45	91.45	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
222	242	2816	T
286	403.98	2816	T

Left Levee Station= 242 Elevation= 2816
Right Levee Station= 286 Elevation= 2816

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2815.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.78	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.63	Reach Len. (ft)	91.45	91.45	91.45
Crit W.S. (ft)	2812.63	Flow Area (sq ft)		235.43	
E.G. Slope (ft/ft)	0.001605	Area (sq ft)		235.43	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	42.57	Top Width (ft)		42.57	
Vel Total (ft/s)	13.38	Avg. Vel. (ft/s)		13.38	
Max Chl Dpth (ft)	7.52	Hydr. Depth (ft)		5.53	
Conv. Total (cfs)	78637.1	Conv. (cfs)		78637.1	
Length Wtd. (ft)	91.45	Wetted Per. (ft)		47.13	
Min Ch El (ft)	2805.10	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	286.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.35	18.98	0.34
C & E Loss (ft)	0.02	Cum SA (acres)	0.20	5.10	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2814.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.56	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.03	Reach Len. (ft)	91.45	91.45	91.45
Crit W.S. (ft)	2812.03	Flow Area (sq ft)		210.47	

E.G. Slope (ft/ft)	0.001609	Area (sq ft)		210.47	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	40.78	Top Width (ft)		40.78	
Vel Total (ft/s)	12.83	Avg. Vel. (ft/s)		12.83	
Max Chl Dpth (ft)	6.93	Hydr. Depth (ft)		5.16	
Conv. Total (cfs)	67307.4	Conv. (cfs)		67307.4	
Length Wtd. (ft)	91.45	Wetted Per. (ft)		44.97	
Min Ch El (ft)	2805.10	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	286.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.28	16.46	0.27
C & E Loss (ft)	0.02	Cum SA (acres)	0.17	4.90	0.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2811.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.92	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.02	Reach Len. (ft)	91.45	91.45	91.45
Crit W.S. (ft)	2810.02	Flow Area (sq ft)		134.79	
E.G. Slope (ft/ft)	0.001737	Area (sq ft)		134.79	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	34.77	Top Width (ft)		34.77	
Vel Total (ft/s)	11.13	Avg. Vel. (ft/s)		11.13	
Max Chl Dpth (ft)	4.92	Hydr. Depth (ft)		3.88	
Conv. Total (cfs)	35993.9	Conv. (cfs)		35993.9	
Length Wtd. (ft)	91.45	Wetted Per. (ft)		37.75	
Min Ch El (ft)	2805.10	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	286.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.13	10.90	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	4.55	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2807.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.013	
W.S. Elev (ft)	2806.51	Reach Len. (ft)	91.45	91.45	91.45
Crit W.S. (ft)	2806.51	Flow Area (sq ft)		31.06	
E.G. Slope (ft/ft)	0.002385	Area (sq ft)		31.06	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	24.21	Top Width (ft)		24.21	
Vel Total (ft/s)	6.44	Avg. Vel. (ft/s)		6.44	
Max Chl Dpth (ft)	1.40	Hydr. Depth (ft)		1.28	

Conv. Total (cfs)	4094.9	Conv. (cfs)		4094.9	
Length Wtd. (ft)	91.45	Wetted Per. (ft)		25.07	
Min Ch El (ft)	2805.10	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	286.00
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	0.01	2.91	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	3.87	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2811.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.91	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.98	Reach Len. (ft)	91.45	91.45	91.45
Crit W.S. (ft)	2809.98	Flow Area (sq ft)		133.44	
E.G. Slope (ft/ft)	0.001740	Area (sq ft)		133.44	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	34.65	Top Width (ft)		34.65	
Vel Total (ft/s)	11.09	Avg. Vel. (ft/s)		11.09	
Max Chl Dpth (ft)	4.88	Hydr. Depth (ft)		3.85	
Conv. Total (cfs)	35484.1	Conv. (cfs)		35484.1	
Length Wtd. (ft)	91.45	Wetted Per. (ft)		37.61	
Min Ch El (ft)	2805.10	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	286.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.13	11.13	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	4.58	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2810.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.55	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.94	Reach Len. (ft)	91.45	91.45	91.45
Crit W.S. (ft)	2808.94	Flow Area (sq ft)		98.96	
E.G. Slope (ft/ft)	0.001833	Area (sq ft)		98.96	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	31.52	Top Width (ft)		31.52	
Vel Total (ft/s)	10.00	Avg. Vel. (ft/s)		10.00	
Max Chl Dpth (ft)	3.84	Hydr. Depth (ft)		3.14	
Conv. Total (cfs)	23126.5	Conv. (cfs)		23126.5	
Length Wtd. (ft)	91.45	Wetted Per. (ft)		33.85	
Min Ch El (ft)	2805.10	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	286.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.08	8.97	0.08

C & E Loss (ft)	0.00	Cum SA (acres)	0.08	4.43	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2809.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.20	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.96	Reach Len. (ft)	91.45	91.45	91.45
Crit W.S. (ft)	2807.96	Flow Area (sq ft)		69.40	
E.G. Slope (ft/ft)	0.001959	Area (sq ft)		69.40	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	28.57	Top Width (ft)		28.57	
Vel Total (ft/s)	8.79	Avg. Vel. (ft/s)		8.79	
Max Chl Dpth (ft)	2.86	Hydr. Depth (ft)		2.43	
Conv. Total (cfs)	13781.2	Conv. (cfs)		13781.2	
Length Wtd. (ft)	91.45	Wetted Per. (ft)		30.30	
Min Ch El (ft)	2805.10	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	286.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.04	6.50	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.06	4.22	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7013.55*

INPUT
Description:
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2818	139	2818	197	2812	203	2810	216	2810
222	2813	242	2813	248	2805	274	2805	281	2813
301	2813	327	2816	404	2816				

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.016	301	.035
404	.035								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	173.55	173.55	173.55	.1	.3

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2815       T
     281     404    2815       T
Left Levee      Station=     242      Elevation=    2815
Right Levee     Station=     281      Elevation=    2815

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2815.18    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               3.49    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2811.68    Reach Len. (ft)           173.55     173.55     173.55
  Crit W.S. (ft)           2812.14    Flow Area (sq ft)                    210.03
  E.G. Slope (ft/ft)      0.002092    Area (sq ft)                         210.03
  Q Total (cfs)            3150.00    Flow (cfs)                          3150.00
  Top Width (ft)             36.86    Top Width (ft)                        36.86
  Vel Total (ft/s)           15.00    Avg. Vel. (ft/s)                      15.00
  Max Chl Dpth (ft)           6.68    Hydr. Depth (ft)                       5.70
  Conv. Total (cfs)        68862.9    Conv. (cfs)                         68862.9
  Length Wtd. (ft)          173.55    Wetted Per. (ft)                      43.23
  Min Ch El (ft)           2805.00    Shear (lb/sq ft)                       0.63
  Alpha                       1.00    Stream Power (lb/ft s)    404.00     242.00     281.00
  Frctn Loss (ft)             0.17    Cum Volume (acre-ft)        0.35      18.51       0.34
  C & E Loss (ft)             0.07    Cum SA (acres)              0.20       5.01       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2814.33    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               3.41    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2810.91    Reach Len. (ft)           173.55     173.55     173.55
  Crit W.S. (ft)           2811.49    Flow Area (sq ft)                    182.10
  E.G. Slope (ft/ft)      0.002323    Area (sq ft)                         182.10
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             35.61    Top Width (ft)                        35.61
  Vel Total (ft/s)           14.83    Avg. Vel. (ft/s)                      14.83
  Max Chl Dpth (ft)           5.91    Hydr. Depth (ft)                       5.11
  Conv. Total (cfs)        56015.8    Conv. (cfs)                         56015.8
  Length Wtd. (ft)          173.55    Wetted Per. (ft)                      41.24
  Min Ch El (ft)           2805.00    Shear (lb/sq ft)                       0.64
  Alpha                       1.00    Stream Power (lb/ft s)    404.00     242.00     281.00
  Frctn Loss (ft)             0.18    Cum Volume (acre-ft)        0.28      16.05       0.27
  C & E Loss (ft)             0.09    Cum SA (acres)              0.17       4.82       0.15


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2811.65    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               2.83    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2808.82    Reach Len. (ft)           173.55     173.55     173.55
  Crit W.S. (ft)           2809.45    Flow Area (sq ft)                    111.17
  E.G. Slope (ft/ft)      0.003082    Area (sq ft)                         111.17
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
  Top Width (ft)             32.21    Top Width (ft)                        32.21
  Vel Total (ft/s)           13.49    Avg. Vel. (ft/s)                      13.49
```

Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)		3.45	
Conv. Total (cfs)	27021.3	Conv. (cfs)		27021.3	
Length Wtd. (ft)	173.55	Wetted Per. (ft)		35.85	
Min Ch El (ft)	2805.00	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)	404.00	242.00	281.00
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	0.13	10.65	0.13
C & E Loss (ft)	0.09	Cum SA (acres)	0.11	4.48	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2806.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.81	Wt. n-Val.		0.013	
W.S. Elev (ft)	2806.03	Reach Len. (ft)	173.55	173.55	173.55
Crit W.S. (ft)	2806.22	Flow Area (sq ft)		27.66	
E.G. Slope (ft/ft)	0.004194	Area (sq ft)		27.66	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	27.67	Top Width (ft)		27.67	
Vel Total (ft/s)	7.23	Avg. Vel. (ft/s)		7.23	
Max Chl Dpth (ft)	1.03	Hydr. Depth (ft)		1.00	
Conv. Total (cfs)	3088.3	Conv. (cfs)		3088.3	
Length Wtd. (ft)	173.55	Wetted Per. (ft)		28.66	
Min Ch El (ft)	2805.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)	404.00	242.00	281.00
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.01	2.85	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	3.82	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2811.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.81	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.78	Reach Len. (ft)	173.55	173.55	173.55
Crit W.S. (ft)	2809.45	Flow Area (sq ft)		109.99	
E.G. Slope (ft/ft)	0.003097	Area (sq ft)		109.99	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	32.15	Top Width (ft)		32.15	
Vel Total (ft/s)	13.46	Avg. Vel. (ft/s)		13.46	
Max Chl Dpth (ft)	3.78	Hydr. Depth (ft)		3.42	
Conv. Total (cfs)	26592.3	Conv. (cfs)		26592.3	
Length Wtd. (ft)	173.55	Wetted Per. (ft)		35.76	
Min Ch El (ft)	2805.00	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)	404.00	242.00	281.00
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	0.13	10.88	0.13
C & E Loss (ft)	0.09	Cum SA (acres)	0.11	4.51	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2810.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.33	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.85	Reach Len. (ft)	173.55	173.55	173.55

Crit W.S. (ft)	2808.42	Flow Area (sq ft)		80.81	
E.G. Slope (ft/ft)	0.003530	Area (sq ft)		80.81	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	30.64	Top Width (ft)		30.64	
Vel Total (ft/s)	12.25	Avg. Vel. (ft/s)		12.25	
Max Chl Dpth (ft)	2.85	Hydr. Depth (ft)		2.64	
Conv. Total (cfs)	16661.9	Conv. (cfs)		16661.9	
Length Wtd. (ft)	173.55	Wetted Per. (ft)		33.36	
Min Ch El (ft)	2805.00	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)	404.00	242.00	281.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.08	8.78	0.08
C & E Loss (ft)	0.08	Cum SA (acres)	0.08	4.36	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2808.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.80	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.05	Reach Len. (ft)	173.55	173.55	173.55
Crit W.S. (ft)	2807.52	Flow Area (sq ft)		56.59	
E.G. Slope (ft/ft)	0.004033	Area (sq ft)		56.59	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	29.32	Top Width (ft)		29.32	
Vel Total (ft/s)	10.78	Avg. Vel. (ft/s)		10.78	
Max Chl Dpth (ft)	2.05	Hydr. Depth (ft)		1.93	
Conv. Total (cfs)	9605.8	Conv. (cfs)		9605.8	
Length Wtd. (ft)	173.55	Wetted Per. (ft)		31.28	
Min Ch El (ft)	2805.00	Shear (lb/sq ft)		0.46	
Alpha	1.00	Stream Power (lb/ft s)	404.00	242.00	281.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.04	6.37	0.04
C & E Loss (ft)	0.06	Cum SA (acres)	0.06	4.16	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6840

INPUT
Description: Section 68+40 (approach to Tuscola Rd.)
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2816	138.63	2816	197	2811	203	2809	216	2809
222	2811.3	242	2811.3	243	2803.3	280	2803.3	281	2811.3
288.85	2813	326.77	2814	403.98	2815				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

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          242     281             38.4    38.4    38.4             .1       .3
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CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2814.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.95	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.27	Reach Len. (ft)	38.40	38.40	38.40
Crit W.S. (ft)	2809.44	Flow Area (sq ft)		148.87	
E.G. Slope (ft/ft)	0.006953	Area (sq ft)		148.87	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	37.99	Top Width (ft)		37.99	
Vel Total (ft/s)	21.16	Avg. Vel. (ft/s)		21.16	
Max Chl Dpth (ft)	3.97	Hydr. Depth (ft)		3.92	
Conv. Total (cfs)	37777.5	Conv. (cfs)		37777.5	
Length Wtd. (ft)	38.40	Wetted Per. (ft)		45.00	
Min Ch El (ft)	2803.30	Shear (lb/sq ft)		1.44	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.61	Cum Volume (acre-ft)	0.35	17.80	0.34
C & E Loss (ft)	0.35	Cum SA (acres)	0.20	4.86	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2813.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.53	Wt. n-Val.		0.013	
W.S. Elev (ft)	2806.82	Reach Len. (ft)	38.40	38.40	38.40
Crit W.S. (ft)	2808.73	Flow Area (sq ft)		131.65	
E.G. Slope (ft/ft)	0.007487	Area (sq ft)		131.65	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	37.88	Top Width (ft)		37.88	
Vel Total (ft/s)	20.51	Avg. Vel. (ft/s)		20.51	
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)		3.48	
Conv. Total (cfs)	31204.3	Conv. (cfs)		31204.3	
Length Wtd. (ft)	38.40	Wetted Per. (ft)		44.09	
Min Ch El (ft)	2803.30	Shear (lb/sq ft)		1.40	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.67	Cum Volume (acre-ft)	0.28	15.42	0.27
C & E Loss (ft)	0.31	Cum SA (acres)	0.17	4.67	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2810.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2805.54	Reach Len. (ft)	38.40	38.40	38.40
Crit W.S. (ft)	2806.98	Flow Area (sq ft)		83.48	
E.G. Slope (ft/ft)	0.009736	Area (sq ft)		83.48	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	37.56	Top Width (ft)		37.56	
Vel Total (ft/s)	17.97	Avg. Vel. (ft/s)		17.97	
Max Chl Dpth (ft)	2.24	Hydr. Depth (ft)		2.22	
Conv. Total (cfs)	15201.7	Conv. (cfs)		15201.7	
Length Wtd. (ft)	38.40	Wetted Per. (ft)		41.51	

Min Ch El (ft)	2803.30	Shear (lb/sq ft)		1.22	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.88	Cum Volume (acre-ft)	0.13	10.26	0.13
C & E Loss (ft)	0.22	Cum SA (acres)	0.11	4.34	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2805.42	Element			
Vel Head (ft)	1.59	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.83	Reach Len. (ft)	38.40	38.40	38.40
Crit W.S. (ft)	2804.26	Flow Area (sq ft)		19.77	
E.G. Slope (ft/ft)	0.018760	Area (sq ft)		19.77	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	37.13	Top Width (ft)		37.13	
Vel Total (ft/s)	10.11	Avg. Vel. (ft/s)		10.11	
Max Chl Dpth (ft)	0.53	Hydr. Depth (ft)		0.53	
Conv. Total (cfs)	1460.2	Conv. (cfs)		1460.2	
Length Wtd. (ft)	38.40	Wetted Per. (ft)		38.08	
Min Ch El (ft)	2803.30	Shear (lb/sq ft)		0.61	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	1.34	Cum Volume (acre-ft)	0.01	2.75	0.01
C & E Loss (ft)	0.08	Cum SA (acres)	0.03	3.69	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2810.50	Element			
Vel Head (ft)	4.98	Wt. n-Val.		0.013	
W.S. Elev (ft)	2805.52	Reach Len. (ft)	38.40	38.40	38.40
Crit W.S. (ft)	2806.95	Flow Area (sq ft)		82.64	
E.G. Slope (ft/ft)	0.009791	Area (sq ft)		82.64	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	37.55	Top Width (ft)		37.55	
Vel Total (ft/s)	17.91	Avg. Vel. (ft/s)		17.91	
Max Chl Dpth (ft)	2.22	Hydr. Depth (ft)		2.20	
Conv. Total (cfs)	14957.4	Conv. (cfs)		14957.4	
Length Wtd. (ft)	38.40	Wetted Per. (ft)		41.47	
Min Ch El (ft)	2803.30	Shear (lb/sq ft)		1.22	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.88	Cum Volume (acre-ft)	0.13	10.49	0.13
C & E Loss (ft)	0.22	Cum SA (acres)	0.11	4.37	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2809.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.95	Reach Len. (ft)	38.40	38.40	38.40
Crit W.S. (ft)	2806.09	Flow Area (sq ft)		61.23	
E.G. Slope (ft/ft)	0.011461	Area (sq ft)		61.23	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	37.41	Top Width (ft)		37.41	
Vel Total (ft/s)	16.17	Avg. Vel. (ft/s)		16.17	
Max Chl Dpth (ft)	1.65	Hydr. Depth (ft)		1.64	
Conv. Total (cfs)	9247.3	Conv. (cfs)		9247.3	
Length Wtd. (ft)	38.40	Wetted Per. (ft)		40.32	
Min Ch El (ft)	2803.30	Shear (lb/sq ft)		1.09	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	1.01	Cum Volume (acre-ft)	0.08	8.50	0.08
C & E Loss (ft)	0.17	Cum SA (acres)	0.08	4.22	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2807.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.46	Reach Len. (ft)	38.40	38.40	38.40
Crit W.S. (ft)	2805.32	Flow Area (sq ft)		43.25	
E.G. Slope (ft/ft)	0.013423	Area (sq ft)		43.25	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	37.29	Top Width (ft)		37.29	
Vel Total (ft/s)	14.10	Avg. Vel. (ft/s)		14.10	
Max Chl Dpth (ft)	1.16	Hydr. Depth (ft)		1.16	
Conv. Total (cfs)	5265.1	Conv. (cfs)		5265.1	
Length Wtd. (ft)	38.40	Wetted Per. (ft)		39.35	
Min Ch El (ft)	2803.30	Shear (lb/sq ft)		0.92	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	1.17	Cum Volume (acre-ft)	0.04	6.17	0.04
C & E Loss (ft)	0.13	Cum SA (acres)	0.06	4.03	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 6801.6

INPUT
Description: Section 68+01.6 (U/S face of Tuscola Rd.)
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2816  138.63    2816     197    2811     203    2809     216    2809
     222    2811     242    2811   242.1    2803     287    2803     287    2811
     307    2811  326.77    2814  403.98    2815

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .035     307    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     287               32      32      32             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2815       T
     287  403.98    2815       T
Left Levee      Station=     242      Elevation=    2815
Right Levee     Station=     287      Elevation=    2815

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)          2812.57    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              1.05    Wt. n-Val.                            0.013
  W.S. Elev (ft)          2811.51    Reach Len. (ft)            32.00      32.00      32.00
  Crit W.S. (ft)          2808.36    Flow Area (sq ft)                    382.70
  E.G. Slope (ft/ft)      0.000457   Area (sq ft)                         382.70
  Q Total (cfs)           3150.00    Flow (cfs)                          3150.00
  Top Width (ft)            45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)           8.23    Avg. Vel. (ft/s)                       8.23
  Max Chl Dpth (ft)          8.51    Hydr. Depth (ft)                       8.50
  Conv. Total (cfs)       147310.9   Conv. (cfs)                       147310.9
  Length Wtd. (ft)          32.00    Wetted Per. (ft)                      61.93
  Min Ch El (ft)          2803.00    Shear (lb/sq ft)                       0.18
  Alpha                      1.00    Stream Power (lb/ft s)    403.98     242.00     287.00
  Frctn Loss (ft)                    Cum Volume (acre-ft)        0.35      17.56       0.34
  C & E Loss (ft)                    Cum SA (acres)              0.20       4.83       0.17


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)          2811.64    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              0.95    Wt. n-Val.                            0.013
  W.S. Elev (ft)          2810.69    Reach Len. (ft)            32.00      32.00      32.00
  Crit W.S. (ft)          2807.84    Flow Area (sq ft)                    345.68
  E.G. Slope (ft/ft)      0.000455   Area (sq ft)                         345.68
  Q Total (cfs)           2700.00    Flow (cfs)                          2700.00
  Top Width (ft)            45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)           7.81    Avg. Vel. (ft/s)                       7.81
  Max Chl Dpth (ft)          7.69    Hydr. Depth (ft)                       7.68
  Conv. Total (cfs)       126586.1   Conv. (cfs)                       126586.1
  Length Wtd. (ft)          32.00    Wetted Per. (ft)                      60.28
  Min Ch El (ft)          2803.00    Shear (lb/sq ft)                       0.16
  Alpha                      1.00    Stream Power (lb/ft s)    403.98     242.00     287.00
  Frctn Loss (ft)                    Cum Volume (acre-ft)        0.28      15.21       0.27
  C & E Loss (ft)                    Cum SA (acres)              0.17       4.63       0.15
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2810.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.81	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2806.27	Flow Area (sq ft)		81.30	
E.G. Slope (ft/ft)	0.013091	Area (sq ft)		81.30	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	44.92	Top Width (ft)		44.92	
Vel Total (ft/s)	18.45	Avg. Vel. (ft/s)		18.45	
Max Chl Dpth (ft)	1.81	Hydr. Depth (ft)		1.81	
Conv. Total (cfs)	13110.3	Conv. (cfs)		13110.3	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		48.52	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	0.13	10.18	0.13
C & E Loss (ft)	0.03	Cum SA (acres)	0.11	4.30	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2804.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.38	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2803.86	Flow Area (sq ft)		61.73	
E.G. Slope (ft/ft)	0.000569	Area (sq ft)		61.73	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	44.92	Top Width (ft)		44.92	
Vel Total (ft/s)	3.24	Avg. Vel. (ft/s)		3.24	
Max Chl Dpth (ft)	1.37	Hydr. Depth (ft)		1.37	
Conv. Total (cfs)	8384.5	Conv. (cfs)		8384.5	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		47.65	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	2.72	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	3.65	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2810.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.25	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.79	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2806.24	Flow Area (sq ft)		80.51	
E.G. Slope (ft/ft)	0.013153	Area (sq ft)		80.51	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	44.92	Top Width (ft)		44.92	
Vel Total (ft/s)	18.38	Avg. Vel. (ft/s)		18.38	
Max Chl Dpth (ft)	1.79	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	12905.0	Conv. (cfs)		12905.0	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		48.49	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		1.36	

Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	0.13	10.42	0.13
C & E Loss (ft)	0.03	Cum SA (acres)	0.11	4.33	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2808.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.15	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.35	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2805.48	Flow Area (sq ft)		60.58	
E.G. Slope (ft/ft)	0.014823	Area (sq ft)		60.58	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	44.92	Top Width (ft)		44.92	
Vel Total (ft/s)	16.34	Avg. Vel. (ft/s)		16.34	
Max Chl Dpth (ft)	1.35	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	8131.3	Conv. (cfs)		8131.3	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		47.60	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		1.18	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.50	Cum Volume (acre-ft)	0.08	8.44	0.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.08	4.19	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2806.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.98	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.98	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2804.80	Flow Area (sq ft)		44.03	
E.G. Slope (ft/ft)	0.015965	Area (sq ft)		44.03	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	44.91	Top Width (ft)		44.91	
Vel Total (ft/s)	13.85	Avg. Vel. (ft/s)		13.85	
Max Chl Dpth (ft)	0.98	Hydr. Depth (ft)		0.98	
Conv. Total (cfs)	4827.7	Conv. (cfs)		4827.7	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		46.86	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)	0.04	6.13	0.04
C & E Loss (ft)	0.03	Cum SA (acres)	0.06	3.99	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 6785.6

INPUT
Description: Tuscola Road
Distance from Upstream XS = .2
Deck/Roadway Width = 31.5
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 5

```
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     140  2814.5             197  2814.5             242  2814.5
     280  2814.5             360  2814.5

Upstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2816  138.63    2816     197    2811     203    2809     216    2809
     222    2811     242    2811   242.1    2803     287    2803     287    2811
     307    2811  326.77    2814  403.98    2815

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .035     307    .016

Bank Sta: Left   Right    Coeff Contr.   Expan.
           242     287             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2815       T
     287  403.98    2815       T
Left Levee      Station=     242      Elevation=    2815
Right Levee     Station=     287      Elevation=    2815

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     140  2814.5             197  2814.5             242  2814.5
     280  2814.5             360  2814.5

Downstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2816  138.63    2816     197    2811     203    2809     216    2809
     222    2811     242    2811   242.1    2803     287    2803     287    2811
     307    2811  326.77    2814  403.98    2815

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .035     307    .016

Bank Sta: Left   Right    Coeff Contr.   Expan.
           242     287             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242  2811.5       T
     287  403.98  2811.5       T
Left Levee      Station=     242      Elevation=  2811.5
Right Levee     Station=     287      Elevation=  2811.5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  2

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
```

```
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .1    31.8     .013     .013        0                   .5                1
Upstream   Elevation =  2809
           Centerline Station =  209.5
Downstream Elevation =  2809
           Centerline Station =  209.5

Culvert Name     Shape      Rise    Span
Culvert #2           Box     7.5      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  1      31     .013     .013        0                   .5                1
Number of Barrels =  3
Upstream   Elevation =  2803
Centerline Stations
    Sta.    Sta.    Sta.
   249.5   264.5   279.5
Downstream Elevation =  2803
Centerline Stations
    Sta.    Sta.    Sta.
   249.5   264.5   279.5

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)         22.28    Culv Full Len (ft)         18.31
  # Barrels                      1    Culv Vel US (ft/s)          7.09
  Q Barrel (cfs)             22.28    Culv Vel DS (ft/s)          7.89
  E.G. US. (ft)            2812.57    Culv Inv El Up (ft)      2809.00
  W.S. US. (ft)            2811.51    Culv Inv El Dn (ft)      2809.00
  E.G. DS (ft)             2811.02    Culv Frctn Ls (ft)          0.52
  W.S. DS (ft)             2808.36    Culv Exit Loss (ft)         0.64
  Delta EG (ft)               1.55    Culv Entr Loss (ft)         0.39
  Delta WS (ft)               3.15    Q Weir (cfs)
  E.G. IC (ft)             2812.34    Weir Sta Lft (ft)
  E.G. OC (ft)             2812.35    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2811.00    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2810.68    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.68    Min El Weir Flow (ft)    2814.51


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)         14.88    Culv Full Len (ft)
  # Barrels                      1    Culv Vel US (ft/s)          5.07
  Q Barrel (cfs)             14.88    Culv Vel DS (ft/s)          6.38
  E.G. US. (ft)            2811.64    Culv Inv El Up (ft)      2809.00
  W.S. US. (ft)            2810.69    Culv Inv El Dn (ft)      2809.00
  E.G. DS (ft)             2810.23    Culv Frctn Ls (ft)          0.14
  W.S. DS (ft)             2807.84    Culv Exit Loss (ft)         0.79
  Delta EG (ft)               1.41    Culv Entr Loss (ft)         0.20
  Delta WS (ft)               2.85    Q Weir (cfs)
  E.G. IC (ft)             2811.24    Weir Sta Lft (ft)
  E.G. OC (ft)             2811.36    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2810.76    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2810.39    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.39    Min El Weir Flow (ft)    2814.51
```

```
CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1    Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2809.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2809.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2814.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1    Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)            2804.54    Culv Inv El Up (ft)      2809.00
  W.S. US. (ft)            2804.38    Culv Inv El Dn (ft)      2809.00
  E.G. DS (ft)             2804.28    Culv Frctn Ls (ft)
  W.S. DS (ft)             2803.85    Culv Exit Loss (ft)
  Delta EG (ft)               0.26    Culv Entr Loss (ft)
  Delta WS (ft)               0.52    Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2814.51


Warning: For this profile, the culvert is located in an ineffective flow region.

CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1    Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2809.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2809.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
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  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2814.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2809.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2809.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2814.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2809.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2809.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2814.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)        3127.72   Culv Full Len (ft)
  # Barrels                       3   Culv Vel US (ft/s)         12.13
  Q Barrel (cfs)            1042.57   Culv Vel DS (ft/s)         13.38
  E.G. US. (ft)             2812.57   Culv Inv El Up (ft)      2803.00
  W.S. US. (ft)             2811.51   Culv Inv El Dn (ft)      2803.00
  E.G. DS (ft)              2811.02   Culv Frctn Ls (ft)          0.08
  W.S. DS (ft)              2808.36   Culv Exit Loss (ft)         0.33
  Delta EG (ft)                1.55   Culv Entr Loss (ft)         1.14
```

Delta WS (ft)	3.15	Q Weir (cfs)	
E.G. IC (ft)	2812.26	Weir Sta Lft (ft)	
E.G. OC (ft)	2812.57	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2809.14	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2808.56	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.56	Min El Weir Flow (ft)	2814.51

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	2685.12	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	11.49
Q Barrel (cfs)	895.04	Culv Vel DS (ft/s)	12.72
E.G. US. (ft)	2811.64	Culv Inv El Up (ft)	2803.00
W.S. US. (ft)	2810.69	Culv Inv El Dn (ft)	2803.00
E.G. DS (ft)	2810.23	Culv Frctn Ls (ft)	0.08
W.S. DS (ft)	2807.84	Culv Exit Loss (ft)	0.30
Delta EG (ft)	1.41	Culv Entr Loss (ft)	1.02
Delta WS (ft)	2.85	Q Weir (cfs)	
E.G. IC (ft)	2811.15	Weir Sta Lft (ft)	
E.G. OC (ft)	2811.64	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2808.57	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2808.03	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.03	Min El Weir Flow (ft)	2814.51

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2803.00
W.S. US. (ft)		Culv Inv El Dn (ft)	2803.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2814.51

Warning: The program cannot perform supercritical flow through multiple culverts. The program sets the water surface to critical
depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	200.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	4.31
Q Barrel (cfs)	66.67	Culv Vel DS (ft/s)	5.35
E.G. US. (ft)	2804.54	Culv Inv El Up (ft)	2803.00
W.S. US. (ft)	2804.38	Culv Inv El Dn (ft)	2803.00
E.G. DS (ft)	2804.28	Culv Frctn Ls (ft)	0.06

W.S. DS (ft)	2803.85	Culv Exit Loss (ft)	0.06
Delta EG (ft)	0.26	Culv Entr Loss (ft)	0.14
Delta WS (ft)	0.52	Q Weir (cfs)	
E.G. IC (ft)	2804.38	Weir Sta Lft (ft)	
E.G. OC (ft)	2804.54	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2804.10	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2803.89	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.89	Min El Weir Flow (ft)	2814.51

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2803.00
W.S. US. (ft)		Culv Inv El Dn (ft)	2803.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2814.51

Warning: The program cannot perform supercritical flow through multiple culverts. The program sets the water surface to critical
depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2803.00
W.S. US. (ft)		Culv Inv El Dn (ft)	2803.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2814.51

Warning: The program cannot perform supercritical flow through multiple culverts. The program sets the water surface to critical
depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)		Culv Full Len (ft)
# Barrels	3	Culv Vel US (ft/s)
Q Barrel (cfs)		Culv Vel DS (ft/s)

E.G. US. (ft)		Culv Inv El Up (ft)	2803.00
W.S. US. (ft)		Culv Inv El Dn (ft)	2803.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2814.51

Warning: The program cannot perform supercritical flow through multiple culverts. The program sets the water surface to critical
depth at the downstream end of the culverts and continues on.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6769.6

INPUT
Description: Section 67+69.6 (D/S face of Tuscola Rd.)
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2816	138.63	2816	197	2811	203	2809	216	2809
222	2811	242	2811	242.1	2803	287	2803	287	2811
307	2811	326.77	2814	403.98	2815				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	287	.035	307	.016

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	287	62.5	62.5	62.5	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2811.5	T
287	403.98	2811.5	T

Left Levee Station= 242 Elevation= 2811.5
Right Levee Station= 287 Elevation= 2811.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2811.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.66	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.36	Reach Len. (ft)	62.50	62.50	62.50
Crit W.S. (ft)	2808.36	Flow Area (sq ft)		240.86	
E.G. Slope (ft/ft)	0.001855	Area (sq ft)		240.86	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	44.97	Top Width (ft)		44.97	
Vel Total (ft/s)	13.08	Avg. Vel. (ft/s)		13.08	
Max Chl Dpth (ft)	5.36	Hydr. Depth (ft)		5.36	
Conv. Total (cfs)	73142.0	Conv. (cfs)		73142.0	
Length Wtd. (ft)	62.50	Wetted Per. (ft)		55.62	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.35	17.50	0.34
C & E Loss (ft)	0.03	Cum SA (acres)	0.20	4.80	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2810.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.39	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.84	Reach Len. (ft)	62.50	62.50	62.50
Crit W.S. (ft)	2807.84	Flow Area (sq ft)		217.50	
E.G. Slope (ft/ft)	0.001867	Area (sq ft)		217.50	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	44.96	Top Width (ft)		44.96	
Vel Total (ft/s)	12.41	Avg. Vel. (ft/s)		12.41	
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)		4.84	
Conv. Total (cfs)	62485.9	Conv. (cfs)		62485.9	
Length Wtd. (ft)	62.50	Wetted Per. (ft)		54.58	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.46	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.28	15.16	0.27
C & E Loss (ft)	0.03	Cum SA (acres)	0.17	4.60	0.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2807.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.62	Wt. n-Val.		0.013	
W.S. Elev (ft)	2806.27	Reach Len. (ft)	62.50	62.50	62.50
Crit W.S. (ft)	2806.27	Flow Area (sq ft)		146.81	
E.G. Slope (ft/ft)	0.001973	Area (sq ft)		146.81	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	44.94	Top Width (ft)		44.94	
Vel Total (ft/s)	10.22	Avg. Vel. (ft/s)		10.22	
Max Chl Dpth (ft)	3.27	Hydr. Depth (ft)		3.27	
Conv. Total (cfs)	33766.1	Conv. (cfs)		33766.1	
Length Wtd. (ft)	62.50	Wetted Per. (ft)		51.44	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	10.18	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	4.27	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2804.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.85	Reach Len. (ft)	62.50	62.50	62.50
Crit W.S. (ft)	2803.85	Flow Area (sq ft)		38.33	
E.G. Slope (ft/ft)	0.002705	Area (sq ft)		38.33	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	44.91	Top Width (ft)		44.91	
Vel Total (ft/s)	5.22	Avg. Vel. (ft/s)		5.22	
Max Chl Dpth (ft)	0.85	Hydr. Depth (ft)		0.85	
Conv. Total (cfs)	3845.3	Conv. (cfs)		3845.3	
Length Wtd. (ft)	62.50	Wetted Per. (ft)		46.61	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.01	2.71	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	3.62	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2807.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.60	Wt. n-Val.		0.013	
W.S. Elev (ft)	2806.25	Reach Len. (ft)	62.50	62.50	62.50
Crit W.S. (ft)	2806.25	Flow Area (sq ft)		145.83	
E.G. Slope (ft/ft)	0.001963	Area (sq ft)		145.83	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	44.94	Top Width (ft)		44.94	
Vel Total (ft/s)	10.15	Avg. Vel. (ft/s)		10.15	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		3.24	
Conv. Total (cfs)	33407.5	Conv. (cfs)		33407.5	
Length Wtd. (ft)	62.50	Wetted Per. (ft)		51.39	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	10.42	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	4.30	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2806.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.		0.013	
W.S. Elev (ft)	2805.45	Reach Len. (ft)	62.50	62.50	62.50
Crit W.S. (ft)	2805.45	Flow Area (sq ft)		109.85	

E.G. Slope (ft/ft)	0.002164	Area (sq ft)		109.85	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	44.93	Top Width (ft)		44.93	
Vel Total (ft/s)	9.01	Avg. Vel. (ft/s)		9.01	
Max Chl Dpth (ft)	2.45	Hydr. Depth (ft)		2.44	
Conv. Total (cfs)	21280.0	Conv. (cfs)		21280.0	
Length Wtd. (ft)	62.50	Wetted Per. (ft)		49.79	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	8.44	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	4.16	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2805.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.88	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.80	Reach Len. (ft)	62.50	62.50	62.50
Crit W.S. (ft)	2804.80	Flow Area (sq ft)		80.88	
E.G. Slope (ft/ft)	0.002202	Area (sq ft)		80.88	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	44.92	Top Width (ft)		44.92	
Vel Total (ft/s)	7.54	Avg. Vel. (ft/s)		7.54	
Max Chl Dpth (ft)	1.80	Hydr. Depth (ft)		1.80	
Conv. Total (cfs)	12999.0	Conv. (cfs)		12999.0	
Length Wtd. (ft)	62.50	Wetted Per. (ft)		48.50	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	6.13	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	3.96	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6707.1

INPUT
Description: Section 67+07.1
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2811	138.63	2811	197	2806	203	2803	216	2803
222	2806	242	2806	254	2798	269	2798	281	2806
288.85	2808	326.77	2809	403.98	2810				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	322.1	322.1	322.1	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2808	T
281	403.98	2808	T

Left Levee Station= 242 Elevation= 2808
Right Levee Station= 281 Elevation= 2808

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2810.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.47	Reach Len. (ft)	322.10	322.10	322.10
Crit W.S. (ft)	2806.36	Flow Area (sq ft)		159.73	
E.G. Slope (ft/ft)	0.004437	Area (sq ft)		159.73	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	34.40	Top Width (ft)		34.40	
Vel Total (ft/s)	19.72	Avg. Vel. (ft/s)		19.72	
Max Chl Dpth (ft)	6.47	Hydr. Depth (ft)		4.64	
Conv. Total (cfs)	47291.0	Conv. (cfs)		47291.0	
Length Wtd. (ft)	322.10	Wetted Per. (ft)		38.32	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		1.15	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.35	17.21	0.34
C & E Loss (ft)	0.34	Cum SA (acres)	0.20	4.74	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2809.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.86	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.85	Reach Len. (ft)	322.10	322.10	322.10
Crit W.S. (ft)	2805.74	Flow Area (sq ft)		138.94	
E.G. Slope (ft/ft)	0.004788	Area (sq ft)		138.94	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	32.54	Top Width (ft)		32.54	
Vel Total (ft/s)	19.43	Avg. Vel. (ft/s)		19.43	
Max Chl Dpth (ft)	5.85	Hydr. Depth (ft)		4.27	
Conv. Total (cfs)	39020.9	Conv. (cfs)		39020.9	
Length Wtd. (ft)	322.10	Wetted Per. (ft)		36.08	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		1.15	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.28	14.90	0.27
C & E Loss (ft)	0.35	Cum SA (acres)	0.17	4.54	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2805.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.60	Reach Len. (ft)	322.10	322.10	322.10
Crit W.S. (ft)	2803.60	Flow Area (sq ft)		130.87	
E.G. Slope (ft/ft)	0.001744	Area (sq ft)		130.87	

Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	31.78	Top Width (ft)		31.78	
Vel Total (ft/s)	11.46	Avg. Vel. (ft/s)		11.46	
Max Chl Dpth (ft)	5.59	Hydr. Depth (ft)		4.12	
Conv. Total (cfs)	35919.7	Conv. (cfs)		35919.7	
Length Wtd. (ft)	322.10	Wetted Per. (ft)		35.17	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)	0.13	9.99	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	4.22	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2803.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.71	Wt. n-Val.		0.013	
W.S. Elev (ft)	2798.72	Reach Len. (ft)	322.10	322.10	322.10
Crit W.S. (ft)	2799.67	Flow Area (sq ft)		11.49	
E.G. Slope (ft/ft)	0.040889	Area (sq ft)		11.49	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.14	Top Width (ft)		17.14	
Vel Total (ft/s)	17.41	Avg. Vel. (ft/s)		17.41	
Max Chl Dpth (ft)	0.71	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	989.1	Conv. (cfs)		989.1	
Length Wtd. (ft)	322.10	Wetted Per. (ft)		17.58	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	0.01	2.67	0.01
C & E Loss (ft)	0.43	Cum SA (acres)	0.03	3.58	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2805.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.56	Reach Len. (ft)	322.10	322.10	322.10
Crit W.S. (ft)	2803.56	Flow Area (sq ft)		129.76	
E.G. Slope (ft/ft)	0.001738	Area (sq ft)		129.76	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	31.68	Top Width (ft)		31.68	
Vel Total (ft/s)	11.41	Avg. Vel. (ft/s)		11.41	

Max Chl Dpth (ft)	5.56	Hydr. Depth (ft)		4.10	
Conv. Total (cfs)	35496.2	Conv. (cfs)		35496.2	
Length Wtd. (ft)	322.10	Wetted Per. (ft)		35.05	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)	0.13	10.22	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	4.25	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2804.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.67	Wt. n-Val.		0.013	
W.S. Elev (ft)	2802.42	Reach Len. (ft)	322.10	322.10	322.10
Crit W.S. (ft)	2802.42	Flow Area (sq ft)		95.59	
E.G. Slope (ft/ft)	0.001824	Area (sq ft)		95.59	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	28.26	Top Width (ft)		28.26	
Vel Total (ft/s)	10.36	Avg. Vel. (ft/s)		10.36	
Max Chl Dpth (ft)	4.42	Hydr. Depth (ft)		3.38	
Conv. Total (cfs)	23179.3	Conv. (cfs)		23179.3	
Length Wtd. (ft)	322.10	Wetted Per. (ft)		30.93	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	0.08	8.29	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	4.10	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2802.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.32	Wt. n-Val.		0.013	
W.S. Elev (ft)	2801.32	Reach Len. (ft)	322.10	322.10	322.10
Crit W.S. (ft)	2801.32	Flow Area (sq ft)		66.26	
E.G. Slope (ft/ft)	0.001956	Area (sq ft)		66.26	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	24.95	Top Width (ft)		24.95	

Vel Total (ft/s)	9.21	Avg. Vel. (ft/s)		9.21	
Max Chl Dpth (ft)	3.32	Hydr. Depth (ft)		2.66	
Conv. Total (cfs)	13791.9	Conv. (cfs)		13791.9	
Length Wtd. (ft)	322.10	Wetted Per. (ft)		26.96	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	0.04	6.03	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	3.91	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6385

INPUT
Description: Section 63+85 Approach
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2809	138.63	2809	197	2804.2	203	2800	216	2800
222	2804.2	242	2804.2	254	2796.2	269	2796.2	281	2804.2
288.85	2806	326.77	2807	403.98	2808				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	281	40	40	40	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2806	T
281	403.98	2806	T

Left Levee Station= 242 Elevation= 2806
Right Levee Station= 281 Elevation= 2806

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2808.97	Element			
Vel Head (ft)	6.45	Wt. n-Val.		0.013	
W.S. Elev (ft)	2802.52	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	2804.53	Flow Area (sq ft)		154.53	
E.G. Slope (ft/ft)	0.004860	Area (sq ft)		154.53	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	33.94	Top Width (ft)		33.94	
Vel Total (ft/s)	20.38	Avg. Vel. (ft/s)		20.38	
Max Chl Dpth (ft)	6.31	Hydr. Depth (ft)		4.55	
Conv. Total (cfs)	45186.4	Conv. (cfs)		45186.4	
Length Wtd. (ft)	40.00	Wetted Per. (ft)		37.77	
Min Ch El (ft)	2796.20	Shear (lb/sq ft)		1.24	

Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	1.49	Cum Volume (acre-ft)	0.35	16.05	0.34
C & E Loss (ft)	0.04	Cum SA (acres)	0.20	4.49	0.17

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2808.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2801.95	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	2803.94	Flow Area (sq ft)		135.80	
E.G. Slope (ft/ft)	0.005101	Area (sq ft)		135.80	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	32.25	Top Width (ft)		32.25	
Vel Total (ft/s)	19.88	Avg. Vel. (ft/s)		19.88	
Max Chl Dpth (ft)	5.75	Hydr. Depth (ft)		4.21	
Conv. Total (cfs)	37804.0	Conv. (cfs)		37804.0	
Length Wtd. (ft)	40.00	Wetted Per. (ft)		35.73	
Min Ch El (ft)	2796.20	Shear (lb/sq ft)		1.21	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	1.59	Cum Volume (acre-ft)	0.28	13.88	0.27
C & E Loss (ft)	0.03	Cum SA (acres)	0.17	4.30	0.15

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2804.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2800.52	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	2801.80	Flow Area (sq ft)		92.86	
E.G. Slope (ft/ft)	0.004543	Area (sq ft)		92.86	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	27.97	Top Width (ft)		27.97	
Vel Total (ft/s)	16.15	Avg. Vel. (ft/s)		16.15	
Max Chl Dpth (ft)	4.32	Hydr. Depth (ft)		3.32	
Conv. Total (cfs)	22254.2	Conv. (cfs)		22254.2	
Length Wtd. (ft)	40.00	Wetted Per. (ft)		30.58	
Min Ch El (ft)	2796.20	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.86	Cum Volume (acre-ft)	0.13	9.16	0.13
C & E Loss (ft)	0.20	Cum SA (acres)	0.11	4.00	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2798.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.24	Wt. n-Val.		0.013	
W.S. Elev (ft)	2797.52	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	2797.87	Flow Area (sq ft)		22.39	
E.G. Slope (ft/ft)	0.005170	Area (sq ft)		22.39	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.96	Top Width (ft)		18.96	
Vel Total (ft/s)	8.93	Avg. Vel. (ft/s)		8.93	
Max Chl Dpth (ft)	1.32	Hydr. Depth (ft)		1.18	
Conv. Total (cfs)	2781.5	Conv. (cfs)		2781.5	
Length Wtd. (ft)	40.00	Wetted Per. (ft)		19.75	
Min Ch El (ft)	2796.20	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	3.62	Cum Volume (acre-ft)	0.01	2.55	0.01
C & E Loss (ft)	1.04	Cum SA (acres)	0.03	3.44	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2804.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.03	Wt. n-Val.		0.013	
W.S. Elev (ft)	2800.49	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	2801.76	Flow Area (sq ft)		91.82	
E.G. Slope (ft/ft)	0.004565	Area (sq ft)		91.82	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	27.86	Top Width (ft)		27.86	
Vel Total (ft/s)	16.12	Avg. Vel. (ft/s)		16.12	
Max Chl Dpth (ft)	4.29	Hydr. Depth (ft)		3.30	
Conv. Total (cfs)	21905.9	Conv. (cfs)		21905.9	
Length Wtd. (ft)	40.00	Wetted Per. (ft)		30.45	
Min Ch El (ft)	2796.20	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.86	Cum Volume (acre-ft)	0.13	9.41	0.13
C & E Loss (ft)	0.20	Cum SA (acres)	0.11	4.03	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2802.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.46	Wt. n-Val.		0.013	

W.S. Elev (ft)	2799.52	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	2800.62	Flow Area (sq ft)		66.31	
E.G. Slope (ft/ft)	0.005140	Area (sq ft)		66.31	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	24.96	Top Width (ft)		24.96	
Vel Total (ft/s)	14.93	Avg. Vel. (ft/s)		14.93	
Max Chl Dpth (ft)	3.32	Hydr. Depth (ft)		2.66	
Conv. Total (cfs)	13808.2	Conv. (cfs)		13808.2	
Length Wtd. (ft)	40.00	Wetted Per. (ft)		26.97	
Min Ch El (ft)	2796.20	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.92	Cum Volume (acre-ft)	0.08	7.70	0.08
C & E Loss (ft)	0.18	Cum SA (acres)	0.08	3.91	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2801.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.84	Wt. n-Val.		0.013	
W.S. Elev (ft)	2798.62	Reach Len. (ft)	40.00	40.00	40.00
Crit W.S. (ft)	2799.52	Flow Area (sq ft)		45.10	
E.G. Slope (ft/ft)	0.005948	Area (sq ft)		45.10	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	22.26	Top Width (ft)		22.26	
Vel Total (ft/s)	13.53	Avg. Vel. (ft/s)		13.53	
Max Chl Dpth (ft)	2.42	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	7909.7	Conv. (cfs)		7909.7	
Length Wtd. (ft)	40.00	Wetted Per. (ft)		23.73	
Min Ch El (ft)	2796.20	Shear (lb/sq ft)		0.71	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	1.02	Cum Volume (acre-ft)	0.04	5.61	0.04
C & E Loss (ft)	0.15	Cum SA (acres)	0.06	3.73	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6345

INPUT
Description: Section 63+45
Station Elevation Data num= 13

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2809  138.63    2809     197    2804     203    2800     216    2800
     222    2804     242    2804     254    2796     269    2796     281    2804
  288.85    2806  326.77    2807  403.98    2808

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     281    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     281               .3      .3      .3             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242  2805.5       T
     281  403.98  2805.5       T
Left Levee      Station=     242      Elevation=  2805.5
Right Levee     Station=     281      Elevation=  2805.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2808.78    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               6.47    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2802.31    Reach Len. (ft)              0.30       0.30       0.30
  Crit W.S. (ft)           2804.36    Flow Area (sq ft)                     154.36
  E.G. Slope (ft/ft)      0.004875    Area (sq ft)                          154.36
  Q Total (cfs)            3150.00    Flow (cfs)                           3150.00
  Top Width (ft)             33.93    Top Width (ft)                         33.93
  Vel Total (ft/s)           20.41    Avg. Vel. (ft/s)                       20.41
  Max Chl Dpth (ft)           6.31    Hydr. Depth (ft)                        4.55
  Conv. Total (cfs)        45116.3    Conv. (cfs)                          45116.3
  Length Wtd. (ft)            0.30    Wetted Per. (ft)                       37.75
  Min Ch El (ft)           2796.00    Shear (lb/sq ft)                        1.24
  Alpha                       1.00    Stream Power (lb/ft s)     403.98     242.00     281.00
  Frctn Loss (ft)             0.19    Cum Volume (acre-ft)         0.35      15.91       0.34
  C & E Loss (ft)             0.00    Cum SA (acres)               0.20       4.45       0.17


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2807.88    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               6.13    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2801.75    Reach Len. (ft)              0.30       0.30       0.30
  Crit W.S. (ft)           2803.71    Flow Area (sq ft)                     135.88
  E.G. Slope (ft/ft)      0.005093    Area (sq ft)                          135.88
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             32.25    Top Width (ft)                         32.25
  Vel Total (ft/s)           19.87    Avg. Vel. (ft/s)                       19.87
  Max Chl Dpth (ft)           5.75    Hydr. Depth (ft)                        4.21
  Conv. Total (cfs)        37834.4    Conv. (cfs)                          37834.4
  Length Wtd. (ft)            0.30    Wetted Per. (ft)                       35.74
  Min Ch El (ft)           2796.00    Shear (lb/sq ft)                        1.21
  Alpha                       1.00    Stream Power (lb/ft s)     403.98     242.00     281.00
  Frctn Loss (ft)             0.20    Cum Volume (acre-ft)         0.28      13.76       0.27
  C & E Loss (ft)             0.00    Cum SA (acres)               0.17       4.27       0.15


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2804.39    Element                    Left OB    Channel   Right OB
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Vel Head (ft)	4.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2800.31	Reach Len. (ft)	0.30	0.30	0.30
Crit W.S. (ft)	2801.60	Flow Area (sq ft)		92.57	
E.G. Slope (ft/ft)	0.004583	Area (sq ft)		92.57	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	27.94	Top Width (ft)		27.94	
Vel Total (ft/s)	16.20	Avg. Vel. (ft/s)		16.20	
Max Chl Dpth (ft)	4.31	Hydr. Depth (ft)		3.31	
Conv. Total (cfs)	22157.7	Conv. (cfs)		22157.7	
Length Wtd. (ft)	0.30	Wetted Per. (ft)		30.55	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.13	9.07	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	3.97	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2798.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.24	Wt. n-Val.		0.013	
W.S. Elev (ft)	2797.32	Reach Len. (ft)	0.30	0.30	0.30
Crit W.S. (ft)	2797.66	Flow Area (sq ft)		22.39	
E.G. Slope (ft/ft)	0.005170	Area (sq ft)		22.39	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.96	Top Width (ft)		18.96	
Vel Total (ft/s)	8.93	Avg. Vel. (ft/s)		8.93	
Max Chl Dpth (ft)	1.32	Hydr. Depth (ft)		1.18	
Conv. Total (cfs)	2781.5	Conv. (cfs)		2781.5	
Length Wtd. (ft)	0.30	Wetted Per. (ft)		19.75	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	0.01	2.53	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	3.43	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2804.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2800.28	Reach Len. (ft)	0.30	0.30	0.30
Crit W.S. (ft)	2801.56	Flow Area (sq ft)		91.55	
E.G. Slope (ft/ft)	0.004603	Area (sq ft)		91.55	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	27.83	Top Width (ft)		27.83	
Vel Total (ft/s)	16.17	Avg. Vel. (ft/s)		16.17	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		3.29	
Conv. Total (cfs)	21814.8	Conv. (cfs)		21814.8	
Length Wtd. (ft)	0.30	Wetted Per. (ft)		30.42	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.13	9.32	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	4.00	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2802.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.43	Wt. n-Val.		0.013	
W.S. Elev (ft)	2799.33	Reach Len. (ft)	0.30	0.30	0.30
Crit W.S. (ft)	2800.42	Flow Area (sq ft)		66.66	
E.G. Slope (ft/ft)	0.005064	Area (sq ft)		66.66	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	25.00	Top Width (ft)		25.00	
Vel Total (ft/s)	14.85	Avg. Vel. (ft/s)		14.85	
Max Chl Dpth (ft)	3.33	Hydr. Depth (ft)		2.67	
Conv. Total (cfs)	13911.8	Conv. (cfs)		13911.8	
Length Wtd. (ft)	0.30	Wetted Per. (ft)		27.02	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.08	7.63	0.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.08	3.88	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2801.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.75	Wt. n-Val.		0.013	
W.S. Elev (ft)	2798.45	Reach Len. (ft)	0.30	0.30	0.30
Crit W.S. (ft)	2799.32	Flow Area (sq ft)		45.80	
E.G. Slope (ft/ft)	0.005687	Area (sq ft)		45.80	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	22.36	Top Width (ft)		22.36	
Vel Total (ft/s)	13.32	Avg. Vel. (ft/s)		13.32	
Max Chl Dpth (ft)	2.45	Hydr. Depth (ft)		2.05	
Conv. Total (cfs)	8089.0	Conv. (cfs)		8089.0	
Length Wtd. (ft)	0.30	Wetted Per. (ft)		23.84	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	281.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.04	5.57	0.04
C & E Loss (ft)	0.03	Cum SA (acres)	0.06	3.71	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6344.7

INPUT
Description: Section 63+44.7 (U/S face of Quantico Rd.)
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2809	138.63	2809	197	2804	203	2800	216	2800
222	2804	242	2804	242	2796	287	2796	287	2804
307	2804	326.77	2807	403.98	2808				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	222	.016	242	.013	287	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
242	287	32.1	32.1	32.1	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	242	2808.5	T

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     287  403.98  2808.5       T
Left Levee      Station=     242      Elevation=  2808.5
Right Levee     Station=     287      Elevation=  2808.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2806.06    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.91    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2805.15    Reach Len. (ft)            32.10      32.10      32.10
  Crit W.S. (ft)           2801.33    Flow Area (sq ft)                    411.54
  E.G. Slope (ft/ft)      0.000369    Area (sq ft)                         411.54
  Q Total (cfs)            3150.00    Flow (cfs)                          3150.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)            7.65    Avg. Vel. (ft/s)                       7.65
  Max Chl Dpth (ft)           9.15    Hydr. Depth (ft)                       9.15
  Conv. Total (cfs)       163872.9    Conv. (cfs)                        163872.9
  Length Wtd. (ft)           32.10    Wetted Per. (ft)                      63.29
  Min Ch El (ft)           2796.00    Shear (lb/sq ft)                       0.15
  Alpha                       1.00    Stream Power (lb/ft s)    403.98     242.00     287.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.35      15.91       0.34
  C & E Loss (ft)                     Cum SA (acres)              0.20       4.45       0.17


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2807.58    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               9.10    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2798.48    Reach Len. (ft)            32.10      32.10      32.10
  Crit W.S. (ft)           2800.82    Flow Area (sq ft)                    111.51
  E.G. Slope (ft/ft)      0.015382    Area (sq ft)                         111.51
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)           24.21    Avg. Vel. (ft/s)                      24.21
  Max Chl Dpth (ft)           2.48    Hydr. Depth (ft)                       2.48
  Conv. Total (cfs)        21770.0    Conv. (cfs)                         21770.0
  Length Wtd. (ft)           32.10    Wetted Per. (ft)                      49.96
  Min Ch El (ft)           2796.00    Shear (lb/sq ft)                       2.14
  Alpha                       1.00    Stream Power (lb/ft s)    403.98     242.00     287.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.28      13.76       0.27
  C & E Loss (ft)             0.30    Cum SA (acres)              0.17       4.27       0.15


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2804.14    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               6.52    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2797.63    Reach Len. (ft)            32.10      32.10      32.10
  Crit W.S. (ft)           2799.26    Flow Area (sq ft)                     73.22
  E.G. Slope (ft/ft)      0.018420    Area (sq ft)                          73.22
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
  Top Width (ft)             45.00    Top Width (ft)                        45.00
  Vel Total (ft/s)           20.49    Avg. Vel. (ft/s)                      20.49
  Max Chl Dpth (ft)           1.63    Hydr. Depth (ft)                       1.63
```

Conv. Total (cfs)	11052.2	Conv. (cfs)		11052.2	
Length Wtd. (ft)	32.10	Wetted Per. (ft)		48.25	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		1.74	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	9.07	0.13
C & E Loss (ft)	0.24	Cum SA (acres)	0.11	3.97	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2798.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2796.38	Reach Len. (ft)	32.10	32.10	32.10
Crit W.S. (ft)	2796.85	Flow Area (sq ft)		17.26	
E.G. Slope (ft/ft)	0.037722	Area (sq ft)		17.26	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	11.59	Avg. Vel. (ft/s)		11.59	
Max Chl Dpth (ft)	0.38	Hydr. Depth (ft)		0.38	
Conv. Total (cfs)	1029.7	Conv. (cfs)		1029.7	
Length Wtd. (ft)	32.10	Wetted Per. (ft)		45.77	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.89	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	2.52	0.01
C & E Loss (ft)	0.08	Cum SA (acres)	0.03	3.43	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2804.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.48	Wt. n-Val.		0.013	
W.S. Elev (ft)	2797.61	Reach Len. (ft)	32.10	32.10	32.10
Crit W.S. (ft)	2799.23	Flow Area (sq ft)		72.45	
E.G. Slope (ft/ft)	0.018557	Area (sq ft)		72.45	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	20.43	Avg. Vel. (ft/s)		20.43	
Max Chl Dpth (ft)	1.61	Hydr. Depth (ft)		1.61	
Conv. Total (cfs)	10864.5	Conv. (cfs)		10864.5	
Length Wtd. (ft)	32.10	Wetted Per. (ft)		48.22	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		1.74	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	9.32	0.13
C & E Loss (ft)	0.24	Cum SA (acres)	0.11	4.00	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2802.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.38	Wt. n-Val.		0.013	
W.S. Elev (ft)	2797.18	Reach Len. (ft)	32.10	32.10	32.10
Crit W.S. (ft)	2798.48	Flow Area (sq ft)		53.20	
E.G. Slope (ft/ft)	0.022708	Area (sq ft)		53.20	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	18.61	Avg. Vel. (ft/s)		18.61	
Max Chl Dpth (ft)	1.18	Hydr. Depth (ft)		1.18	
Conv. Total (cfs)	6569.7	Conv. (cfs)		6569.7	
Length Wtd. (ft)	32.10	Wetted Per. (ft)		47.36	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		1.59	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	7.63	0.08
C & E Loss (ft)	0.20	Cum SA (acres)	0.08	3.88	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2801.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2796.82	Reach Len. (ft)	32.10	32.10	32.10
Crit W.S. (ft)	2797.79	Flow Area (sq ft)		36.95	
E.G. Slope (ft/ft)	0.028466	Area (sq ft)		36.95	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	16.51	Avg. Vel. (ft/s)		16.51	
Max Chl Dpth (ft)	0.82	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	3615.5	Conv. (cfs)		3615.5	
Length Wtd. (ft)	32.10	Wetted Per. (ft)		46.64	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		1.41	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	5.57	0.04
C & E Loss (ft)	0.15	Cum SA (acres)	0.06	3.71	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 6328.7

```
INPUT
Description: Quantico Road
Distance from Upstream XS =      .2
Deck/Roadway Width        =    31.8
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100  2808.5             242  2808.5             262  2808.5
     296  2808.5             404  2808.5

Upstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2809  138.63    2809     197    2804     203    2800     216    2800
     222    2804     242    2804     242    2796     287    2796     287    2804
     307    2804  326.77    2807  403.98    2808

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
           242     287             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242  2808.5       T
     287  403.98  2808.5       T
Left Levee      Station=     242      Elevation=  2808.5
Right Levee     Station=     287      Elevation=  2808.5

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100  2808.5             242  2808.5             262  2808.5
     296  2808.5             404  2808.5

Downstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2809  138.63    2809     197    2804     203    2800     216    2800
     222    2804     242    2804     242    2796     287    2796     287    2804
     307    2804  326.77    2807  403.98    2808

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .013

Bank Sta: Left   Right    Coeff Contr.   Expan.
           242     287             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2808       T
     287  403.98    2808       T
Left Levee      Station=     242      Elevation=    2808
Right Levee     Station=     287      Elevation=    2808

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested
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Number of Culverts =  2

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .3    31.8     .013     .013        0                  .5                1
Upstream   Elevation =  2800
           Centerline Station =  209.5
Downstream Elevation =  2800
           Centerline Station =  209.5

Culvert Name     Shape      Rise    Span
Culvert #2           Box       8      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .3    31.8     .013     .013        0                  .5                1
Number of Barrels =  3
Upstream   Elevation =  2796
Centerline Stations
    Sta.    Sta.    Sta.
   249.5   264.5   279.5
Downstream Elevation =  2796
Centerline Stations
    Sta.    Sta.    Sta.
   249.5   264.5   279.5

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)         23.46    Culv Full Len (ft)         31.80
  # Barrels                      1    Culv Vel US (ft/s)          7.47
  Q Barrel (cfs)             23.46    Culv Vel DS (ft/s)          7.47
  E.G. US. (ft)            2806.06    Culv Inv El Up (ft)      2800.00
  W.S. US. (ft)            2805.15    Culv Inv El Dn (ft)      2800.00
  E.G. DS (ft)             2805.17    Culv Frctn Ls (ft)          0.45
  W.S. DS (ft)             2803.98    Culv Exit Loss (ft)         0.00
  Delta EG (ft)               0.88    Culv Entr Loss (ft)         0.43
  Delta WS (ft)               1.17    Q Weir (cfs)
  E.G. IC (ft)             2803.56    Weir Sta Lft (ft)
  E.G. OC (ft)             2805.95    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2802.00    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2802.00    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.72    Min El Weir Flow (ft)    2808.51


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                      1    Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2800.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2800.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
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  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2808.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2800.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2800.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2808.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2800.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2800.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2808.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2800.00
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  W.S. US. (ft)                       Culv Inv El Dn (ft)      2800.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2808.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2800.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2800.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2808.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     1     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2800.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2800.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2808.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.
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CULVERT OUTPUT Profile #100-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)	3126.54	Culv Full Len (ft)	20.28
# Barrels	3	Culv Vel US (ft/s)	9.31
Q Barrel (cfs)	1042.18	Culv Vel DS (ft/s)	9.33
E.G. US. (ft)	2806.06	Culv Inv El Up (ft)	2796.00
W.S. US. (ft)	2805.15	Culv Inv El Dn (ft)	2796.00
E.G. DS (ft)	2805.17	Culv Frctn Ls (ft)	0.05
W.S. DS (ft)	2803.98	Culv Exit Loss (ft)	0.16
Delta EG (ft)	0.88	Culv Entr Loss (ft)	0.67
Delta WS (ft)	1.17	Q Weir (cfs)	
E.G. IC (ft)	2805.03	Weir Sta Lft (ft)	
E.G. OC (ft)	2806.06	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2804.00	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2803.98	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.56	Min El Weir Flow (ft)	2808.51

CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2796.00
W.S. US. (ft)		Culv Inv El Dn (ft)	2796.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2808.51

Warning: The program cannot perform supercritical flow through multiple culverts. The program sets the water surface to critical
depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2796.00
W.S. US. (ft)		Culv Inv El Dn (ft)	2796.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2808.51

```
Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #2

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     3     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2796.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2796.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2808.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     3     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2796.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2796.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2808.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     3     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2796.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2796.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
```

```
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2808.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     3     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2796.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2796.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2808.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 6312.6

INPUT
Description: Section 63+12.6 (D/S face of Quantico Rd.)
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2809  138.63    2809     197    2804     203    2800     216    2800
     222    2804     242    2804     242    2796     287    2796     287    2804
     307    2804  326.77    2807  403.98    2808

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     222    .016     242    .013     287    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           242     287               .5      .5      .5             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     242    2808       T
     287  403.98    2808       T
Left Levee      Station=     242      Elevation=    2808
Right Levee     Station=     287      Elevation=    2808

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2805.17    Element                    Left OB    Channel   Right OB
```

Vel Head (ft)	1.20	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.98	Reach Len. (ft)	0.50	0.50	0.50
Crit W.S. (ft)	2801.34	Flow Area (sq ft)		358.97	
E.G. Slope (ft/ft)	0.000554	Area (sq ft)		358.97	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	8.78	Avg. Vel. (ft/s)		8.78	
Max Chl Dpth (ft)	7.98	Hydr. Depth (ft)		7.98	
Conv. Total (cfs)	133805.7	Conv. (cfs)		133805.7	
Length Wtd. (ft)	0.50	Wetted Per. (ft)		60.95	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.35	15.82	0.34
C & E Loss (ft)	0.50	Cum SA (acres)	0.20	4.42	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2803.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2800.83	Reach Len. (ft)	0.50	0.50	0.50
Crit W.S. (ft)	2800.83	Flow Area (sq ft)		217.24	
E.G. Slope (ft/ft)	0.001878	Area (sq ft)		217.24	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	12.43	Avg. Vel. (ft/s)		12.43	
Max Chl Dpth (ft)	4.83	Hydr. Depth (ft)		4.83	
Conv. Total (cfs)	62307.8	Conv. (cfs)		62307.8	
Length Wtd. (ft)	0.50	Wetted Per. (ft)		54.66	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.28	13.76	0.27
C & E Loss (ft)		Cum SA (acres)	0.17	4.24	0.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2800.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.61	Wt. n-Val.		0.013	
W.S. Elev (ft)	2799.28	Reach Len. (ft)	0.50	0.50	0.50
Crit W.S. (ft)	2799.28	Flow Area (sq ft)		147.39	
E.G. Slope (ft/ft)	0.001953	Area (sq ft)		147.39	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	10.18	Avg. Vel. (ft/s)		10.18	
Max Chl Dpth (ft)	3.28	Hydr. Depth (ft)		3.28	
Conv. Total (cfs)	33938.1	Conv. (cfs)		33938.1	
Length Wtd. (ft)	0.50	Wetted Per. (ft)		51.55	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	9.07	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	3.94	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2797.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2796.86	Reach Len. (ft)	0.50	0.50	0.50
Crit W.S. (ft)	2796.86	Flow Area (sq ft)		38.49	
E.G. Slope (ft/ft)	0.002676	Area (sq ft)		38.49	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	5.20	Avg. Vel. (ft/s)		5.20	
Max Chl Dpth (ft)	0.86	Hydr. Depth (ft)		0.86	
Conv. Total (cfs)	3866.0	Conv. (cfs)		3866.0	
Length Wtd. (ft)	0.50	Wetted Per. (ft)		46.71	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	2.52	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	3.39	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2800.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.63	Wt. n-Val.		0.013	
W.S. Elev (ft)	2799.22	Reach Len. (ft)	0.50	0.50	0.50
Crit W.S. (ft)	2799.22	Flow Area (sq ft)		144.67	
E.G. Slope (ft/ft)	0.002017	Area (sq ft)		144.67	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	10.23	Avg. Vel. (ft/s)		10.23	
Max Chl Dpth (ft)	3.21	Hydr. Depth (ft)		3.21	
Conv. Total (cfs)	32950.6	Conv. (cfs)		32950.6	
Length Wtd. (ft)	0.50	Wetted Per. (ft)		51.43	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	9.32	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	3.97	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2799.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.22	Wt. n-Val.		0.013	
W.S. Elev (ft)	2798.48	Reach Len. (ft)	0.50	0.50	0.50
Crit W.S. (ft)	2798.48	Flow Area (sq ft)		111.64	
E.G. Slope (ft/ft)	0.002060	Area (sq ft)		111.64	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	8.87	Avg. Vel. (ft/s)		8.87	
Max Chl Dpth (ft)	2.48	Hydr. Depth (ft)		2.48	
Conv. Total (cfs)	21811.2	Conv. (cfs)		21811.2	
Length Wtd. (ft)	0.50	Wetted Per. (ft)		49.96	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	7.63	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	3.85	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2798.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.89	Wt. n-Val.		0.013	
W.S. Elev (ft)	2797.79	Reach Len. (ft)	0.50	0.50	0.50
Crit W.S. (ft)	2797.79	Flow Area (sq ft)		80.44	
E.G. Slope (ft/ft)	0.002246	Area (sq ft)		80.44	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	45.00	Top Width (ft)		45.00	
Vel Total (ft/s)	7.58	Avg. Vel. (ft/s)		7.58	
Max Chl Dpth (ft)	1.79	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	12870.0	Conv. (cfs)		12870.0	
Length Wtd. (ft)	0.50	Wetted Per. (ft)		48.58	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	403.98	242.00	287.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	5.57	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	3.68	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6312.1

INPUT
Description: Section 63+12.1
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2809	138.63	2809	197	2804	217	2804	217.1	2796
257	2796	257	2804	277	2804	288.85	2806	326.77	2807
403.98	2808								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	197	.016	217	.013	257	.016	277	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
217	257	45	45	45	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	217	2805	T
257.1	403.98	2805	T

Left Levee Station= 217 Elevation= 2805
Right Levee Station= 257 Elevation= 2805

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2804.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.88	Wt. n-Val.		0.013	
W.S. Elev (ft)	2801.80	Reach Len. (ft)	45.00	45.00	45.00
Crit W.S. (ft)	2801.80	Flow Area (sq ft)		231.45	
E.G. Slope (ft/ft)	0.001911	Area (sq ft)		231.45	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	39.97	Top Width (ft)		39.97	
Vel Total (ft/s)	13.61	Avg. Vel. (ft/s)		13.61	
Max Chl Dpth (ft)	5.80	Hydr. Depth (ft)		5.79	
Conv. Total (cfs)	72052.3	Conv. (cfs)		72052.3	

Length Wtd. (ft)	45.00	Wetted Per. (ft)		51.49	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)	403.98	217.00	257.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.35	15.82	0.34
C & E Loss (ft)	0.17	Cum SA (acres)	0.20	4.42	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2803.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.60	Wt. n-Val.		0.013	
W.S. Elev (ft)	2801.23	Reach Len. (ft)	45.00	45.00	45.00
Crit W.S. (ft)	2801.23	Flow Area (sq ft)		208.81	
E.G. Slope (ft/ft)	0.001921	Area (sq ft)		208.81	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	39.97	Top Width (ft)		39.97	
Vel Total (ft/s)	12.93	Avg. Vel. (ft/s)		12.93	
Max Chl Dpth (ft)	5.23	Hydr. Depth (ft)		5.22	
Conv. Total (cfs)	61600.3	Conv. (cfs)		61600.3	
Length Wtd. (ft)	45.00	Wetted Per. (ft)		50.36	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	403.98	217.00	257.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.28	13.76	0.27
C & E Loss (ft)	0.14	Cum SA (acres)	0.17	4.24	0.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2801.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.74	Wt. n-Val.		0.013	
W.S. Elev (ft)	2799.55	Reach Len. (ft)	45.00	45.00	45.00
Crit W.S. (ft)	2799.55	Flow Area (sq ft)		141.66	
E.G. Slope (ft/ft)	0.001971	Area (sq ft)		141.66	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	39.94	Top Width (ft)		39.94	

Vel Total (ft/s)	10.59	Avg. Vel. (ft/s)		10.59	
Max Chl Dpth (ft)	3.55	Hydr. Depth (ft)		3.55	
Conv. Total (cfs)	33786.1	Conv. (cfs)		33786.1	
Length Wtd. (ft)	45.00	Wetted Per. (ft)		47.00	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)	403.98	217.00	257.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.13	9.07	0.13
C & E Loss (ft)	0.06	Cum SA (acres)	0.11	3.94	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2797.38	Element			
Vel Head (ft)	0.46	Wt. n-Val.		0.013	
W.S. Elev (ft)	2796.92	Reach Len. (ft)	45.00	45.00	45.00
Crit W.S. (ft)	2796.92	Flow Area (sq ft)		36.85	
E.G. Slope (ft/ft)	0.002664	Area (sq ft)		36.85	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	39.91	Top Width (ft)		39.91	
Vel Total (ft/s)	5.43	Avg. Vel. (ft/s)		5.43	
Max Chl Dpth (ft)	0.92	Hydr. Depth (ft)		0.92	
Conv. Total (cfs)	3875.3	Conv. (cfs)		3875.3	
Length Wtd. (ft)	45.00	Wetted Per. (ft)		41.75	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	403.98	217.00	257.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.01	2.52	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	3.39	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2801.24	Element			
Vel Head (ft)	1.73	Wt. n-Val.		0.013	
W.S. Elev (ft)	2799.51	Reach Len. (ft)	45.00	45.00	45.00
Crit W.S. (ft)	2799.51	Flow Area (sq ft)		140.21	
E.G. Slope (ft/ft)	0.001981	Area (sq ft)		140.21	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	

Top Width (ft)	39.94	Top Width (ft)		39.94	
Vel Total (ft/s)	10.56	Avg. Vel. (ft/s)		10.56	
Max Chl Dpth (ft)	3.51	Hydr. Depth (ft)		3.51	
Conv. Total (cfs)	33248.6	Conv. (cfs)		33248.6	
Length Wtd. (ft)	45.00	Wetted Per. (ft)		46.92	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)	403.98	217.00	257.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.13	9.32	0.13
C & E Loss (ft)	0.06	Cum SA (acres)	0.11	3.97	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2800.01	Element			
Vel Head (ft)	1.34	Wt. n-Val.		0.013	
W.S. Elev (ft)	2798.68	Reach Len. (ft)	45.00	45.00	45.00
Crit W.S. (ft)	2798.68	Flow Area (sq ft)		106.77	
E.G. Slope (ft/ft)	0.002095	Area (sq ft)		106.77	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	39.93	Top Width (ft)		39.93	
Vel Total (ft/s)	9.27	Avg. Vel. (ft/s)		9.27	
Max Chl Dpth (ft)	2.67	Hydr. Depth (ft)		2.67	
Conv. Total (cfs)	21629.9	Conv. (cfs)		21629.9	
Length Wtd. (ft)	45.00	Wetted Per. (ft)		45.25	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	403.98	217.00	257.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.08	7.63	0.08
C & E Loss (ft)	0.04	Cum SA (acres)	0.08	3.85	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2798.90	Element			
Vel Head (ft)	0.96	Wt. n-Val.		0.013	
W.S. Elev (ft)	2797.95	Reach Len. (ft)	45.00	45.00	45.00
Crit W.S. (ft)	2797.95	Flow Area (sq ft)		77.70	
E.G. Slope (ft/ft)	0.002196	Area (sq ft)		77.70	

Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	39.92	Top Width (ft)		39.92	
Vel Total (ft/s)	7.85	Avg. Vel. (ft/s)		7.85	
Max Chl Dpth (ft)	1.95	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	13016.1	Conv. (cfs)		13016.1	
Length Wtd. (ft)	45.00	Wetted Per. (ft)		43.79	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)	403.98	217.00	257.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.04	5.57	0.04
C & E Loss (ft)	0.02	Cum SA (acres)	0.06	3.68	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6267.1

INPUT
Description: Section 62+67.1
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2805	138.63	2805	197	2800	217	2800	229	2792
269	2792	281	2800	301	2800	326.77	2803	403.98	2804

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	197	.016	217	.013	281	.016	301	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
217	281	267.1	267.1	267.1	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2803.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.93	Wt. n-Val.		0.013	
W.S. Elev (ft)	2794.96	Reach Len. (ft)	267.10	267.10	267.10
Crit W.S. (ft)	2797.36	Flow Area (sq ft)		131.35	
E.G. Slope (ft/ft)	0.012358	Area (sq ft)		131.35	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	48.87	Top Width (ft)		48.87	
Vel Total (ft/s)	23.98	Avg. Vel. (ft/s)		23.98	
Max Chl Dpth (ft)	2.96	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	28335.6	Conv. (cfs)		28335.6	
Length Wtd. (ft)	267.10	Wetted Per. (ft)		50.66	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		2.00	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.35	15.63	0.34
C & E Loss (ft)	0.61	Cum SA (acres)	0.20	4.37	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2803.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2794.64	Reach Len. (ft)	267.10	267.10	267.10
Crit W.S. (ft)	2796.87	Flow Area (sq ft)		115.93	
E.G. Slope (ft/ft)	0.013351	Area (sq ft)		115.93	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	47.91	Top Width (ft)		47.91	
Vel Total (ft/s)	23.29	Avg. Vel. (ft/s)		23.29	
Max Chl Dpth (ft)	2.64	Hydr. Depth (ft)		2.42	
Conv. Total (cfs)	23366.9	Conv. (cfs)		23366.9	
Length Wtd. (ft)	267.10	Wetted Per. (ft)		49.51	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		1.95	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.28	13.59	0.27
C & E Loss (ft)	0.58	Cum SA (acres)	0.17	4.20	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2800.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.90	Wt. n-Val.		0.013	
W.S. Elev (ft)	2793.67	Reach Len. (ft)	267.10	267.10	267.10
Crit W.S. (ft)	2795.36	Flow Area (sq ft)		71.13	
E.G. Slope (ft/ft)	0.019051	Area (sq ft)		71.13	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	45.02	Top Width (ft)		45.02	
Vel Total (ft/s)	21.09	Avg. Vel. (ft/s)		21.09	
Max Chl Dpth (ft)	1.67	Hydr. Depth (ft)		1.58	
Conv. Total (cfs)	10867.5	Conv. (cfs)		10867.5	
Length Wtd. (ft)	267.10	Wetted Per. (ft)		46.03	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		1.84	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.13	8.96	0.13
C & E Loss (ft)	0.52	Cum SA (acres)	0.11	3.89	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2796.63	Element	Left OB	Channel	Right OB

Vel Head (ft)	4.34	Wt. n-Val.		0.013	
W.S. Elev (ft)	2792.30	Reach Len. (ft)	267.10	267.10	267.10
Crit W.S. (ft)	2792.91	Flow Area (sq ft)		11.97	
E.G. Slope (ft/ft)	0.110653	Area (sq ft)		11.97	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	40.89	Top Width (ft)		40.89	
Vel Total (ft/s)	16.71	Avg. Vel. (ft/s)		16.71	
Max Chl Dpth (ft)	0.30	Hydr. Depth (ft)		0.29	
Conv. Total (cfs)	601.2	Conv. (cfs)		601.2	
Length Wtd. (ft)	267.10	Wetted Per. (ft)		41.07	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		2.01	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	0.01	2.50	0.01
C & E Loss (ft)	0.39	Cum SA (acres)	0.03	3.35	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2800.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.87	Wt. n-Val.		0.013	
W.S. Elev (ft)	2793.66	Reach Len. (ft)	267.10	267.10	267.10
Crit W.S. (ft)	2795.33	Flow Area (sq ft)		70.34	
E.G. Slope (ft/ft)	0.019216	Area (sq ft)		70.34	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	44.97	Top Width (ft)		44.97	
Vel Total (ft/s)	21.04	Avg. Vel. (ft/s)		21.04	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		1.56	
Conv. Total (cfs)	10676.7	Conv. (cfs)		10676.7	
Length Wtd. (ft)	267.10	Wetted Per. (ft)		45.97	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		1.84	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.13	9.21	0.13
C & E Loss (ft)	0.51	Cum SA (acres)	0.11	3.92	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2799.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	2793.19	Reach Len. (ft)	267.10	267.10	267.10
Crit W.S. (ft)	2794.57	Flow Area (sq ft)		49.88	
E.G. Slope (ft/ft)	0.025741	Area (sq ft)		49.88	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	43.58	Top Width (ft)		43.58	
Vel Total (ft/s)	19.85	Avg. Vel. (ft/s)		19.85	
Max Chl Dpth (ft)	1.19	Hydr. Depth (ft)		1.14	
Conv. Total (cfs)	6170.5	Conv. (cfs)		6170.5	
Length Wtd. (ft)	267.10	Wetted Per. (ft)		44.30	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		1.81	

Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.08	7.55	0.08
C & E Loss (ft)	0.48	Cum SA (acres)	0.08	3.81	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2798.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.41	Wt. n-Val.		0.013	
W.S. Elev (ft)	2792.79	Reach Len. (ft)	267.10	267.10	267.10
Crit W.S. (ft)	2793.88	Flow Area (sq ft)		32.69	
E.G. Slope (ft/ft)	0.038236	Area (sq ft)		32.69	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	42.38	Top Width (ft)		42.38	
Vel Total (ft/s)	18.66	Avg. Vel. (ft/s)		18.66	
Max Chl Dpth (ft)	0.79	Hydr. Depth (ft)		0.77	
Conv. Total (cfs)	3119.6	Conv. (cfs)		3119.6	
Length Wtd. (ft)	267.10	Wetted Per. (ft)		42.86	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		1.82	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.04	5.51	0.04
C & E Loss (ft)	0.44	Cum SA (acres)	0.06	3.63	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6000

INPUT
Description: Section 60+00
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2797	138.63	2797	197	2795.5	202	2795.5	222	2795.5
234	2787.5	274	2787.5	286	2795.5	306	2795.5	326.77	2795
403.98	2796								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	202	.016	222	.013	286	.016	306	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
222	286	50	50	50	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2800.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.90	Wt. n-Val.		0.013	

W.S. Elev (ft)	2790.32	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2792.86	Flow Area (sq ft)		124.74	
E.G. Slope (ft/ft)	0.014489	Area (sq ft)		124.74	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	48.46	Top Width (ft)		48.46	
Vel Total (ft/s)	25.25	Avg. Vel. (ft/s)		25.25	
Max Chl Dpth (ft)	2.82	Hydr. Depth (ft)		2.57	
Conv. Total (cfs)	26169.4	Conv. (cfs)		26169.4	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		50.17	
Min Ch El (ft)	2787.50	Shear (lb/sq ft)		2.25	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	3.57	Cum Volume (acre-ft)	0.35	14.85	0.34
C & E Loss (ft)	0.10	Cum SA (acres)	0.20	4.08	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2799.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.15	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.04	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2792.37	Flow Area (sq ft)		111.23	
E.G. Slope (ft/ft)	0.015180	Area (sq ft)		111.23	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	47.62	Top Width (ft)		47.62	
Vel Total (ft/s)	24.27	Avg. Vel. (ft/s)		24.27	
Max Chl Dpth (ft)	2.54	Hydr. Depth (ft)		2.34	
Conv. Total (cfs)	21914.4	Conv. (cfs)		21914.4	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		49.15	
Min Ch El (ft)	2787.50	Shear (lb/sq ft)		2.14	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	3.80	Cum Volume (acre-ft)	0.28	12.89	0.27
C & E Loss (ft)	0.07	Cum SA (acres)	0.17	3.90	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2795.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2789.23	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2790.86	Flow Area (sq ft)		73.87	
E.G. Slope (ft/ft)	0.016909	Area (sq ft)		73.87	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	45.20	Top Width (ft)		45.20	
Vel Total (ft/s)	20.31	Avg. Vel. (ft/s)		20.31	
Max Chl Dpth (ft)	1.73	Hydr. Depth (ft)		1.63	
Conv. Total (cfs)	11535.4	Conv. (cfs)		11535.4	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		46.25	
Min Ch El (ft)	2787.50	Shear (lb/sq ft)		1.69	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	4.79	Cum Volume (acre-ft)	0.13	8.52	0.13
C & E Loss (ft)	0.15	Cum SA (acres)	0.11	3.62	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2789.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.		0.013	
W.S. Elev (ft)	2788.10	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2788.41	Flow Area (sq ft)		24.58	
E.G. Slope (ft/ft)	0.010400	Area (sq ft)		24.58	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	41.80	Top Width (ft)		41.80	
Vel Total (ft/s)	8.14	Avg. Vel. (ft/s)		8.14	
Max Chl Dpth (ft)	0.60	Hydr. Depth (ft)		0.59	
Conv. Total (cfs)	1961.2	Conv. (cfs)		1961.2	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		42.17	
Min Ch El (ft)	2787.50	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	6.51	Cum Volume (acre-ft)	0.01	2.39	0.01
C & E Loss (ft)	0.99	Cum SA (acres)	0.03	3.10	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2795.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.34	Wt. n-Val.		0.013	
W.S. Elev (ft)	2789.22	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2790.83	Flow Area (sq ft)		73.25	
E.G. Slope (ft/ft)	0.016904	Area (sq ft)		73.25	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	45.16	Top Width (ft)		45.16	
Vel Total (ft/s)	20.21	Avg. Vel. (ft/s)		20.21	
Max Chl Dpth (ft)	1.72	Hydr. Depth (ft)		1.62	
Conv. Total (cfs)	11383.1	Conv. (cfs)		11383.1	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		46.20	
Min Ch El (ft)	2787.50	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	4.81	Cum Volume (acre-ft)	0.13	8.77	0.13
C & E Loss (ft)	0.16	Cum SA (acres)	0.11	3.65	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2793.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.59	Wt. n-Val.		0.013	
W.S. Elev (ft)	2788.87	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2790.08	Flow Area (sq ft)		57.58	

E.G. Slope (ft/ft)	0.016260	Area (sq ft)		57.58		
Q Total (cfs)	990.00	Flow (cfs)		990.00		
Top Width (ft)	44.11	Top Width (ft)		44.11		
Vel Total (ft/s)	17.19	Avg. Vel. (ft/s)		17.19		
Max Chl Dpth (ft)	1.37	Hydr. Depth (ft)		1.31		
Conv. Total (cfs)	7763.8	Conv. (cfs)		7763.8		
Length Wtd. (ft)	50.00	Wetted Per. (ft)		44.94		
Min Ch El (ft)	2787.50	Shear (lb/sq ft)		1.30		
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00	
Frctn Loss (ft)	5.39	Cum Volume (acre-ft)	0.08	7.22	0.08	
C & E Loss (ft)	0.46	Cum SA (acres)	0.08	3.54	0.08	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2791.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.97	Wt. n-Val.		0.013	
W.S. Elev (ft)	2788.56	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2789.38	Flow Area (sq ft)		44.10	
E.G. Slope (ft/ft)	0.014524	Area (sq ft)		44.10	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	43.18	Top Width (ft)		43.18	
Vel Total (ft/s)	13.83	Avg. Vel. (ft/s)		13.83	
Max Chl Dpth (ft)	1.06	Hydr. Depth (ft)		1.02	
Conv. Total (cfs)	5061.6	Conv. (cfs)		5061.6	
Length Wtd. (ft)	50.00	Wetted Per. (ft)		43.82	
Min Ch El (ft)	2787.50	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	5.94	Cum Volume (acre-ft)	0.04	5.28	0.04
C & E Loss (ft)	0.73	Cum SA (acres)	0.06	3.37	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 5950

INPUT
Description: Section 59+50
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2797	138.63	2797	234	2794.8	234.1	2786.8	274	2786.8
274.1	2794.8	326.77	2795	403.98	2796				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	234	.013	274.1	.016

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

```
          234   274.1            177.9   177.9   177.9             .1       .3
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CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2799.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.00	Reach Len. (ft)	177.90	177.90	177.90
Crit W.S. (ft)	2792.56	Flow Area (sq ft)		127.87	
E.G. Slope (ft/ft)	0.011987	Area (sq ft)		127.87	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	39.98	Top Width (ft)		39.98	
Vel Total (ft/s)	24.63	Avg. Vel. (ft/s)		24.63	
Max Chl Dpth (ft)	3.20	Hydr. Depth (ft)		3.20	
Conv. Total (cfs)	28770.9	Conv. (cfs)		28770.9	
Length Wtd. (ft)	177.90	Wetted Per. (ft)		46.30	
Min Ch El (ft)	2786.80	Shear (lb/sq ft)		2.07	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)	0.35	14.70	0.34
C & E Loss (ft)	0.14	Cum SA (acres)	0.20	4.03	0.17

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2798.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.72	Wt. n-Val.		0.013	
W.S. Elev (ft)	2789.65	Reach Len. (ft)	177.90	177.90	177.90
Crit W.S. (ft)	2792.00	Flow Area (sq ft)		113.96	
E.G. Slope (ft/ft)	0.012673	Area (sq ft)		113.96	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	39.97	Top Width (ft)		39.97	
Vel Total (ft/s)	23.69	Avg. Vel. (ft/s)		23.69	
Max Chl Dpth (ft)	2.85	Hydr. Depth (ft)		2.85	
Conv. Total (cfs)	23984.4	Conv. (cfs)		23984.4	
Length Wtd. (ft)	177.90	Wetted Per. (ft)		45.61	
Min Ch El (ft)	2786.80	Shear (lb/sq ft)		1.98	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)	0.28	12.76	0.27
C & E Loss (ft)	0.13	Cum SA (acres)	0.17	3.85	0.15

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2794.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2788.70	Reach Len. (ft)	177.90	177.90	177.90
Crit W.S. (ft)	2790.32	Flow Area (sq ft)		75.95	
E.G. Slope (ft/ft)	0.014290	Area (sq ft)		75.95	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	39.95	Top Width (ft)		39.95	
Vel Total (ft/s)	19.75	Avg. Vel. (ft/s)		19.75	
Max Chl Dpth (ft)	1.90	Hydr. Depth (ft)		1.90	
Conv. Total (cfs)	12547.9	Conv. (cfs)		12547.9	
Length Wtd. (ft)	177.90	Wetted Per. (ft)		43.70	
Min Ch El (ft)	2786.80	Shear (lb/sq ft)		1.55	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)	0.13	8.43	0.13
C & E Loss (ft)	0.10	Cum SA (acres)	0.11	3.57	0.10

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2788.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.17	Wt. n-Val.		0.013	
W.S. Elev (ft)	2787.38	Reach Len. (ft)	177.90	177.90	177.90
Crit W.S. (ft)	2787.72	Flow Area (sq ft)		23.07	

E.G. Slope (ft/ft)	0.012404	Area (sq ft)		23.07	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	39.91	Top Width (ft)		39.91	
Vel Total (ft/s)	8.67	Avg. Vel. (ft/s)		8.67	
Max Chl Dpth (ft)	0.58	Hydr. Depth (ft)		0.58	
Conv. Total (cfs)	1795.8	Conv. (cfs)		1795.8	
Length Wtd. (ft)	177.90	Wetted Per. (ft)		41.06	
Min Ch El (ft)	2786.80	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.57	Cum Volume (acre-ft)	0.01	2.36	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	3.05	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2794.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.00	Wt. n-Val.		0.013	
W.S. Elev (ft)	2788.69	Reach Len. (ft)	177.90	177.90	177.90
Crit W.S. (ft)	2790.28	Flow Area (sq ft)		75.31	
E.G. Slope (ft/ft)	0.014293	Area (sq ft)		75.31	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	39.95	Top Width (ft)		39.95	
Vel Total (ft/s)	19.65	Avg. Vel. (ft/s)		19.65	
Max Chl Dpth (ft)	1.89	Hydr. Depth (ft)		1.89	
Conv. Total (cfs)	12379.6	Conv. (cfs)		12379.6	
Length Wtd. (ft)	177.90	Wetted Per. (ft)		43.67	
Min Ch El (ft)	2786.80	Shear (lb/sq ft)		1.54	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)	0.13	8.69	0.13
C & E Loss (ft)	0.10	Cum SA (acres)	0.11	3.60	0.10

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2792.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.36	Wt. n-Val.		0.013	
W.S. Elev (ft)	2788.28	Reach Len. (ft)	177.90	177.90	177.90
Crit W.S. (ft)	2789.46	Flow Area (sq ft)		59.11	
E.G. Slope (ft/ft)	0.013989	Area (sq ft)		59.11	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	39.94	Top Width (ft)		39.94	
Vel Total (ft/s)	16.75	Avg. Vel. (ft/s)		16.75	
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)		1.48	
Conv. Total (cfs)	8370.3	Conv. (cfs)		8370.3	
Length Wtd. (ft)	177.90	Wetted Per. (ft)		42.86	
Min Ch El (ft)	2786.80	Shear (lb/sq ft)		1.20	
Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)	0.08	7.16	0.08
C & E Loss (ft)	0.07	Cum SA (acres)	0.08	3.49	0.08

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2790.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.90	Wt. n-Val.		0.013	
W.S. Elev (ft)	2787.92	Reach Len. (ft)	177.90	177.90	177.90
Crit W.S. (ft)	2788.73	Flow Area (sq ft)		44.66	
E.G. Slope (ft/ft)	0.013215	Area (sq ft)		44.66	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	39.93	Top Width (ft)		39.93	
Vel Total (ft/s)	13.66	Avg. Vel. (ft/s)		13.66	
Max Chl Dpth (ft)	1.12	Hydr. Depth (ft)		1.12	
Conv. Total (cfs)	5306.4	Conv. (cfs)		5306.4	
Length Wtd. (ft)	177.90	Wetted Per. (ft)		42.14	
Min Ch El (ft)	2786.80	Shear (lb/sq ft)		0.87	

Alpha	1.00	Stream Power (lb/ft s)	403.98	0.00	0.00
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)	0.04	5.23	0.04
C & E Loss (ft)	0.02	Cum SA (acres)	0.06	3.32	0.06

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 5772.1

INPUT
Description: Section 57+72
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2797	138.63	2797	214	2795	234	2795	234.1	2784.4
274	2784.4	274.1	2795	294	2795	326.77	2795	403.98	2796

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	214	.016	234	.013	274.1	.016	294	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
234	274.1	30.1	30.1	30.1	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	234	2798	T
274.1	403.98	2798	T

Left Levee Station= 234 Elevation= 2798
Right Levee Station= 274 Elevation= 2798

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2795.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.88	Wt. n-Val.		0.013	
W.S. Elev (ft)	2794.89	Reach Len. (ft)	30.10	30.10	30.10
Crit W.S. (ft)	2790.19	Flow Area (sq ft)		418.98	
E.G. Slope (ft/ft)	0.000330	Area (sq ft)		418.98	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	7.52	Avg. Vel. (ft/s)		7.52	
Max Chl Dpth (ft)	10.49	Hydr. Depth (ft)		10.47	
Conv. Total (cfs)	173279.0	Conv. (cfs)		173279.0	
Length Wtd. (ft)	30.10	Wetted Per. (ft)		60.88	
Min Ch El (ft)	2784.40	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	403.98	234.00	274.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.35	13.58	0.34
C & E Loss (ft)	0.15	Cum SA (acres)	0.20	3.86	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2794.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.013	
W.S. Elev (ft)	2793.51	Reach Len. (ft)	30.10	30.10	30.10
Crit W.S. (ft)	2789.61	Flow Area (sq ft)		363.77	

E.G. Slope (ft/ft)	0.000366	Area (sq ft)		363.77	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	39.99	Top Width (ft)		39.99	
Vel Total (ft/s)	7.42	Avg. Vel. (ft/s)		7.42	
Max Chl Dpth (ft)	9.11	Hydr. Depth (ft)		9.10	
Conv. Total (cfs)	141221.5	Conv. (cfs)		141221.5	
Length Wtd. (ft)	30.10	Wetted Per. (ft)		58.11	
Min Ch El (ft)	2784.40	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	403.98	234.00	274.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.28	11.79	0.27
C & E Loss (ft)	0.14	Cum SA (acres)	0.17	3.69	0.15

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2792.22	Element			
Vel Head (ft)	5.89	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.33	Reach Len. (ft)	30.10	30.10	30.10
Crit W.S. (ft)	2787.95	Flow Area (sq ft)		77.00	
E.G. Slope (ft/ft)	0.013672	Area (sq ft)		77.00	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	39.92	Top Width (ft)		39.92	
Vel Total (ft/s)	19.48	Avg. Vel. (ft/s)		19.48	
Max Chl Dpth (ft)	1.93	Hydr. Depth (ft)		1.93	
Conv. Total (cfs)	12828.6	Conv. (cfs)		12828.6	
Length Wtd. (ft)	30.10	Wetted Per. (ft)		43.76	
Min Ch El (ft)	2784.40	Shear (lb/sq ft)		1.50	
Alpha	1.00	Stream Power (lb/ft s)	403.98	234.00	274.00
Frctn Loss (ft)	2.49	Cum Volume (acre-ft)	0.13	8.12	0.13
C & E Loss (ft)	0.05	Cum SA (acres)	0.11	3.40	0.10

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2786.21	Element			
Vel Head (ft)	1.24	Wt. n-Val.		0.013	
W.S. Elev (ft)	2784.96	Reach Len. (ft)	30.10	30.10	30.10
Crit W.S. (ft)	2785.32	Flow Area (sq ft)		22.34	
E.G. Slope (ft/ft)	0.013797	Area (sq ft)		22.34	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	39.91	Top Width (ft)		39.91	
Vel Total (ft/s)	8.95	Avg. Vel. (ft/s)		8.95	
Max Chl Dpth (ft)	0.56	Hydr. Depth (ft)		0.56	
Conv. Total (cfs)	1702.7	Conv. (cfs)		1702.7	
Length Wtd. (ft)	30.10	Wetted Per. (ft)		41.02	
Min Ch El (ft)	2784.40	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)	403.98	234.00	274.00
Frctn Loss (ft)	2.33	Cum Volume (acre-ft)	0.01	2.27	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	2.89	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2792.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.83	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.31	Reach Len. (ft)	30.10	30.10	30.10
Crit W.S. (ft)	2787.90	Flow Area (sq ft)		76.37	
E.G. Slope (ft/ft)	0.013668	Area (sq ft)		76.37	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	39.92	Top Width (ft)		39.92	
Vel Total (ft/s)	19.38	Avg. Vel. (ft/s)		19.38	
Max Chl Dpth (ft)	1.91	Hydr. Depth (ft)		1.91	
Conv. Total (cfs)	12659.4	Conv. (cfs)		12659.4	
Length Wtd. (ft)	30.10	Wetted Per. (ft)		43.73	
Min Ch El (ft)	2784.40	Shear (lb/sq ft)		1.49	
Alpha	1.00	Stream Power (lb/ft s)	403.98	234.00	274.00
Frctn Loss (ft)	2.49	Cum Volume (acre-ft)	0.13	8.38	0.13
C & E Loss (ft)	0.05	Cum SA (acres)	0.11	3.43	0.10

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2790.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.27	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.90	Reach Len. (ft)	30.10	30.10	30.10
Crit W.S. (ft)	2787.08	Flow Area (sq ft)		59.72	
E.G. Slope (ft/ft)	0.013526	Area (sq ft)		59.72	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	39.91	Top Width (ft)		39.91	
Vel Total (ft/s)	16.58	Avg. Vel. (ft/s)		16.58	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		1.50	
Conv. Total (cfs)	8512.3	Conv. (cfs)		8512.3	
Length Wtd. (ft)	30.10	Wetted Per. (ft)		42.89	
Min Ch El (ft)	2784.40	Shear (lb/sq ft)		1.18	
Alpha	1.00	Stream Power (lb/ft s)	403.98	234.00	274.00
Frctn Loss (ft)	2.45	Cum Volume (acre-ft)	0.08	6.91	0.08
C & E Loss (ft)	0.03	Cum SA (acres)	0.08	3.33	0.08

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2788.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.93	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.51	Reach Len. (ft)	30.10	30.10	30.10
Crit W.S. (ft)	2786.34	Flow Area (sq ft)		44.42	
E.G. Slope (ft/ft)	0.013453	Area (sq ft)		44.42	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	39.91	Top Width (ft)		39.91	

Vel Total (ft/s)	13.73	Avg. Vel. (ft/s)		13.73	
Max Chl Dpth (ft)	1.11	Hydr. Depth (ft)		1.11	
Conv. Total (cfs)	5259.2	Conv. (cfs)		5259.2	
Length Wtd. (ft)	30.10	Wetted Per. (ft)		42.13	
Min Ch El (ft)	2784.40	Shear (lb/sq ft)		0.89	
Alpha	1.00	Stream Power (lb/ft s)	403.98	234.00	274.00
Frctn Loss (ft)	2.37	Cum Volume (acre-ft)	0.04	5.05	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	3.16	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 5742

INPUT
Description: Section 57+42 (U/S of Apple Valley Road)
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2797	138.63	2797	187.4	2796	207.41	2796	212	2795
232	2790	238	2787	238	2784	285	2784	285	2790
293	2795.5	313	2795.5	326.77	2795.5	403.98	2796		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	187.4	.016	212	.013	293	.016	313	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
207.41	293	132.4	132.4	132.4	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	207.41	2798.5	T
293	403.98	2798.5	T

Left Levee Station= 207.4 Elevation= 2798.5
Right Levee Station= 293 Elevation= 2798.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2795.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.013	
W.S. Elev (ft)	2795.24	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2789.27	Flow Area (sq ft)		643.18	
E.G. Slope (ft/ft)	0.000141	Area (sq ft)		643.18	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	81.69	Top Width (ft)		81.69	
Vel Total (ft/s)	4.90	Avg. Vel. (ft/s)		4.90	
Max Chl Dpth (ft)	11.23	Hydr. Depth (ft)		7.87	
Conv. Total (cfs)	264837.0	Conv. (cfs)		264837.0	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		93.67	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	403.98	207.40	293.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.35	13.22	0.34
C & E Loss (ft)		Cum SA (acres)	0.20	3.82	0.17

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2794.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2793.82	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2788.74	Flow Area (sq ft)		533.21	
E.G. Slope (ft/ft)	0.000170	Area (sq ft)		533.21	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	73.83	Top Width (ft)		73.83	
Vel Total (ft/s)	5.06	Avg. Vel. (ft/s)		5.06	
Max Chl Dpth (ft)	9.82	Hydr. Depth (ft)		7.22	
Conv. Total (cfs)	206980.5	Conv. (cfs)		206980.5	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		85.20	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	403.98	207.40	293.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.28	11.48	0.27
C & E Loss (ft)		Cum SA (acres)	0.17	3.65	0.15

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2790.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.44	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2787.19	Flow Area (sq ft)		314.71	
E.G. Slope (ft/ft)	0.000214	Area (sq ft)		314.71	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	55.39	Top Width (ft)		55.39	
Vel Total (ft/s)	4.77	Avg. Vel. (ft/s)		4.77	
Max Chl Dpth (ft)	6.44	Hydr. Depth (ft)		5.68	
Conv. Total (cfs)	102650.8	Conv. (cfs)		102650.8	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		65.28	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	403.98	207.40	293.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	7.98	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	3.37	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2785.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.48	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2784.83	Flow Area (sq ft)		69.47	
E.G. Slope (ft/ft)	0.000409	Area (sq ft)		69.47	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	47.00	Top Width (ft)		47.00	
Vel Total (ft/s)	2.88	Avg. Vel. (ft/s)		2.88	
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)		1.48	
Conv. Total (cfs)	9892.2	Conv. (cfs)		9892.2	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		49.96	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	403.98	207.40	293.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	2.24	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	2.86	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2790.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.38	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2787.14	Flow Area (sq ft)		311.47	
E.G. Slope (ft/ft)	0.000214	Area (sq ft)		311.47	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	55.07	Top Width (ft)		55.07	
Vel Total (ft/s)	4.75	Avg. Vel. (ft/s)		4.75	
Max Chl Dpth (ft)	6.38	Hydr. Depth (ft)		5.66	
Conv. Total (cfs)	101254.8	Conv. (cfs)		101254.8	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		64.94	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	403.98	207.40	293.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	8.24	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	3.40	0.10

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2789.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2788.78	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2786.41	Flow Area (sq ft)		228.02	
E.G. Slope (ft/ft)	0.000237	Area (sq ft)		228.02	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	50.57	Top Width (ft)		50.57	
Vel Total (ft/s)	4.34	Avg. Vel. (ft/s)		4.34	
Max Chl Dpth (ft)	4.78	Hydr. Depth (ft)		4.51	
Conv. Total (cfs)	64349.2	Conv. (cfs)		64349.2	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		58.77	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	403.98	207.40	293.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	6.81	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	3.29	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2787.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2787.37	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2785.74	Flow Area (sq ft)		158.50	
E.G. Slope (ft/ft)	0.000271	Area (sq ft)		158.50	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	47.74	Top Width (ft)		47.74	
Vel Total (ft/s)	3.85	Avg. Vel. (ft/s)		3.85	
Max Chl Dpth (ft)	3.37	Hydr. Depth (ft)		3.32	
Conv. Total (cfs)	37049.4	Conv. (cfs)		37049.4	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		54.20	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	403.98	207.40	293.00

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  Frctn Loss (ft)                      Cum Volume (acre-ft)        0.04       4.98       0.04
  C & E Loss (ft)                      Cum SA (acres)              0.06       3.13       0.06


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CULVERT


RIVER: Desert Knolls Wa
REACH: Main               RS: 5679.8

INPUT
Description: Apple Valley Road Station 56+79.8
Distance from Upstream XS =      .5
Deck/Roadway Width        =   131.5
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=      10
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100    2799             119  2798.2          135.81  2797.5
  159.24  2797.5          177.08  2797.5          227.59  2797.5
  268.39  2797.5          334.53  2797.5          413.82  2797.5
     455    2799

Upstream Bridge Cross Section Data
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2797  138.63    2797   187.4    2796  207.41    2796     212    2795
     232    2790     238    2787     238    2784     285    2784     285    2790
     293  2795.5     313  2795.5  326.77  2795.5  403.98    2796

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035   187.4    .016     212    .013     293    .016     313    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        207.41     293             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100  207.41  2798.5       T
     293  403.98  2798.5       T
Left Levee      Station=   207.4      Elevation=  2798.5
Right Levee     Station=     293      Elevation=  2798.5

Downstream  Deck/Roadway Coordinates
    num=      10
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100    2799             119    2798          135.81    2797
  159.24    2797          177.08    2797          227.59    2797
  268.39    2797          334.53    2797          413.82    2797
     455    2797

Downstream Bridge Cross Section Data
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2806  163.43    2803  186.22    2801  189.43    2800   193.6    2799
  220.14    2798  225.96    2797  235.64    2796  243.21    2795  252.32    2794
  265.12    2793     273    2792     273    2784  280.62    2784  310.38    2784
     319    2784     319    2792  340.05    2793  406.62    2794  422.95    2794
  454.77    2795

Manning's n Values        num=       3
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     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     273    .013     319    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           273     319             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     273  2797.5       T
     319  454.77  2797.5       T
Left Levee      Station=     273      Elevation=  2797.5
Right Levee     Station=     319      Elevation=  2797.5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  2

Culvert Name     Shape      Rise    Span
Culvert #2           Box       9       7
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .3     132     .013     .013        0                  .2                1
Number of Barrels =  2
Upstream   Elevation =  2784
Centerline Stations
    Sta.    Sta.
     242   280.5
Downstream Elevation =  2784
Centerline Stations
    Sta.    Sta.
     277   314.5

Culvert Name     Shape      Rise    Span
Culvert #1           Box       9      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .3     132     .013     .013        0                  .2                1
Number of Barrels =  2
Upstream   Elevation =  2784
Centerline Stations
    Sta.    Sta.
   253.5     269
Downstream Elevation =  2784
Centerline Stations
    Sta.    Sta.
     288     303

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)       1033.73    Culv Full Len (ft)        132.00
  # Barrels                      2    Culv Vel US (ft/s)          8.20
  Q Barrel (cfs)            516.87    Culv Vel DS (ft/s)          8.20
  E.G. US. (ft)            2795.61    Culv Inv El Up (ft)      2784.00
  W.S. US. (ft)            2795.24    Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)             2794.81    Culv Frctn Ls (ft)          0.26
  W.S. DS (ft)             2794.10    Culv Exit Loss (ft)         0.33
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Delta EG (ft)	0.80	Culv Entr Loss (ft)	0.21
Delta WS (ft)	1.14	Q Weir (cfs)	
E.G. IC (ft)	2792.94	Weir Sta Lft (ft)	
E.G. OC (ft)	2795.63	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2793.00	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2793.00	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.53	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	887.62	Culv Full Len (ft)	132.00
# Barrels	2	Culv Vel US (ft/s)	7.04
Q Barrel (cfs)	443.81	Culv Vel DS (ft/s)	7.04
E.G. US. (ft)	2794.22	Culv Inv El Up (ft)	2784.00
W.S. US. (ft)	2793.82	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2793.75	Culv Frctn Ls (ft)	0.18
W.S. DS (ft)	2793.11	Culv Exit Loss (ft)	0.13
Delta EG (ft)	0.46	Culv Entr Loss (ft)	0.15
Delta WS (ft)	0.71	Q Weir (cfs)	
E.G. IC (ft)	2792.05	Weir Sta Lft (ft)	
E.G. OC (ft)	2794.24	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2793.00	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2793.00	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.00	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	496.16	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	5.72
Q Barrel (cfs)	248.08	Culv Vel DS (ft/s)	5.85
E.G. US. (ft)	2790.79	Culv Inv El Up (ft)	2784.00
W.S. US. (ft)	2790.44	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2790.51	Culv Frctn Ls (ft)	0.12
W.S. DS (ft)	2790.06	Culv Exit Loss (ft)	0.08
Delta EG (ft)	0.28	Culv Entr Loss (ft)	0.10
Delta WS (ft)	0.38	Q Weir (cfs)	
E.G. IC (ft)	2789.39	Weir Sta Lft (ft)	
E.G. OC (ft)	2790.81	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2790.20	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2790.06	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.39	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	66.67	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	3.36
Q Barrel (cfs)	33.33	Culv Vel DS (ft/s)	3.92
E.G. US. (ft)	2785.61	Culv Inv El Up (ft)	2784.00
W.S. US. (ft)	2785.48	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2785.41	Culv Frctn Ls (ft)	0.14
W.S. DS (ft)	2785.21	Culv Exit Loss (ft)	0.04
Delta EG (ft)	0.20	Culv Entr Loss (ft)	0.04
Delta WS (ft)	0.26	Q Weir (cfs)	
E.G. IC (ft)	2785.38	Weir Sta Lft (ft)	
E.G. OC (ft)	2785.63	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	

Culv WS Inlet (ft)	2785.42	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2785.21	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.89	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)	489.51	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	5.69
Q Barrel (cfs)	244.75	Culv Vel DS (ft/s)	5.82
E.G. US. (ft)	2790.73	Culv Inv El Up (ft)	2784.00
W.S. US. (ft)	2790.38	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2790.45	Culv Frctn Ls (ft)	0.12
W.S. DS (ft)	2790.01	Culv Exit Loss (ft)	0.08
Delta EG (ft)	0.28	Culv Entr Loss (ft)	0.10
Delta WS (ft)	0.37	Q Weir (cfs)	
E.G. IC (ft)	2789.34	Weir Sta Lft (ft)	
E.G. OC (ft)	2790.75	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2790.14	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2790.01	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.36	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)	328.42	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	5.08
Q Barrel (cfs)	164.21	Culv Vel DS (ft/s)	5.23
E.G. US. (ft)	2789.08	Culv Inv El Up (ft)	2784.00
W.S. US. (ft)	2788.78	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2788.84	Culv Frctn Ls (ft)	0.11
W.S. DS (ft)	2788.48	Culv Exit Loss (ft)	0.07
Delta EG (ft)	0.24	Culv Entr Loss (ft)	0.08
Delta WS (ft)	0.30	Q Weir (cfs)	
E.G. IC (ft)	2788.07	Weir Sta Lft (ft)	
E.G. OC (ft)	2789.10	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2788.61	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2788.48	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.58	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)	203.33	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	4.47
Q Barrel (cfs)	101.67	Culv Vel DS (ft/s)	4.67
E.G. US. (ft)	2787.60	Culv Inv El Up (ft)	2784.00
W.S. US. (ft)	2787.37	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2787.39	Culv Frctn Ls (ft)	0.11
W.S. DS (ft)	2787.11	Culv Exit Loss (ft)	0.06
Delta EG (ft)	0.21	Culv Entr Loss (ft)	0.06
Delta WS (ft)	0.26	Q Weir (cfs)	
E.G. IC (ft)	2786.93	Weir Sta Lft (ft)	
E.G. OC (ft)	2787.62	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2787.25	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2787.11	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.87	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #100-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	2116.27	Culv Full Len (ft)	132.00
# Barrels	2	Culv Vel US (ft/s)	8.40
Q Barrel (cfs)	1058.13	Culv Vel DS (ft/s)	8.40
E.G. US. (ft)	2795.61	Culv Inv El Up (ft)	2784.00
W.S. US. (ft)	2795.24	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2794.81	Culv Frctn Ls (ft)	0.20
W.S. DS (ft)	2794.10	Culv Exit Loss (ft)	0.38
Delta EG (ft)	0.80	Culv Entr Loss (ft)	0.22
Delta WS (ft)	1.14	Q Weir (cfs)	
E.G. IC (ft)	2793.08	Weir Sta Lft (ft)	
E.G. OC (ft)	2795.60	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2793.00	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2793.00	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.62	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	1812.39	Culv Full Len (ft)	132.00
# Barrels	2	Culv Vel US (ft/s)	7.19
Q Barrel (cfs)	906.19	Culv Vel DS (ft/s)	7.19
E.G. US. (ft)	2794.22	Culv Inv El Up (ft)	2784.00
W.S. US. (ft)	2793.82	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2793.75	Culv Frctn Ls (ft)	0.15
W.S. DS (ft)	2793.11	Culv Exit Loss (ft)	0.16
Delta EG (ft)	0.46	Culv Entr Loss (ft)	0.16
Delta WS (ft)	0.71	Q Weir (cfs)	
E.G. IC (ft)	2792.16	Weir Sta Lft (ft)	
E.G. OC (ft)	2794.21	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2793.00	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2793.00	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.07	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	1003.84	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	5.83
Q Barrel (cfs)	501.92	Culv Vel DS (ft/s)	5.92
E.G. US. (ft)	2790.79	Culv Inv El Up (ft)	2784.00
W.S. US. (ft)	2790.44	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2790.51	Culv Frctn Ls (ft)	0.07
W.S. DS (ft)	2790.06	Culv Exit Loss (ft)	0.09
Delta EG (ft)	0.28	Culv Entr Loss (ft)	0.11
Delta WS (ft)	0.38	Q Weir (cfs)	
E.G. IC (ft)	2789.44	Weir Sta Lft (ft)	
E.G. OC (ft)	2790.78	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2790.15	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2790.06	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.42	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	133.33	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	3.43

Q Barrel (cfs)	66.67	Culv Vel DS (ft/s)	3.92
E.G. US. (ft)	2785.61	Culv Inv El Up (ft)	2784.00
W.S. US. (ft)	2785.48	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2785.41	Culv Frctn Ls (ft)	0.12
W.S. DS (ft)	2785.21	Culv Exit Loss (ft)	0.04
Delta EG (ft)	0.20	Culv Entr Loss (ft)	0.04
Delta WS (ft)	0.26	Q Weir (cfs)	
E.G. IC (ft)	2785.38	Weir Sta Lft (ft)	
E.G. OC (ft)	2785.61	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2785.39	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2785.21	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.89	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	990.49	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	5.81
Q Barrel (cfs)	495.25	Culv Vel DS (ft/s)	5.89
E.G. US. (ft)	2790.73	Culv Inv El Up (ft)	2784.00
W.S. US. (ft)	2790.38	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2790.45	Culv Frctn Ls (ft)	0.07
W.S. DS (ft)	2790.01	Culv Exit Loss (ft)	0.09
Delta EG (ft)	0.28	Culv Entr Loss (ft)	0.10
Delta WS (ft)	0.37	Q Weir (cfs)	
E.G. IC (ft)	2789.39	Weir Sta Lft (ft)	
E.G. OC (ft)	2790.72	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2790.09	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2790.01	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.39	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	661.58	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	5.17
Q Barrel (cfs)	330.79	Culv Vel DS (ft/s)	5.27
E.G. US. (ft)	2789.08	Culv Inv El Up (ft)	2784.00
W.S. US. (ft)	2788.78	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2788.84	Culv Frctn Ls (ft)	0.07
W.S. DS (ft)	2788.48	Culv Exit Loss (ft)	0.07
Delta EG (ft)	0.24	Culv Entr Loss (ft)	0.08
Delta WS (ft)	0.30	Q Weir (cfs)	
E.G. IC (ft)	2788.09	Weir Sta Lft (ft)	
E.G. OC (ft)	2789.07	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2788.57	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2788.48	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.59	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	406.67	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	4.53
Q Barrel (cfs)	203.33	Culv Vel DS (ft/s)	4.67
E.G. US. (ft)	2787.60	Culv Inv El Up (ft)	2784.00
W.S. US. (ft)	2787.37	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2787.39	Culv Frctn Ls (ft)	0.08
W.S. DS (ft)	2787.11	Culv Exit Loss (ft)	0.06

Delta EG (ft)	0.21	Culv Entr Loss (ft)	0.06
Delta WS (ft)	0.26	Q Weir (cfs)	
E.G. IC (ft)	2786.93	Weir Sta Lft (ft)	
E.G. OC (ft)	2787.59	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2787.21	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2787.11	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.87	Min El Weir Flow (ft)	2797.51

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 5609.6

INPUT
Description: Section 56+09.6 (D/S of Apple Valley Road)
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2806	163.43	2803	186.22	2801	189.43	2800	193.6	2799
220.14	2798	225.96	2797	235.64	2796	243.21	2795	252.32	2794
265.12	2793	273	2792	273	2784	280.62	2784	310.38	2784
319	2784	319	2792	340.05	2793	406.62	2794	422.95	2794
454.77	2795								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	273	.013	319	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
273	319	28.3	28.3	28.3	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	273	2797.5	T
319	454.77	2797.5	T

Left Levee Station= 273 Elevation= 2797.5
Right Levee Station= 319 Elevation= 2797.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2794.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.71	Wt. n-Val.		0.013	
W.S. Elev (ft)	2794.10	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2789.28	Flow Area (sq ft)		464.46	
E.G. Slope (ft/ft)	0.000262	Area (sq ft)		464.46	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	6.78	Avg. Vel. (ft/s)		6.78	
Max Chl Dpth (ft)	10.10	Hydr. Depth (ft)		10.10	
Conv. Total (cfs)	194574.0	Conv. (cfs)		194574.0	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		66.19	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.35	12.64	0.34
C & E Loss (ft)	0.79	Cum SA (acres)	0.20	3.63	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2793.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.013	
W.S. Elev (ft)	2793.11	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2788.77	Flow Area (sq ft)		418.98	
E.G. Slope (ft/ft)	0.000261	Area (sq ft)		418.98	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	6.44	Avg. Vel. (ft/s)		6.44	
Max Chl Dpth (ft)	9.11	Hydr. Depth (ft)		9.11	
Conv. Total (cfs)	167212.4	Conv. (cfs)		167212.4	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		64.22	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.28	10.90	0.27
C & E Loss (ft)	0.72	Cum SA (acres)	0.17	3.47	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2790.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.06	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2787.22	Flow Area (sq ft)		278.77	
E.G. Slope (ft/ft)	0.000274	Area (sq ft)		278.77	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	5.38	Avg. Vel. (ft/s)		5.38	
Max Chl Dpth (ft)	6.06	Hydr. Depth (ft)		6.06	
Conv. Total (cfs)	90625.8	Conv. (cfs)		90625.8	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		58.12	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	7.59	0.13
C & E Loss (ft)	0.50	Cum SA (acres)	0.11	3.22	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2785.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.21	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2784.84	Flow Area (sq ft)		55.83	
E.G. Slope (ft/ft)	0.000813	Area (sq ft)		55.83	
Q Total (cfs)	200.00	Flow (cfs)		200.00	

Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	3.58	Avg. Vel. (ft/s)		3.58	
Max Chl Dpth (ft)	1.21	Hydr. Depth (ft)		1.21	
Conv. Total (cfs)	7015.5	Conv. (cfs)		7015.5	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		48.43	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01	2.15	0.01
C & E Loss (ft)	0.10	Cum SA (acres)	0.03	2.71	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2790.45	Element			
Vel Head (ft)	0.45	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.01	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2787.20	Flow Area (sq ft)		276.24	
E.G. Slope (ft/ft)	0.000274	Area (sq ft)		276.24	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	5.36	Avg. Vel. (ft/s)		5.36	
Max Chl Dpth (ft)	6.01	Hydr. Depth (ft)		6.01	
Conv. Total (cfs)	89368.0	Conv. (cfs)		89368.0	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		58.01	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	7.85	0.13
C & E Loss (ft)	0.50	Cum SA (acres)	0.11	3.25	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2788.84	Element			
Vel Head (ft)	0.36	Wt. n-Val.		0.013	
W.S. Elev (ft)	2788.48	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2786.42	Flow Area (sq ft)		206.14	
E.G. Slope (ft/ft)	0.000303	Area (sq ft)		206.14	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	4.80	Avg. Vel. (ft/s)		4.80	
Max Chl Dpth (ft)	4.48	Hydr. Depth (ft)		4.48	
Conv. Total (cfs)	56875.9	Conv. (cfs)		56875.9	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		54.96	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.08	6.52	0.08
C & E Loss (ft)	0.37	Cum SA (acres)	0.08	3.15	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2787.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.		0.013	
W.S. Elev (ft)	2787.11	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2785.77	Flow Area (sq ft)		143.14	
E.G. Slope (ft/ft)	0.000362	Area (sq ft)		143.14	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	4.26	Avg. Vel. (ft/s)		4.26	
Max Chl Dpth (ft)	3.11	Hydr. Depth (ft)		3.11	
Conv. Total (cfs)	32045.0	Conv. (cfs)		32045.0	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		52.22	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.04	4.77	0.04
C & E Loss (ft)	0.26	Cum SA (acres)	0.06	2.99	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 5581.3

INPUT
Description: Section 52+51.2
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2795	104.63	2793	111.39	2792	134.99	2791	136.49	2790
137.99	2789	140.22	2787	140.23	2783.6	170.24	2783.6	170.25	2788
171.65	2789	173.14	2790	175.06	2791	177.7	2792	203.68	2793

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	140.22	.013	170.25	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
140.22	170.25	66	66	66	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	135	2794	T
175	203.68	2794	T

Left Levee Station= 135 Elevation= 2794
Right Levee Station= 175 Elevation= 2794

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2794.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.35	Wt. n-Val.	0.035	0.013	0.035
W.S. Elev (ft)	2790.66	Reach Len. (ft)	66.00	66.00	66.00

Crit W.S. (ft)	2790.66	Flow Area (sq ft)	7.97	211.81	5.15
E.G. Slope (ft/ft)	0.001674	Area (sq ft)	7.97	211.81	5.15
Q Total (cfs)	3150.00	Flow (cfs)	16.78	3124.02	9.20
Top Width (ft)	38.89	Top Width (ft)	4.71	30.03	4.15
Vel Total (ft/s)	14.00	Avg. Vel. (ft/s)	2.10	14.75	1.79
Max Chl Dpth (ft)	7.05	Hydr. Depth (ft)	1.69	7.05	1.24
Conv. Total (cfs)	76997.3	Conv. (cfs)	410.1	76362.3	224.9
Length Wtd. (ft)	66.00	Wetted Per. (ft)	5.98	37.81	4.93
Min Ch El (ft)	2783.60	Shear (lb/sq ft)	0.14	0.59	0.11
Alpha	1.10	Stream Power (lb/ft s)	203.68	135.00	175.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.35	12.42	0.33
C & E Loss (ft)	0.45	Cum SA (acres)	0.19	3.60	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2793.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.04	Wt. n-Val.	0.035	0.013	0.035
W.S. Elev (ft)	2789.98	Reach Len. (ft)	66.00	66.00	66.00
Crit W.S. (ft)	2789.98	Flow Area (sq ft)	5.12	191.40	2.77
E.G. Slope (ft/ft)	0.001735	Area (sq ft)	5.12	191.40	2.77
Q Total (cfs)	2700.00	Flow (cfs)	9.51	2686.27	4.22
Top Width (ft)	36.58	Top Width (ft)	3.69	30.03	2.85
Vel Total (ft/s)	13.55	Avg. Vel. (ft/s)	1.86	14.03	1.52
Max Chl Dpth (ft)	6.38	Hydr. Depth (ft)	1.39	6.37	0.97
Conv. Total (cfs)	64829.7	Conv. (cfs)	228.2	64500.1	101.4
Length Wtd. (ft)	66.00	Wetted Per. (ft)	4.75	37.81	3.47
Min Ch El (ft)	2783.60	Shear (lb/sq ft)	0.12	0.55	0.09
Alpha	1.07	Stream Power (lb/ft s)	203.68	135.00	175.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.28	10.70	0.27
C & E Loss (ft)	0.25	Cum SA (acres)	0.17	3.44	0.15

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2790.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.11	Wt. n-Val.	0.035	0.013	
W.S. Elev (ft)	2787.88	Reach Len. (ft)	66.00	66.00	66.00
Crit W.S. (ft)	2787.88	Flow Area (sq ft)	0.43	128.56	
E.G. Slope (ft/ft)	0.002028	Area (sq ft)	0.43	128.56	
Q Total (cfs)	1500.00	Flow (cfs)	0.40	1499.61	
Top Width (ft)	31.01	Top Width (ft)	0.98	30.03	
Vel Total (ft/s)	11.63	Avg. Vel. (ft/s)	0.91	11.66	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)	0.44	4.28	
Conv. Total (cfs)	33305.2	Conv. (cfs)	8.8	33296.4	
Length Wtd. (ft)	66.00	Wetted Per. (ft)	1.32	37.69	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)	0.04	0.43	
Alpha	1.01	Stream Power (lb/ft s)	203.68	135.00	175.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.13	7.46	0.13
C & E Loss (ft)	0.15	Cum SA (acres)	0.11	3.19	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2785.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.		0.013	
W.S. Elev (ft)	2784.72	Reach Len. (ft)	66.00	66.00	66.00
Crit W.S. (ft)	2784.72	Flow Area (sq ft)		33.68	
E.G. Slope (ft/ft)	0.002549	Area (sq ft)		33.68	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	30.02	Top Width (ft)		30.02	
Vel Total (ft/s)	5.94	Avg. Vel. (ft/s)		5.94	
Max Chl Dpth (ft)	1.12	Hydr. Depth (ft)		1.12	
Conv. Total (cfs)	3961.7	Conv. (cfs)		3961.7	
Length Wtd. (ft)	66.00	Wetted Per. (ft)		32.25	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	203.68	135.00	175.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.01	2.12	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	2.69	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2789.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.10	Wt. n-Val.	0.035	0.013	
W.S. Elev (ft)	2787.84	Reach Len. (ft)	66.00	66.00	66.00
Crit W.S. (ft)	2787.84	Flow Area (sq ft)	0.39	127.19	
E.G. Slope (ft/ft)	0.002043	Area (sq ft)	0.39	127.19	
Q Total (cfs)	1480.00	Flow (cfs)	0.34	1479.66	
Top Width (ft)	30.96	Top Width (ft)	0.93	30.03	
Vel Total (ft/s)	11.60	Avg. Vel. (ft/s)	0.88	11.63	
Max Chl Dpth (ft)	4.24	Hydr. Depth (ft)	0.42	4.24	
Conv. Total (cfs)	32740.8	Conv. (cfs)	7.6	32733.2	
Length Wtd. (ft)	66.00	Wetted Per. (ft)	1.25	37.65	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)	0.04	0.43	
Alpha	1.01	Stream Power (lb/ft s)	203.68	135.00	175.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.13	7.72	0.13
C & E Loss (ft)	0.15	Cum SA (acres)	0.11	3.22	0.10

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2788.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.60	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.85	Reach Len. (ft)	66.00	66.00	66.00
Crit W.S. (ft)	2786.85	Flow Area (sq ft)		97.56	
E.G. Slope (ft/ft)	0.002126	Area (sq ft)		97.56	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	30.03	Top Width (ft)		30.03	
Vel Total (ft/s)	10.15	Avg. Vel. (ft/s)		10.15	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		3.25	
Conv. Total (cfs)	21473.0	Conv. (cfs)		21473.0	
Length Wtd. (ft)	66.00	Wetted Per. (ft)		36.51	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)	203.68	135.00	175.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.08	6.42	0.08
C & E Loss (ft)	0.09	Cum SA (acres)	0.08	3.12	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2787.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.16	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.95	Reach Len. (ft)	66.00	66.00	66.00
Crit W.S. (ft)	2785.95	Flow Area (sq ft)		70.61	
E.G. Slope (ft/ft)	0.002217	Area (sq ft)		70.61	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	30.02	Top Width (ft)		30.02	
Vel Total (ft/s)	8.64	Avg. Vel. (ft/s)		8.64	
Max Chl Dpth (ft)	2.35	Hydr. Depth (ft)		2.35	
Conv. Total (cfs)	12956.1	Conv. (cfs)		12956.1	
Length Wtd. (ft)	66.00	Wetted Per. (ft)		34.71	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)	203.68	135.00	175.00
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.04	4.70	0.04
C & E Loss (ft)	0.05	Cum SA (acres)	0.06	2.96	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 5515.3

INPUT
Description: Section 51+85.2 (D/S of Apple Valley Road)
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2799	104.77	2798	110.07	2797	113.04	2796	115.11	2795
116.81	2794	119.03	2793	121.23	2792	136.53	2791	142.52	2790
145.66	2788	149.33	2786	151.31	2785	153.42	2784	155.79	2783
187.1	2783	190.49	2785	194.01	2787	199.36	2790	215.96	2791
221.95	2792	227.95	2793	280.62	2793	330.6	2794		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	142.52	.013	199.36	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
142.52	199.36	50.3	50.3	50.3	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2793.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.55	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.94	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2788.94	Flow Area (sq ft)		153.37	
E.G. Slope (ft/ft)	0.006906	Area (sq ft)		153.37	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	46.28	Top Width (ft)		46.28	
Vel Total (ft/s)	20.54	Avg. Vel. (ft/s)		20.54	
Max Chl Dpth (ft)	3.94	Hydr. Depth (ft)		3.31	
Conv. Total (cfs)	37904.1	Conv. (cfs)		37904.1	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		48.24	

Min Ch El (ft)	2783.00	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.34	12.14	0.33
C & E Loss (ft)	0.32	Cum SA (acres)	0.19	3.54	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2792.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.92	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.60	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2788.42	Flow Area (sq ft)		138.26	
E.G. Slope (ft/ft)	0.006902	Area (sq ft)		138.26	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	45.09	Top Width (ft)		45.09	
Vel Total (ft/s)	19.53	Avg. Vel. (ft/s)		19.53	
Max Chl Dpth (ft)	3.60	Hydr. Depth (ft)		3.07	
Conv. Total (cfs)	32499.8	Conv. (cfs)		32499.8	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		46.88	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		1.27	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.27	10.45	0.27
C & E Loss (ft)	0.29	Cum SA (acres)	0.17	3.39	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2789.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.56	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2786.80	Flow Area (sq ft)		93.29	
E.G. Slope (ft/ft)	0.006946	Area (sq ft)		93.29	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	41.29	Top Width (ft)		41.29	
Vel Total (ft/s)	16.08	Avg. Vel. (ft/s)		16.08	
Max Chl Dpth (ft)	2.56	Hydr. Depth (ft)		2.26	
Conv. Total (cfs)	17998.0	Conv. (cfs)		17998.0	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		42.54	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.13	7.29	0.13
C & E Loss (ft)	0.19	Cum SA (acres)	0.11	3.14	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2784.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2783.69	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2784.05	Flow Area (sq ft)		22.69	
E.G. Slope (ft/ft)	0.010387	Area (sq ft)		22.69	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	34.13	Top Width (ft)		34.13	
Vel Total (ft/s)	8.82	Avg. Vel. (ft/s)		8.82	
Max Chl Dpth (ft)	0.69	Hydr. Depth (ft)		0.66	
Conv. Total (cfs)	1962.4	Conv. (cfs)		1962.4	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		34.46	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.01	2.08	0.01
C & E Loss (ft)	0.07	Cum SA (acres)	0.03	2.64	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2789.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.98	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.54	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2786.76	Flow Area (sq ft)		92.45	
E.G. Slope (ft/ft)	0.006949	Area (sq ft)		92.45	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	41.21	Top Width (ft)		41.21	
Vel Total (ft/s)	16.01	Avg. Vel. (ft/s)		16.01	
Max Chl Dpth (ft)	2.54	Hydr. Depth (ft)		2.24	
Conv. Total (cfs)	17754.0	Conv. (cfs)		17754.0	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		42.46	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.13	7.56	0.13
C & E Loss (ft)	0.19	Cum SA (acres)	0.11	3.17	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2788.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2784.99	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2785.93	Flow Area (sq ft)		70.38	
E.G. Slope (ft/ft)	0.007160	Area (sq ft)		70.38	
Q Total (cfs)	990.00	Flow (cfs)		990.00	

Top Width (ft)	39.16	Top Width (ft)		39.16		
Vel Total (ft/s)	14.07	Avg. Vel. (ft/s)		14.07		
Max Chl Dpth (ft)	1.99	Hydr. Depth (ft)		1.80		
Conv. Total (cfs)	11700.0	Conv. (cfs)		11700.0		
Length Wtd. (ft)	50.30	Wetted Per. (ft)		40.13		
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.78		
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00	
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.08	6.30	0.08	
C & E Loss (ft)	0.15	Cum SA (acres)	0.08	3.07	0.08	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2786.75	Element			
Vel Head (ft)	2.28	Wt. n-Val.		0.013	
W.S. Elev (ft)	2784.47	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2785.16	Flow Area (sq ft)		50.31	
E.G. Slope (ft/ft)	0.007705	Area (sq ft)		50.31	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	37.15	Top Width (ft)		37.15	
Vel Total (ft/s)	12.13	Avg. Vel. (ft/s)		12.13	
Max Chl Dpth (ft)	1.47	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	6949.4	Conv. (cfs)		6949.4	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		37.86	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.64	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.04	4.61	0.04
C & E Loss (ft)	0.11	Cum SA (acres)	0.06	2.91	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 5135

INPUT
Description: Section 51+35 Improved Concrete Channel
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2790.21	112	2782.21	142	2782.21	154	2790.21

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	112	.013	142	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112	142	260	260	260	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2793.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.61	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2786.58	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2788.63	Flow Area (sq ft)	14.29	130.94	14.29
E.G. Slope (ft/ft)	0.004936	Area (sq ft)	14.29	130.94	14.29
Q Total (cfs)	3150.00	Flow (cfs)	170.78	2808.44	170.78
Top Width (ft)	43.09	Top Width (ft)	6.55	30.00	6.55
Vel Total (ft/s)	19.75	Avg. Vel. (ft/s)	11.95	21.45	11.95
Max Chl Dpth (ft)	4.36	Hydr. Depth (ft)	2.18	4.36	2.18
Conv. Total (cfs)	44835.0	Conv. (cfs)	2430.8	39973.4	2430.8
Length Wtd. (ft)	260.00	Wetted Per. (ft)	7.87	30.00	7.87
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.56	1.35	0.56
Alpha	1.09	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)	0.33	11.98	0.32
C & E Loss (ft)	0.01	Cum SA (acres)	0.19	3.50	0.16

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2792.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.04	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2786.18	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2788.03	Flow Area (sq ft)	11.79	118.96	11.79
E.G. Slope (ft/ft)	0.005094	Area (sq ft)	11.79	118.96	11.79
Q Total (cfs)	2700.00	Flow (cfs)	134.32	2431.36	134.32
Top Width (ft)	41.90	Top Width (ft)	5.95	30.00	5.95
Vel Total (ft/s)	18.94	Avg. Vel. (ft/s)	11.39	20.44	11.39
Max Chl Dpth (ft)	3.97	Hydr. Depth (ft)	1.98	3.97	1.98
Conv. Total (cfs)	37828.7	Conv. (cfs)	1881.9	34064.8	1881.9
Length Wtd. (ft)	260.00	Wetted Per. (ft)	7.15	30.00	7.15
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.52	1.26	0.52
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.27	10.30	0.26
C & E Loss (ft)	0.01	Cum SA (acres)	0.16	3.34	0.15

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2789.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.30	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2784.93	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2786.24	Flow Area (sq ft)	5.57	81.72	5.57
E.G. Slope (ft/ft)	0.005855	Area (sq ft)	5.57	81.72	5.57
Q Total (cfs)	1500.00	Flow (cfs)	52.91	1394.17	52.91
Top Width (ft)	38.17	Top Width (ft)	4.09	30.00	4.09
Vel Total (ft/s)	16.15	Avg. Vel. (ft/s)	9.51	17.06	9.51
Max Chl Dpth (ft)	2.72	Hydr. Depth (ft)	1.36	2.72	1.36
Conv. Total (cfs)	19603.1	Conv. (cfs)	691.5	18220.1	691.5
Length Wtd. (ft)	260.00	Wetted Per. (ft)	4.91	30.00	4.91
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.41	1.00	0.41
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.13	7.19	0.13
C & E Loss (ft)	0.03	Cum SA (acres)	0.10	3.10	0.10

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2784.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.43	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2782.89	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2783.31	Flow Area (sq ft)	0.34	20.32	0.34
E.G. Slope (ft/ft)	0.012013	Area (sq ft)	0.34	20.32	0.34
Q Total (cfs)	200.00	Flow (cfs)	1.85	196.30	1.85

Top Width (ft)	32.03	Top Width (ft)	1.02	30.00	1.02
Vel Total (ft/s)	9.52	Avg. Vel. (ft/s)	5.38	9.66	5.38
Max Chl Dpth (ft)	0.68	Hydr. Depth (ft)	0.34	0.68	0.34
Conv. Total (cfs)	1824.7	Conv. (cfs)	16.9	1791.0	16.9
Length Wtd. (ft)	260.00	Wetted Per. (ft)	1.22	30.00	1.22
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.21	0.51	0.21
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)	0.01	2.05	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	2.60	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2789.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.27	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2784.91	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2786.21	Flow Area (sq ft)	5.46	80.98	5.46
E.G. Slope (ft/ft)	0.005885	Area (sq ft)	5.46	80.98	5.46
Q Total (cfs)	1480.00	Flow (cfs)	51.76	1376.47	51.76
Top Width (ft)	38.10	Top Width (ft)	4.05	30.00	4.05
Vel Total (ft/s)	16.10	Avg. Vel. (ft/s)	9.47	17.00	9.47
Max Chl Dpth (ft)	2.70	Hydr. Depth (ft)	1.35	2.70	1.35
Conv. Total (cfs)	19292.9	Conv. (cfs)	674.8	17943.3	674.8
Length Wtd. (ft)	260.00	Wetted Per. (ft)	4.87	30.00	4.87
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.41	0.99	0.41
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.13	7.46	0.12
C & E Loss (ft)	0.03	Cum SA (acres)	0.11	3.13	0.10

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2787.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.41	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2784.28	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2785.31	Flow Area (sq ft)	3.20	61.96	3.20
E.G. Slope (ft/ft)	0.006645	Area (sq ft)	3.20	61.96	3.20
Q Total (cfs)	990.00	Flow (cfs)	26.93	936.13	26.93
Top Width (ft)	36.20	Top Width (ft)	3.10	30.00	3.10
Vel Total (ft/s)	14.48	Avg. Vel. (ft/s)	8.42	15.11	8.42
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)	1.03	2.07	1.03
Conv. Total (cfs)	12145.2	Conv. (cfs)	330.4	11484.3	330.4
Length Wtd. (ft)	260.00	Wetted Per. (ft)	3.72	30.00	3.72
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.36	0.86	0.36
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.08	6.22	0.08
C & E Loss (ft)	0.03	Cum SA (acres)	0.08	3.03	0.08

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2786.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.63	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2783.69	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2784.48	Flow Area (sq ft)	1.64	44.39	1.64
E.G. Slope (ft/ft)	0.007906	Area (sq ft)	1.64	44.39	1.64
Q Total (cfs)	610.00	Flow (cfs)	12.08	585.84	12.08
Top Width (ft)	34.44	Top Width (ft)	2.22	30.00	2.22
Vel Total (ft/s)	12.79	Avg. Vel. (ft/s)	7.35	13.20	7.35
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)	0.74	1.48	0.74
Conv. Total (cfs)	6860.6	Conv. (cfs)	135.8	6588.9	135.8
Length Wtd. (ft)	260.00	Wetted Per. (ft)	2.67	30.00	2.67
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.30	0.73	0.30
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	0.04	4.56	0.04

C & E Loss (ft)	0.03	Cum SA (acres)	0.06	2.87	0.06

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 4875

INPUT
Description: Section 48+75 Improved Concrete Channel
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2787.75	112	2779.75	142	2779.75	154	2787.75

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	112	.013	142	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112	142	240	240	240	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2791.62	Element			
Vel Head (ft)	7.81	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2783.81	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2786.17	Flow Area (sq ft)	12.34	121.68	12.34
E.G. Slope (ft/ft)	0.006401	Area (sq ft)	12.34	121.68	12.34
Q Total (cfs)	3150.00	Flow (cfs)	159.93	2830.13	159.93
Top Width (ft)	42.17	Top Width (ft)	6.08	30.00	6.08
Vel Total (ft/s)	21.52	Avg. Vel. (ft/s)	12.96	23.26	12.96
Max Chl Dpth (ft)	4.06	Hydr. Depth (ft)	2.03	4.06	2.03
Conv. Total (cfs)	39373.2	Conv. (cfs)	1999.1	35375.0	1999.1
Length Wtd. (ft)	240.00	Wetted Per. (ft)	7.31	30.00	7.31
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.67	1.62	0.67
Alpha	1.09	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.46	Cum Volume (acre-ft)	0.25	11.22	0.24
C & E Loss (ft)	0.12	Cum SA (acres)	0.15	3.32	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2790.60	Element			
Vel Head (ft)	7.17	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2783.43	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2785.57	Flow Area (sq ft)	10.13	110.24	10.13
E.G. Slope (ft/ft)	0.006663	Area (sq ft)	10.13	110.24	10.13
Q Total (cfs)	2700.00	Flow (cfs)	125.39	2449.23	125.39
Top Width (ft)	41.02	Top Width (ft)	5.51	30.00	5.51
Vel Total (ft/s)	20.69	Avg. Vel. (ft/s)	12.38	22.22	12.38
Max Chl Dpth (ft)	3.67	Hydr. Depth (ft)	1.84	3.67	1.84
Conv. Total (cfs)	33076.3	Conv. (cfs)	1536.1	30004.2	1536.1
Length Wtd. (ft)	240.00	Wetted Per. (ft)	6.62	30.00	6.62
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.64	1.53	0.64
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.51	Cum Volume (acre-ft)	0.20	9.62	0.20
C & E Loss (ft)	0.11	Cum SA (acres)	0.13	3.16	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2787.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.14	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2782.26	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2783.78	Flow Area (sq ft)	4.72	75.28	4.72
E.G. Slope (ft/ft)	0.007786	Area (sq ft)	4.72	75.28	4.72
Q Total (cfs)	1500.00	Flow (cfs)	49.01	1401.97	49.01
Top Width (ft)	37.53	Top Width (ft)	3.76	30.00	3.76
Vel Total (ft/s)	17.70	Avg. Vel. (ft/s)	10.38	18.62	10.38
Max Chl Dpth (ft)	2.51	Hydr. Depth (ft)	1.25	2.51	1.25
Conv. Total (cfs)	16999.6	Conv. (cfs)	555.5	15888.7	555.5
Length Wtd. (ft)	240.00	Wetted Per. (ft)	4.52	30.00	4.52
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.51	1.22	0.51
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.75	Cum Volume (acre-ft)	0.09	6.72	0.09
C & E Loss (ft)	0.08	Cum SA (acres)	0.08	2.92	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2781.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.15	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2780.50	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2780.84	Flow Area (sq ft)	0.43	22.62	0.43
E.G. Slope (ft/ft)	0.008368	Area (sq ft)	0.43	22.62	0.43
Q Total (cfs)	200.00	Flow (cfs)	2.06	195.89	2.06
Top Width (ft)	32.26	Top Width (ft)	1.13	30.00	1.13
Vel Total (ft/s)	8.52	Avg. Vel. (ft/s)	4.83	8.66	4.83
Max Chl Dpth (ft)	0.75	Hydr. Depth (ft)	0.38	0.75	0.38
Conv. Total (cfs)	2186.4	Conv. (cfs)	22.5	2141.4	22.5
Length Wtd. (ft)	240.00	Wetted Per. (ft)	1.36	30.00	1.36
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.16	0.39	0.16
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.59	Cum Volume (acre-ft)	0.01	1.93	0.01
C & E Loss (ft)	0.08	Cum SA (acres)	0.02	2.43	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2787.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.10	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2782.24	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2783.75	Flow Area (sq ft)	4.64	74.61	4.64
E.G. Slope (ft/ft)	0.007817	Area (sq ft)	4.64	74.61	4.64
Q Total (cfs)	1480.00	Flow (cfs)	47.96	1384.08	47.96
Top Width (ft)	37.46	Top Width (ft)	3.73	30.00	3.73
Vel Total (ft/s)	17.64	Avg. Vel. (ft/s)	10.34	18.55	10.34

Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)	1.24	2.49	1.24
Conv. Total (cfs)	16739.8	Conv. (cfs)	542.4	15654.9	542.4
Length Wtd. (ft)	240.00	Wetted Per. (ft)	4.48	30.00	4.48
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.50	1.21	0.50
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.75	Cum Volume (acre-ft)	0.09	6.99	0.09
C & E Loss (ft)	0.08	Cum SA (acres)	0.08	2.95	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2785.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.00	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2781.67	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2782.85	Flow Area (sq ft)	2.75	57.49	2.75
E.G. Slope (ft/ft)	0.008595	Area (sq ft)	2.75	57.49	2.75
Q Total (cfs)	990.00	Flow (cfs)	25.09	939.82	25.09
Top Width (ft)	35.75	Top Width (ft)	2.87	30.00	2.87
Vel Total (ft/s)	15.72	Avg. Vel. (ft/s)	9.11	16.35	9.11
Max Chl Dpth (ft)	1.92	Hydr. Depth (ft)	0.96	1.92	0.96
Conv. Total (cfs)	10678.8	Conv. (cfs)	270.6	10137.5	270.6
Length Wtd. (ft)	240.00	Wetted Per. (ft)	3.45	30.00	3.45
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.43	1.03	0.43
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.96	Cum Volume (acre-ft)	0.06	5.86	0.06
C & E Loss (ft)	0.06	Cum SA (acres)	0.06	2.85	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2784.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.90	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2781.16	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2782.02	Flow Area (sq ft)	1.49	42.35	1.49
E.G. Slope (ft/ft)	0.009284	Area (sq ft)	1.49	42.35	1.49
Q Total (cfs)	610.00	Flow (cfs)	11.54	586.91	11.54
Top Width (ft)	34.23	Top Width (ft)	2.12	30.00	2.12
Vel Total (ft/s)	13.45	Avg. Vel. (ft/s)	7.72	13.86	7.72
Max Chl Dpth (ft)	1.41	Hydr. Depth (ft)	0.71	1.41	0.71
Conv. Total (cfs)	6330.8	Conv. (cfs)	119.8	6091.2	119.8
Length Wtd. (ft)	240.00	Wetted Per. (ft)	2.54	30.00	2.54
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.34	0.82	0.34
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.22	Cum Volume (acre-ft)	0.03	4.30	0.03
C & E Loss (ft)	0.03	Cum SA (acres)	0.05	2.70	0.05

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

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RIVER: Desert Knolls Wa
REACH: Main               RS: 4635

INPUT
Description: Section 46+35 Improved Concrete Channel
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2785.45     112 2777.45     142 2777.45     154 2785.45

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .013     112    .013     142    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           112     142              250     250     250             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2789.90    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               8.55    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2781.35    Reach Len. (ft)           250.00     250.00     250.00
  Crit W.S. (ft)           2783.87    Flow Area (sq ft)          11.39     116.93      11.39
  E.G. Slope (ft/ft)      0.007368    Area (sq ft)               11.39     116.93      11.39
  Q Total (cfs)            3150.00    Flow (cfs)                154.30    2841.40     154.30
  Top Width (ft)             41.69    Top Width (ft)              5.85      30.00       5.85
  Vel Total (ft/s)           22.55    Avg. Vel. (ft/s)           13.54      24.30      13.54
  Max Chl Dpth (ft)           3.90    Hydr. Depth (ft)            1.95       3.90       1.95
  Conv. Total (cfs)        36697.2    Conv. (cfs)               1797.6    33102.0     1797.6
  Length Wtd. (ft)          250.00    Wetted Per. (ft)            7.03      30.00       7.03
  Min Ch El (ft)           2777.45    Shear (lb/sq ft)            0.75       1.79       0.75
  Alpha                       1.08    Stream Power (lb/ft s)    154.00       0.00       0.00
  Frctn Loss (ft)             1.65    Cum Volume (acre-ft)        0.19      10.57       0.18
  C & E Loss (ft)             0.07    Cum SA (acres)              0.12       3.16       0.09


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2788.82    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               7.84    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2780.98    Reach Len. (ft)           250.00     250.00     250.00
  Crit W.S. (ft)           2783.27    Flow Area (sq ft)           9.36     105.97       9.36
  E.G. Slope (ft/ft)      0.007654    Area (sq ft)                9.36     105.97       9.36
  Q Total (cfs)            2700.00    Flow (cfs)                120.97    2458.05     120.97
  Top Width (ft)             40.60    Top Width (ft)              5.30      30.00       5.30
  Vel Total (ft/s)           21.65    Avg. Vel. (ft/s)           12.93      23.19      12.93
  Max Chl Dpth (ft)           3.53    Hydr. Depth (ft)            1.77       3.53       1.77
  Conv. Total (cfs)        30861.0    Conv. (cfs)               1382.7    28095.5     1382.7
  Length Wtd. (ft)          250.00    Wetted Per. (ft)            6.37      30.00       6.37
  Min Ch El (ft)           2777.45    Shear (lb/sq ft)            0.70       1.69       0.70
  Alpha                       1.08    Stream Power (lb/ft s)    154.00       0.00       0.00
  Frctn Loss (ft)             1.71    Cum Volume (acre-ft)        0.15       9.02       0.14
  C & E Loss (ft)             0.07    Cum SA (acres)              0.10       3.00       0.08


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
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need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2785.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.52	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2779.88	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2781.48	Flow Area (sq ft)	4.42	72.87	4.42
E.G. Slope (ft/ft)	0.008714	Area (sq ft)	4.42	72.87	4.42
Q Total (cfs)	1500.00	Flow (cfs)	47.54	1404.91	47.54
Top Width (ft)	37.29	Top Width (ft)	3.64	30.00	3.64
Vel Total (ft/s)	18.36	Avg. Vel. (ft/s)	10.74	19.28	10.74
Max Chl Dpth (ft)	2.43	Hydr. Depth (ft)	1.21	2.43	1.21
Conv. Total (cfs)	16068.7	Conv. (cfs)	509.3	15050.1	509.3
Length Wtd. (ft)	250.00	Wetted Per. (ft)	4.38	30.00	4.38
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.55	1.32	0.55
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.98	Cum Volume (acre-ft)	0.07	6.31	0.07
C & E Loss (ft)	0.04	Cum SA (acres)	0.06	2.75	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2779.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.28	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2778.17	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2778.54	Flow Area (sq ft)	0.38	21.45	0.38
E.G. Slope (ft/ft)	0.010001	Area (sq ft)	0.38	21.45	0.38
Q Total (cfs)	200.00	Flow (cfs)	1.95	196.09	1.95
Top Width (ft)	32.15	Top Width (ft)	1.07	30.00	1.07
Vel Total (ft/s)	9.00	Avg. Vel. (ft/s)	5.09	9.14	5.09
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)	0.36	0.72	0.36
Conv. Total (cfs)	1999.9	Conv. (cfs)	19.5	1960.8	19.5
Length Wtd. (ft)	250.00	Wetted Per. (ft)	1.29	30.00	1.29
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.19	0.45	0.19
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.19	Cum Volume (acre-ft)	0.01	1.80	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.02	2.26	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2785.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.47	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2779.86	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2781.45	Flow Area (sq ft)	4.36	72.30	4.36
E.G. Slope (ft/ft)	0.008717	Area (sq ft)	4.36	72.30	4.36
Q Total (cfs)	1480.00	Flow (cfs)	46.56	1386.87	46.56
Top Width (ft)	37.23	Top Width (ft)	3.61	30.00	3.61
Vel Total (ft/s)	18.27	Avg. Vel. (ft/s)	10.69	19.18	10.69
Max Chl Dpth (ft)	2.41	Hydr. Depth (ft)	1.20	2.41	1.20
Conv. Total (cfs)	15851.4	Conv. (cfs)	498.7	14853.9	498.7
Length Wtd. (ft)	250.00	Wetted Per. (ft)	4.34	30.00	4.34
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.55	1.31	0.55
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.98	Cum Volume (acre-ft)	0.07	6.59	0.07
C & E Loss (ft)	0.04	Cum SA (acres)	0.06	2.78	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2783.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.18	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2779.33	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2780.55	Flow Area (sq ft)	2.64	56.32	2.64
E.G. Slope (ft/ft)	0.009220	Area (sq ft)	2.64	56.32	2.64
Q Total (cfs)	990.00	Flow (cfs)	24.61	940.78	24.61
Top Width (ft)	35.63	Top Width (ft)	2.82	30.00	2.82
Vel Total (ft/s)	16.07	Avg. Vel. (ft/s)	9.31	16.70	9.31
Max Chl Dpth (ft)	1.88	Hydr. Depth (ft)	0.94	1.88	0.94
Conv. Total (cfs)	10310.1	Conv. (cfs)	256.3	9797.5	256.3
Length Wtd. (ft)	250.00	Wetted Per. (ft)	3.38	30.00	3.38
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.45	1.08	0.45
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.14	Cum Volume (acre-ft)	0.04	5.55	0.04
C & E Loss (ft)	0.02	Cum SA (acres)	0.05	2.69	0.05

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2781.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.95	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2778.85	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2779.72	Flow Area (sq ft)	1.47	42.03	1.47
E.G. Slope (ft/ft)	0.009529	Area (sq ft)	1.47	42.03	1.47
Q Total (cfs)	610.00	Flow (cfs)	11.46	587.08	11.46
Top Width (ft)	34.20	Top Width (ft)	2.10	30.00	2.10
Vel Total (ft/s)	13.56	Avg. Vel. (ft/s)	7.78	13.97	7.78
Max Chl Dpth (ft)	1.40	Hydr. Depth (ft)	0.70	1.40	0.70
Conv. Total (cfs)	6248.9	Conv. (cfs)	117.4	6014.1	117.4
Length Wtd. (ft)	250.00	Wetted Per. (ft)	2.53	30.00	2.53
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.35	0.83	0.35
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.26	Cum Volume (acre-ft)	0.02	4.07	0.02
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	2.53	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 4385

INPUT
Description: Section 43+85 Improved Concrete Channel
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2783.05	112	2775.05	142	2775.05	154	2783.05

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	112	.013	142	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112	142	250	250	250	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2787.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.07	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2778.85	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2781.47	Flow Area (sq ft)	10.81	113.90	10.81
E.G. Slope (ft/ft)	0.008084	Area (sq ft)	10.81	113.90	10.81
Q Total (cfs)	3150.00	Flow (cfs)	150.68	2848.64	150.68
Top Width (ft)	41.39	Top Width (ft)	5.69	30.00	5.69
Vel Total (ft/s)	23.24	Avg. Vel. (ft/s)	13.94	25.01	13.94
Max Chl Dpth (ft)	3.80	Hydr. Depth (ft)	1.90	3.80	1.90
Conv. Total (cfs)	35035.6	Conv. (cfs)	1675.9	31683.8	1675.9
Length Wtd. (ft)	250.00	Wetted Per. (ft)	6.84	30.00	6.84
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.80	1.92	0.80
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.93	Cum Volume (acre-ft)	0.12	9.90	0.11
C & E Loss (ft)	0.05	Cum SA (acres)	0.08	2.98	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2786.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.28	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2778.50	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2780.87	Flow Area (sq ft)	8.91	103.39	8.91
E.G. Slope (ft/ft)	0.008348	Area (sq ft)	8.91	103.39	8.91
Q Total (cfs)	2700.00	Flow (cfs)	118.28	2463.44	118.28
Top Width (ft)	40.34	Top Width (ft)	5.17	30.00	5.17
Vel Total (ft/s)	22.28	Avg. Vel. (ft/s)	13.28	23.83	13.28
Max Chl Dpth (ft)	3.45	Hydr. Depth (ft)	1.72	3.45	1.72
Conv. Total (cfs)	29551.6	Conv. (cfs)	1294.6	26962.4	1294.6
Length Wtd. (ft)	250.00	Wetted Per. (ft)	6.21	30.00	6.21
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.75	1.80	0.75
Alpha	1.07	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.00	Cum Volume (acre-ft)	0.10	8.42	0.09
C & E Loss (ft)	0.04	Cum SA (acres)	0.07	2.83	0.05

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2783.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.70	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2777.44	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2779.08	Flow Area (sq ft)	4.30	71.81	4.30
E.G. Slope (ft/ft)	0.009165	Area (sq ft)	4.30	71.81	4.30
Q Total (cfs)	1500.00	Flow (cfs)	46.90	1406.20	46.90
Top Width (ft)	37.18	Top Width (ft)	3.59	30.00	3.59
Vel Total (ft/s)	18.65	Avg. Vel. (ft/s)	10.91	19.58	10.91
Max Chl Dpth (ft)	2.39	Hydr. Depth (ft)	1.20	2.39	1.20

Conv. Total (cfs)	15668.6	Conv. (cfs)	489.9	14688.8	489.9
Length Wtd. (ft)	250.00	Wetted Per. (ft)	4.32	30.00	4.32
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.57	1.37	0.57
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.23	Cum Volume (acre-ft)	0.04	5.90	0.04
C & E Loss (ft)	0.02	Cum SA (acres)	0.04	2.58	0.04

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2777.01	Element			
Vel Head (ft)	1.23	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2775.78	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2776.15	Flow Area (sq ft)	0.40	21.86	0.40
E.G. Slope (ft/ft)	0.009382	Area (sq ft)	0.40	21.86	0.40
Q Total (cfs)	200.00	Flow (cfs)	1.99	196.02	1.99
Top Width (ft)	32.19	Top Width (ft)	1.09	30.00	1.09
Vel Total (ft/s)	8.83	Avg. Vel. (ft/s)	5.00	8.97	5.00
Max Chl Dpth (ft)	0.73	Hydr. Depth (ft)	0.36	0.73	0.36
Conv. Total (cfs)	2064.8	Conv. (cfs)	20.5	2023.7	20.5
Length Wtd. (ft)	250.00	Wetted Per. (ft)	1.31	30.00	1.31
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.18	0.43	0.18
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.42	Cum Volume (acre-ft)	0.00	1.68	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	2.09	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2783.07	Element			
Vel Head (ft)	5.64	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2777.43	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2779.05	Flow Area (sq ft)	4.23	71.25	4.23
E.G. Slope (ft/ft)	0.009169	Area (sq ft)	4.23	71.25	4.23
Q Total (cfs)	1480.00	Flow (cfs)	45.93	1388.14	45.93
Top Width (ft)	37.13	Top Width (ft)	3.56	30.00	3.56
Vel Total (ft/s)	18.57	Avg. Vel. (ft/s)	10.86	19.48	10.86
Max Chl Dpth (ft)	2.38	Hydr. Depth (ft)	1.19	2.38	1.19
Conv. Total (cfs)	15456.4	Conv. (cfs)	479.7	14497.0	479.7
Length Wtd. (ft)	250.00	Wetted Per. (ft)	4.28	30.00	4.28
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.57	1.36	0.57
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.23	Cum Volume (acre-ft)	0.05	6.17	0.05
C & E Loss (ft)	0.02	Cum SA (acres)	0.04	2.61	0.04

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2781.17	Element			
Vel Head (ft)	4.25	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2776.91	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2778.15	Flow Area (sq ft)	2.60	55.89	2.60
E.G. Slope (ft/ft)	0.009467	Area (sq ft)	2.60	55.89	2.60

Q Total (cfs)	990.00	Flow (cfs)	24.43	941.14	24.43
Top Width (ft)	35.59	Top Width (ft)	2.79	30.00	2.79
Vel Total (ft/s)	16.20	Avg. Vel. (ft/s)	9.38	16.84	9.38
Max Chl Dpth (ft)	1.86	Hydr. Depth (ft)	0.93	1.86	0.93
Conv. Total (cfs)	10174.7	Conv. (cfs)	251.1	9672.6	251.1
Length Wtd. (ft)	250.00	Wetted Per. (ft)	3.36	30.00	3.36
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.46	1.10	0.46
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.34	Cum Volume (acre-ft)	0.03	5.23	0.03
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	2.51	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2779.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.96	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2776.45	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2777.32	Flow Area (sq ft)	1.47	41.99	1.47
E.G. Slope (ft/ft)	0.009557	Area (sq ft)	1.47	41.99	1.47
Q Total (cfs)	610.00	Flow (cfs)	11.45	587.10	11.45
Top Width (ft)	34.20	Top Width (ft)	2.10	30.00	2.10
Vel Total (ft/s)	13.58	Avg. Vel. (ft/s)	7.79	13.98	7.79
Max Chl Dpth (ft)	1.40	Hydr. Depth (ft)	0.70	1.40	0.70
Conv. Total (cfs)	6239.6	Conv. (cfs)	117.1	6005.4	117.1
Length Wtd. (ft)	250.00	Wetted Per. (ft)	2.52	30.00	2.52
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.35	0.84	0.35
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	0.02	3.82	0.02
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	2.36	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 4135

INPUT
Description: Section 41+35 Improved Concrete Channel
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2780.65	112	2772.65	142	2772.65	154	2780.65

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	112	.013	142	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112	142	165.4	165.4	165.4	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2785.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.42	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2776.38	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2779.07	Flow Area (sq ft)	10.46	112.01	10.46
E.G. Slope (ft/ft)	0.008574	Area (sq ft)	10.46	112.01	10.46

Q Total (cfs)	3150.00	Flow (cfs)	148.42	2853.17	148.42
Top Width (ft)	41.20	Top Width (ft)	5.60	30.00	5.60
Vel Total (ft/s)	23.70	Avg. Vel. (ft/s)	14.20	25.47	14.20
Max Chl Dpth (ft)	3.73	Hydr. Depth (ft)	1.87	3.73	1.87
Conv. Total (cfs)	34018.2	Conv. (cfs)	1602.8	30812.6	1602.8
Length Wtd. (ft)	165.40	Wetted Per. (ft)	6.73	30.00	6.73
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.83	2.00	0.83
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.08	Cum Volume (acre-ft)	0.06	9.26	0.05
C & E Loss (ft)	0.03	Cum SA (acres)	0.05	2.81	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2784.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.56	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2776.05	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2778.47	Flow Area (sq ft)	8.65	101.87	8.65
E.G. Slope (ft/ft)	0.008794	Area (sq ft)	8.65	101.87	8.65
Q Total (cfs)	2700.00	Flow (cfs)	116.69	2466.62	116.69
Top Width (ft)	40.19	Top Width (ft)	5.09	30.00	5.09
Vel Total (ft/s)	22.66	Avg. Vel. (ft/s)	13.49	24.21	13.49
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)	1.70	3.40	1.70
Conv. Total (cfs)	28792.2	Conv. (cfs)	1244.3	26303.5	1244.3
Length Wtd. (ft)	165.40	Wetted Per. (ft)	6.12	30.00	6.12
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.78	1.86	0.78
Alpha	1.07	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.14	Cum Volume (acre-ft)	0.04	7.83	0.04
C & E Loss (ft)	0.03	Cum SA (acres)	0.04	2.65	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2780.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.78	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2775.03	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2776.68	Flow Area (sq ft)	4.24	71.31	4.24
E.G. Slope (ft/ft)	0.009391	Area (sq ft)	4.24	71.31	4.24
Q Total (cfs)	1500.00	Flow (cfs)	46.59	1406.82	46.59
Top Width (ft)	37.13	Top Width (ft)	3.57	30.00	3.57
Vel Total (ft/s)	18.80	Avg. Vel. (ft/s)	10.99	19.73	10.99
Max Chl Dpth (ft)	2.38	Hydr. Depth (ft)	1.19	2.38	1.19
Conv. Total (cfs)	15478.4	Conv. (cfs)	480.7	14516.9	480.7
Length Wtd. (ft)	165.40	Wetted Per. (ft)	4.29	30.00	4.29
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.58	1.39	0.58
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.32	Cum Volume (acre-ft)	0.02	5.49	0.02
C & E Loss (ft)	0.01	Cum SA (acres)	0.02	2.41	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2774.63	Element	Left OB	Channel	Right OB

Vel Head (ft)	1.26	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2773.37	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2773.74	Flow Area (sq ft)	0.39	21.64	0.39
E.G. Slope (ft/ft)	0.009707	Area (sq ft)	0.39	21.64	0.39
Q Total (cfs)	200.00	Flow (cfs)	1.97	196.06	1.97
Top Width (ft)	32.16	Top Width (ft)	1.08	30.00	1.08
Vel Total (ft/s)	8.92	Avg. Vel. (ft/s)	5.05	9.06	5.05
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)	0.36	0.72	0.36
Conv. Total (cfs)	2029.9	Conv. (cfs)	20.0	1989.9	20.0
Length Wtd. (ft)	165.40	Wetted Per. (ft)	1.30	30.00	1.30
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.18	0.44	0.18
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	0.00	1.56	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	1.92	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2780.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.73	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2775.01	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2776.65	Flow Area (sq ft)	4.17	70.74	4.17
E.G. Slope (ft/ft)	0.009397	Area (sq ft)	4.17	70.74	4.17
Q Total (cfs)	1480.00	Flow (cfs)	45.63	1388.75	45.63
Top Width (ft)	37.07	Top Width (ft)	3.54	30.00	3.54
Vel Total (ft/s)	18.71	Avg. Vel. (ft/s)	10.94	19.63	10.94
Max Chl Dpth (ft)	2.36	Hydr. Depth (ft)	1.18	2.36	1.18
Conv. Total (cfs)	15267.4	Conv. (cfs)	470.7	14326.1	470.7
Length Wtd. (ft)	165.40	Wetted Per. (ft)	4.25	30.00	4.25
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.58	1.38	0.58
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.32	Cum Volume (acre-ft)	0.02	5.77	0.02
C & E Loss (ft)	0.01	Cum SA (acres)	0.02	2.44	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2778.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.28	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2774.51	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2775.75	Flow Area (sq ft)	2.59	55.72	2.59
E.G. Slope (ft/ft)	0.009570	Area (sq ft)	2.59	55.72	2.59
Q Total (cfs)	990.00	Flow (cfs)	24.36	941.29	24.36
Top Width (ft)	35.57	Top Width (ft)	2.79	30.00	2.79
Vel Total (ft/s)	16.26	Avg. Vel. (ft/s)	9.42	16.89	9.42
Max Chl Dpth (ft)	1.86	Hydr. Depth (ft)	0.93	1.86	0.93
Conv. Total (cfs)	10119.9	Conv. (cfs)	249.0	9621.9	249.0
Length Wtd. (ft)	165.40	Wetted Per. (ft)	3.35	30.00	3.35
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.46	1.11	0.46
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.38	Cum Volume (acre-ft)	0.01	4.91	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	2.34	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2777.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.96	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2774.05	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2774.92	Flow Area (sq ft)	1.47	41.94	1.47
E.G. Slope (ft/ft)	0.009597	Area (sq ft)	1.47	41.94	1.47
Q Total (cfs)	610.00	Flow (cfs)	11.44	587.13	11.44
Top Width (ft)	34.19	Top Width (ft)	2.10	30.00	2.10
Vel Total (ft/s)	13.59	Avg. Vel. (ft/s)	7.80	14.00	7.80
Max Chl Dpth (ft)	1.40	Hydr. Depth (ft)	0.70	1.40	0.70
Conv. Total (cfs)	6226.7	Conv. (cfs)	116.7	5993.2	116.7
Length Wtd. (ft)	165.40	Wetted Per. (ft)	2.52	30.00	2.52
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.35	0.84	0.35
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	0.01	3.58	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	2.19	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3969.6

INPUT
Description: Section 39+69.6
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2785	141.2	2781	169.77	2780	181.58	2779	202.31	2778
207.79	2778	213.27	2779	229.66	2779	234.4	2778	239.14	2775
245.44	2771	275.44	2771	277	2772	281.5	2775	286	2778
299.19	2779	315.96	2781	324.96	2785				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	234.4	.013	286	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
234.4	286	134.6	134.6	134.6	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2784.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.43	Wt. n-Val.		0.013	
W.S. Elev (ft)	2774.82	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2777.51	Flow Area (sq ft)		137.17	
E.G. Slope (ft/ft)	0.010223	Area (sq ft)		137.17	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	41.80	Top Width (ft)		41.80	
Vel Total (ft/s)	24.64	Avg. Vel. (ft/s)		24.64	
Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)		3.28	
Conv. Total (cfs)	33428.6	Conv. (cfs)		33428.6	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		44.06	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		1.99	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.55	Cum Volume (acre-ft)	0.04	8.78	0.03
C & E Loss (ft)	0.00	Cum SA (acres)	0.04	2.67	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2782.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.70	Wt. n-Val.		0.013	
W.S. Elev (ft)	2774.26	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2776.67	Flow Area (sq ft)		114.09	
E.G. Slope (ft/ft)	0.011306	Area (sq ft)		114.09	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	40.07	Top Width (ft)		40.07	
Vel Total (ft/s)	23.67	Avg. Vel. (ft/s)		23.67	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		2.85	
Conv. Total (cfs)	25392.6	Conv. (cfs)		25392.6	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		41.99	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		1.92	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.64	Cum Volume (acre-ft)	0.03	7.42	0.02
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	2.52	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2779.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.80	Wt. n-Val.		0.013	
W.S. Elev (ft)	2773.31	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2774.96	Flow Area (sq ft)		77.63	
E.G. Slope (ft/ft)	0.011227	Area (sq ft)		77.63	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	37.16	Top Width (ft)		37.16	
Vel Total (ft/s)	19.32	Avg. Vel. (ft/s)		19.32	
Max Chl Dpth (ft)	2.31	Hydr. Depth (ft)		2.09	
Conv. Total (cfs)	14156.6	Conv. (cfs)		14156.6	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		38.53	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		1.41	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.69	Cum Volume (acre-ft)	0.01	5.20	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	2.28	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2772.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.		0.013	
W.S. Elev (ft)	2771.71	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2772.09	Flow Area (sq ft)		22.22	
E.G. Slope (ft/ft)	0.010357	Area (sq ft)		22.22	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	32.24	Top Width (ft)		32.24	
Vel Total (ft/s)	9.00	Avg. Vel. (ft/s)		9.00	
Max Chl Dpth (ft)	0.71	Hydr. Depth (ft)		0.69	
Conv. Total (cfs)	1965.2	Conv. (cfs)		1965.2	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		32.66	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00

Frctn Loss (ft)	1.66	Cum Volume (acre-ft)	0.00	1.47	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	1.80	0.00

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2779.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.61	Wt. n-Val.		0.013	
W.S. Elev (ft)	2773.49	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2775.12	Flow Area (sq ft)		84.17	
E.G. Slope (ft/ft)	0.009974	Area (sq ft)		84.17	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	37.70	Top Width (ft)		37.70	
Vel Total (ft/s)	19.01	Avg. Vel. (ft/s)		19.01	
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)		2.23	
Conv. Total (cfs)	16020.7	Conv. (cfs)		16020.7	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		39.17	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		1.34	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.60	Cum Volume (acre-ft)	0.01	5.47	0.01
C & E Loss (ft)	0.04	Cum SA (acres)	0.01	2.31	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2777.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.19	Wt. n-Val.		0.013	
W.S. Elev (ft)	2772.97	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2774.20	Flow Area (sq ft)		65.14	
E.G. Slope (ft/ft)	0.009813	Area (sq ft)		65.14	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	36.12	Top Width (ft)		36.12	
Vel Total (ft/s)	16.43	Avg. Vel. (ft/s)		16.43	
Max Chl Dpth (ft)	1.97	Hydr. Depth (ft)		1.80	
Conv. Total (cfs)	10801.4	Conv. (cfs)		10801.4	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		37.28	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		1.07	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.60	Cum Volume (acre-ft)	0.01	4.68	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.01	2.22	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2775.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.94	Wt. n-Val.		0.013	
W.S. Elev (ft)	2772.46	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2773.33	Flow Area (sq ft)		47.27	
E.G. Slope (ft/ft)	0.009851	Area (sq ft)		47.27	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	34.56	Top Width (ft)		34.56	
Vel Total (ft/s)	13.75	Avg. Vel. (ft/s)		13.75	
Max Chl Dpth (ft)	1.46	Hydr. Depth (ft)		1.37	

Conv. Total (cfs)	6548.9	Conv. (cfs)		6548.9	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		35.42	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		0.82	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.61	Cum Volume (acre-ft)	0.00	3.41	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	2.06	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3835

INPUT
Description: Section 38+35 Improved Concrete Channel (D/S Limit)
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2777.77	112	2769.77	142	2769.77	154	2777.77

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	112	.013	142	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112	142	95	95	95	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2782.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.20	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2773.79	Reach Len. (ft)	95.00	95.00	95.00
Crit W.S. (ft)	2776.48	Flow Area (sq ft)	12.09	120.46	12.09
E.G. Slope (ft/ft)	0.007637	Area (sq ft)	12.09	120.46	12.09
Q Total (cfs)	3380.00	Flow (cfs)	170.06	3039.88	170.06
Top Width (ft)	42.05	Top Width (ft)	6.02	30.00	6.02
Vel Total (ft/s)	23.37	Avg. Vel. (ft/s)	14.06	25.24	14.06
Max Chl Dpth (ft)	4.02	Hydr. Depth (ft)	2.01	4.02	2.01
Conv. Total (cfs)	38676.3	Conv. (cfs)	1945.9	34784.4	1945.9
Length Wtd. (ft)	95.00	Wetted Per. (ft)	7.24	30.00	7.24
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.80	1.91	0.80
Alpha	1.09	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.18	Cum Volume (acre-ft)	0.02	8.38	0.01
C & E Loss (ft)	0.07	Cum SA (acres)	0.03	2.56	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2781.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.32	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2773.21	Reach Len. (ft)	95.00	95.00	95.00
Crit W.S. (ft)	2775.59	Flow Area (sq ft)	8.87	103.19	8.87
E.G. Slope (ft/ft)	0.008404	Area (sq ft)	8.87	103.19	8.87
Q Total (cfs)	2700.00	Flow (cfs)	118.07	2463.85	118.07
Top Width (ft)	40.32	Top Width (ft)	5.16	30.00	5.16
Vel Total (ft/s)	22.33	Avg. Vel. (ft/s)	13.31	23.88	13.31
Max Chl Dpth (ft)	3.44	Hydr. Depth (ft)	1.72	3.44	1.72

Conv. Total (cfs)	29452.5	Conv. (cfs)	1288.0	26876.5	1288.0
Length Wtd. (ft)	95.00	Wetted Per. (ft)	6.20	30.00	6.20
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.75	1.80	0.75
Alpha	1.07	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)	0.01	7.09	0.01
C & E Loss (ft)	0.11	Cum SA (acres)	0.02	2.41	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2777.70	Element			
Vel Head (ft)	5.49	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2772.21	Reach Len. (ft)	95.00	95.00	95.00
Crit W.S. (ft)	2773.80	Flow Area (sq ft)	4.45	73.05	4.45
E.G. Slope (ft/ft)	0.008639	Area (sq ft)	4.45	73.05	4.45
Q Total (cfs)	1500.00	Flow (cfs)	47.66	1404.69	47.66
Top Width (ft)	37.31	Top Width (ft)	3.65	30.00	3.65
Vel Total (ft/s)	18.30	Avg. Vel. (ft/s)	10.72	19.23	10.72
Max Chl Dpth (ft)	2.44	Hydr. Depth (ft)	1.22	2.44	1.22
Conv. Total (cfs)	16138.6	Conv. (cfs)	512.7	15113.2	512.7
Length Wtd. (ft)	95.00	Wetted Per. (ft)	4.39	30.00	4.39
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.55	1.31	0.55
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.32	Cum Volume (acre-ft)	0.00	4.97	0.00
C & E Loss (ft)	0.09	Cum SA (acres)	0.01	2.18	0.00

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2771.68	Element			
Vel Head (ft)	1.16	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2770.52	Reach Len. (ft)	95.00	95.00	95.00
Crit W.S. (ft)	2770.87	Flow Area (sq ft)	0.42	22.49	0.42
E.G. Slope (ft/ft)	0.008525	Area (sq ft)	0.42	22.49	0.42
Q Total (cfs)	200.00	Flow (cfs)	2.05	195.91	2.05
Top Width (ft)	32.25	Top Width (ft)	1.12	30.00	1.12
Vel Total (ft/s)	8.57	Avg. Vel. (ft/s)	4.85	8.71	4.85
Max Chl Dpth (ft)	0.75	Hydr. Depth (ft)	0.37	0.75	0.37
Conv. Total (cfs)	2166.1	Conv. (cfs)	22.2	2121.8	22.2
Length Wtd. (ft)	95.00	Wetted Per. (ft)	1.35	30.00	1.35
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.17	0.40	0.17
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.26	Cum Volume (acre-ft)	0.00	1.40	0.00
C & E Loss (ft)	0.03	Cum SA (acres)	0.00	1.70	0.00

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2777.86	Element			
Vel Head (ft)	5.51	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2772.35	Reach Len. (ft)	95.00	95.00	95.00
Crit W.S. (ft)	2773.97	Flow Area (sq ft)	4.99	77.36	4.99
E.G. Slope (ft/ft)	0.008060	Area (sq ft)	4.99	77.36	4.99

Q Total (cfs)	1600.00	Flow (cfs)	53.63	1492.74	53.63
Top Width (ft)	37.74	Top Width (ft)	3.87	30.00	3.87
Vel Total (ft/s)	18.32	Avg. Vel. (ft/s)	10.75	19.30	10.75
Max Chl Dpth (ft)	2.58	Hydr. Depth (ft)	1.29	2.58	1.29
Conv. Total (cfs)	17821.8	Conv. (cfs)	597.3	16627.1	597.3
Length Wtd. (ft)	95.00	Wetted Per. (ft)	4.65	30.00	4.65
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.54	1.30	0.54
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.20	Cum Volume (acre-ft)	0.01	5.22	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.01	2.21	0.00

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2775.94	Element			
Vel Head (ft)	4.15	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2771.80	Reach Len. (ft)	95.00	95.00	95.00
Crit W.S. (ft)	2773.03	Flow Area (sq ft)	3.08	60.82	3.08
E.G. Slope (ft/ft)	0.008272	Area (sq ft)	3.08	60.82	3.08
Q Total (cfs)	1070.00	Flow (cfs)	28.61	1012.79	28.61
Top Width (ft)	36.08	Top Width (ft)	3.04	30.00	3.04
Vel Total (ft/s)	15.97	Avg. Vel. (ft/s)	9.28	16.65	9.28
Max Chl Dpth (ft)	2.03	Hydr. Depth (ft)	1.01	2.03	1.01
Conv. Total (cfs)	11764.8	Conv. (cfs)	314.5	11135.7	314.5
Length Wtd. (ft)	95.00	Wetted Per. (ft)	3.65	30.00	3.65
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.44	1.05	0.44
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.21	Cum Volume (acre-ft)	0.00	4.48	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.00	2.11	0.00

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2774.16	Element			
Vel Head (ft)	2.88	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2771.28	Reach Len. (ft)	95.00	95.00	95.00
Crit W.S. (ft)	2772.13	Flow Area (sq ft)	1.70	45.15	1.70
E.G. Slope (ft/ft)	0.008475	Area (sq ft)	1.70	45.15	1.70
Q Total (cfs)	650.00	Flow (cfs)	13.08	623.84	13.08
Top Width (ft)	34.51	Top Width (ft)	2.26	30.00	2.26
Vel Total (ft/s)	13.39	Avg. Vel. (ft/s)	7.70	13.82	7.70
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)	0.75	1.50	0.75
Conv. Total (cfs)	7060.7	Conv. (cfs)	142.1	6776.6	142.1
Length Wtd. (ft)	95.00	Wetted Per. (ft)	2.71	30.00	2.71
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.33	0.80	0.33
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.23	Cum Volume (acre-ft)	0.00	3.27	0.00
C & E Loss (ft)	0.02	Cum SA (acres)	0.00	1.96	0.00

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

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RIVER: Desert Knolls Wa
REACH: Main               RS: 3740

INPUT
Description: Section 37+40 Chute (U/S)
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     316  2774.7     336  2774.7     348  2766.7     363  2766.7     375  2774.7

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     316    .016     336    .013     375    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           336     375                8       8       8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     316     336  2775.5       T
     375     375  2775.5       T
Left Levee      Station=     336      Elevation=  2775.5
Right Levee     Station=     375      Elevation=  2775.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2782.18    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               9.76    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2772.42    Reach Len. (ft)              8.00       8.00       8.00
  Crit W.S. (ft)           2775.35    Flow Area (sq ft)                     134.81
  E.G. Slope (ft/ft)      0.008156    Area (sq ft)                          134.81
  Q Total (cfs)            3380.00    Flow (cfs)                           3380.00
  Top Width (ft)             32.15    Top Width (ft)                         32.15
  Vel Total (ft/s)           25.07    Avg. Vel. (ft/s)                       25.07
  Max Chl Dpth (ft)           5.72    Hydr. Depth (ft)                        4.19
  Conv. Total (cfs)        37426.1    Conv. (cfs)                          37426.1
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                       35.62
  Min Ch El (ft)           2766.70    Shear (lb/sq ft)                        1.93
  Alpha                       1.00    Stream Power (lb/ft s)     375.00     336.00     375.00
  Frctn Loss (ft)             0.75    Cum Volume (acre-ft)         0.01       8.11
  C & E Loss (ft)             0.06    Cum SA (acres)               0.02       2.50


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2780.66    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               8.96    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2771.70    Reach Len. (ft)              8.00       8.00       8.00
  Crit W.S. (ft)           2774.44    Flow Area (sq ft)                     112.40
  E.G. Slope (ft/ft)      0.008623    Area (sq ft)                          112.40
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             29.99    Top Width (ft)                         29.99
  Vel Total (ft/s)           24.02    Avg. Vel. (ft/s)                       24.02
  Max Chl Dpth (ft)           5.00    Hydr. Depth (ft)                        3.75
  Conv. Total (cfs)        29076.4    Conv. (cfs)                          29076.4
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                       33.02
  Min Ch El (ft)           2766.70    Shear (lb/sq ft)                        1.83
  Alpha                       1.00    Stream Power (lb/ft s)     375.00     336.00     375.00
  Frctn Loss (ft)             0.81    Cum Volume (acre-ft)         0.00       6.85
  C & E Loss (ft)             0.06    Cum SA (acres)               0.02       2.35
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2776.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.47	Wt. n-Val.		0.013	
W.S. Elev (ft)	2770.30	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2772.29	Flow Area (sq ft)		73.51	
E.G. Slope (ft/ft)	0.008797	Area (sq ft)		73.51	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	25.81	Top Width (ft)		25.81	
Vel Total (ft/s)	20.41	Avg. Vel. (ft/s)		20.41	
Max Chl Dpth (ft)	3.60	Hydr. Depth (ft)		2.85	
Conv. Total (cfs)	15992.8	Conv. (cfs)		15992.8	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		27.99	
Min Ch El (ft)	2766.70	Shear (lb/sq ft)		1.44	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.83	Cum Volume (acre-ft)	0.00	4.81	
C & E Loss (ft)	0.10	Cum SA (acres)	0.00	2.12	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2770.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.77	Wt. n-Val.		0.013	
W.S. Elev (ft)	2767.61	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2768.37	Flow Area (sq ft)		14.96	
E.G. Slope (ft/ft)	0.017875	Area (sq ft)		14.96	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.74	Top Width (ft)		17.74	
Vel Total (ft/s)	13.37	Avg. Vel. (ft/s)		13.37	
Max Chl Dpth (ft)	0.91	Hydr. Depth (ft)		0.84	
Conv. Total (cfs)	1495.9	Conv. (cfs)		1495.9	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		18.30	
Min Ch El (ft)	2766.70	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	1.13	Cum Volume (acre-ft)		1.36	
C & E Loss (ft)	0.16	Cum SA (acres)		1.65	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2776.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.49	Wt. n-Val.		0.013	

W.S. Elev (ft)	2770.49	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2772.51	Flow Area (sq ft)		78.26	
E.G. Slope (ft/ft)	0.008379	Area (sq ft)		78.26	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	26.35	Top Width (ft)		26.35	
Vel Total (ft/s)	20.45	Avg. Vel. (ft/s)		20.45	
Max Chl Dpth (ft)	3.78	Hydr. Depth (ft)		2.97	
Conv. Total (cfs)	17479.8	Conv. (cfs)		17479.8	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		28.65	
Min Ch El (ft)	2766.70	Shear (lb/sq ft)		1.43	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)	0.00	5.05	
C & E Loss (ft)	0.10	Cum SA (acres)	0.00	2.15	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2775.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.34	Wt. n-Val.		0.013	
W.S. Elev (ft)	2769.67	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2771.32	Flow Area (sq ft)		57.69	
E.G. Slope (ft/ft)	0.008955	Area (sq ft)		57.69	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	23.90	Top Width (ft)		23.90	
Vel Total (ft/s)	18.55	Avg. Vel. (ft/s)		18.55	
Max Chl Dpth (ft)	2.97	Hydr. Depth (ft)		2.41	
Conv. Total (cfs)	11307.3	Conv. (cfs)		11307.3	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		25.70	
Min Ch El (ft)	2766.70	Shear (lb/sq ft)		1.26	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.82	Cum Volume (acre-ft)		4.35	
C & E Loss (ft)	0.12	Cum SA (acres)		2.06	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2773.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2768.85	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2770.15	Flow Area (sq ft)		39.12	
E.G. Slope (ft/ft)	0.010253	Area (sq ft)		39.12	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	21.44	Top Width (ft)		21.44	
Vel Total (ft/s)	16.62	Avg. Vel. (ft/s)		16.62	
Max Chl Dpth (ft)	2.15	Hydr. Depth (ft)		1.82	
Conv. Total (cfs)	6419.3	Conv. (cfs)		6419.3	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		22.74	
Min Ch El (ft)	2766.70	Shear (lb/sq ft)		1.10	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.88	Cum Volume (acre-ft)		3.18	
C & E Loss (ft)	0.14	Cum SA (acres)		1.91	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3732

INPUT
Description: Section 37+32 Chute Sag
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
316	2774.7	336	2774.7	348	2765	363	2765	375	2774.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
316	.016	336	.013	375	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
336	375	4	4	4	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
316	336	2777	T
375	375	2777	T

Left Levee Station= 336 Elevation= 2777
Right Levee Station= 375 Elevation= 2777

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2781.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.26	Wt. n-Val.		0.013	
W.S. Elev (ft)	2770.69	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2774.06	Flow Area (sq ft)		125.49	
E.G. Slope (ft/ft)	0.009397	Area (sq ft)		125.49	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	29.09	Top Width (ft)		29.09	
Vel Total (ft/s)	26.93	Avg. Vel. (ft/s)		26.93	
Max Chl Dpth (ft)	5.69	Hydr. Depth (ft)		4.31	
Conv. Total (cfs)	34868.0	Conv. (cfs)		34868.0	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		33.11	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		2.22	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.01	8.08	
C & E Loss (ft)	0.15	Cum SA (acres)	0.02	2.49	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2780.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.51	Wt. n-Val.		0.013	
W.S. Elev (ft)	2769.92	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2773.02	Flow Area (sq ft)		103.79	
E.G. Slope (ft/ft)	0.010190	Area (sq ft)		103.79	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	27.18	Top Width (ft)		27.18	

Vel Total (ft/s)	26.01	Avg. Vel. (ft/s)		26.01	
Max Chl Dpth (ft)	4.92	Hydr. Depth (ft)		3.82	
Conv. Total (cfs)	26747.6	Conv. (cfs)		26747.6	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		30.66	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		2.15	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.00	6.83	
C & E Loss (ft)	0.15	Cum SA (acres)	0.02	2.34	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2774.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.013	
W.S. Elev (ft)	2773.80	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2770.75	Flow Area (sq ft)		227.96	
E.G. Slope (ft/ft)	0.000359	Area (sq ft)		227.96	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	36.78	Top Width (ft)		36.78	
Vel Total (ft/s)	6.58	Avg. Vel. (ft/s)		6.58	
Max Chl Dpth (ft)	8.80	Hydr. Depth (ft)		6.20	
Conv. Total (cfs)	79205.9	Conv. (cfs)		79205.9	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		43.01	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.00	4.78	
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	2.11	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2769.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2769.07	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2766.70	Flow Area (sq ft)		81.56	
E.G. Slope (ft/ft)	0.000110	Area (sq ft)		81.56	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.07	Top Width (ft)		25.07	
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)		2.45	
Max Chl Dpth (ft)	4.07	Hydr. Depth (ft)		3.25	
Conv. Total (cfs)	19035.3	Conv. (cfs)		19035.3	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		27.95	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.35	
C & E Loss (ft)	0.00	Cum SA (acres)		1.65	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2776.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.13	Wt. n-Val.		0.013	

W.S. Elev (ft)	2768.60	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2770.96	Flow Area (sq ft)		69.91	
E.G. Slope (ft/ft)	0.010962	Area (sq ft)		69.91	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	23.89	Top Width (ft)		23.89	
Vel Total (ft/s)	22.89	Avg. Vel. (ft/s)		22.89	
Max Chl Dpth (ft)	3.59	Hydr. Depth (ft)		2.93	
Conv. Total (cfs)	15281.6	Conv. (cfs)		15281.6	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		26.44	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		1.81	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.00	5.04	
C & E Loss (ft)	0.16	Cum SA (acres)	0.00	2.14	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2773.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.013	
W.S. Elev (ft)	2772.68	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2769.73	Flow Area (sq ft)		188.09	
E.G. Slope (ft/ft)	0.000308	Area (sq ft)		188.09	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	34.00	Top Width (ft)		34.00	
Vel Total (ft/s)	5.69	Avg. Vel. (ft/s)		5.69	
Max Chl Dpth (ft)	7.68	Hydr. Depth (ft)		5.53	
Conv. Total (cfs)	60926.6	Conv. (cfs)		60926.6	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		39.43	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		4.33	
C & E Loss (ft)	0.00	Cum SA (acres)		2.05	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2771.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.013	
W.S. Elev (ft)	2771.29	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2768.52	Flow Area (sq ft)		143.38	
E.G. Slope (ft/ft)	0.000240	Area (sq ft)		143.38	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	30.57	Top Width (ft)		30.57	
Vel Total (ft/s)	4.53	Avg. Vel. (ft/s)		4.53	
Max Chl Dpth (ft)	6.29	Hydr. Depth (ft)		4.69	
Conv. Total (cfs)	41941.8	Conv. (cfs)		41941.8	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		35.02	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.16	
C & E Loss (ft)	0.00	Cum SA (acres)		1.90	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

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LATERAL STRUCTURE


RIVER: Desert Knolls Wa
REACH: Main               RS: 3730

INPUT
Description: Reach 1 Diversion Chute #5
Lateral structure position     = Left overbank
Distance from Upstream XS =
Deck/Roadway Width        =      20
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =        4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2774.7       6  2774.7      12  2774.7   211.7  2769.3

Weir crest shape                           = Broad Crested


Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                       362     .013     .013        0                  .5                 1
Upstream   Elevation =  2765
           Centerline Station =  4
Downstream Elevation =  2757
           Centerline Station =  4

LATERAL STRUCTURE OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2781.96    Weir Sta US (ft)              12.00
  W.S. US. (ft)                2770.69    Weir Sta DS (ft)             211.70
  E.G. DS (ft)                 2778.85    Min El Weir Flow (ft)       2769.30
  W.S. DS (ft)                 2766.55    Wr Top Wdth (ft)
  Q US (cfs)                   3380.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          32.89    Weir Avg Depth (ft)
  Q DS (cfs)                   3380.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  0.97    Weir Coef (ft^1/2)            2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)            32.89
  Q Culv (cfs)                   32.89    # Barrels                         1
  Q Lat RC (cfs)                          Culv Length (ft)             362.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)         2765.00
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)         2757.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2780.43    Weir Sta US (ft)
  W.S. US. (ft)                2769.92    Weir Sta DS (ft)
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  E.G. DS (ft)                  2777.23    Min El Weir Flow (ft)        2769.30
  W.S. DS (ft)                  2765.87    Wr Top Wdth (ft)
  Q US (cfs)                    2700.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)           29.85    Weir Avg Depth (ft)
  Q DS (cfs)                    2700.00    Weir Flow Area (sq ft)
  Perc Q Leaving                   1.11    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                     0.00    Weir Submerg
  Q Gates (cfs)                            Q Culv Group (cfs)             29.85
  Q Culv (cfs)                    29.85    # Barrels                           1
  Q Lat RC (cfs)                           Culv Length (ft)              362.00
                                           Culv Depth Blocked (ft)
  Q Breach (cfs)                           Culv Inv El Up (ft)          2765.00
  Breach Avg Velocity (ft/s)               Culv Inv El Dn (ft)          2757.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                 2774.48    Weir Sta US (ft)
  W.S. US. (ft)                 2773.80    Weir Sta DS (ft)
  E.G. DS (ft)                  2772.96    Min El Weir Flow (ft)        2769.30
  W.S. DS (ft)                  2764.54    Wr Top Wdth (ft)
  Q US (cfs)                    1500.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)           39.60    Weir Avg Depth (ft)
  Q DS (cfs)                    1500.00    Weir Flow Area (sq ft)
  Perc Q Leaving                   2.64    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                     0.00    Weir Submerg
  Q Gates (cfs)                            Q Culv Group (cfs)             39.60
  Q Culv (cfs)                    39.60    # Barrels                           1
  Q Lat RC (cfs)                           Culv Length (ft)              362.00
                                           Culv Depth Blocked (ft)
  Q Breach (cfs)                           Culv Inv El Up (ft)          2765.00
  Breach Avg Velocity (ft/s)               Culv Inv El Dn (ft)          2757.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                 2769.16    Weir Sta US (ft)
  W.S. US. (ft)                 2769.07    Weir Sta DS (ft)
  E.G. DS (ft)                  2767.36    Min El Weir Flow (ft)        2769.30
  W.S. DS (ft)                  2761.97    Wr Top Wdth (ft)
  Q US (cfs)                     200.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)           26.03    Weir Avg Depth (ft)
  Q DS (cfs)                     200.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  13.02    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                     0.00    Weir Submerg
  Q Gates (cfs)                            Q Culv Group (cfs)             26.03
  Q Culv (cfs)                    26.03    # Barrels                           1
  Q Lat RC (cfs)                           Culv Length (ft)              362.00
                                           Culv Depth Blocked (ft)
  Q Breach (cfs)                           Culv Inv El Up (ft)          2765.00
  Breach Avg Velocity (ft/s)               Culv Inv El Dn (ft)          2757.00
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  Breach Flow Area (sq ft)


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

LATERAL STRUCTURE OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2776.73    Weir Sta US (ft)
  W.S. US. (ft)                2768.60    Weir Sta DS (ft)
  E.G. DS (ft)                 2773.24    Min El Weir Flow (ft)        2769.30
  W.S. DS (ft)                 2764.70    Wr Top Wdth (ft)
  Q US (cfs)                   1600.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          37.43    Weir Avg Depth (ft)
  Q DS (cfs)                   1600.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  2.34    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             37.43
  Q Culv (cfs)                   37.43    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              362.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2765.00
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2757.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2773.18    Weir Sta US (ft)
  W.S. US. (ft)                2772.68    Weir Sta DS (ft)
  E.G. DS (ft)                 2771.64    Min El Weir Flow (ft)        2769.30
  W.S. DS (ft)                 2763.84    Wr Top Wdth (ft)
  Q US (cfs)                   1070.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          38.07    Weir Avg Depth (ft)
  Q DS (cfs)                   1070.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  3.56    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             38.07
  Q Culv (cfs)                   38.07    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              362.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2765.00
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2757.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2771.61    Weir Sta US (ft)
  W.S. US. (ft)                2771.29    Weir Sta DS (ft)
  E.G. DS (ft)                 2770.03    Min El Weir Flow (ft)        2769.30
  W.S. DS (ft)                 2763.04    Wr Top Wdth (ft)
  Q US (cfs)                    650.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          35.08    Weir Avg Depth (ft)
  Q DS (cfs)                    650.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  5.40    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             35.08
  Q Culv (cfs)                   35.08    # Barrels                           1
  Q Lat RC (cfs)                          Culv Length (ft)              362.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2765.00
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2757.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 3728

INPUT
Description: Section 37+28 Chute Sag
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     316  2774.7     336  2774.7     348    2765     363    2765     375  2774.7

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     316    .016     336    .013     375    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           336     375                8       8       8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     316     336  2777.5       T
     375     375  2777.5       T
Left Levee      Station=     336      Elevation=  2777.5
Right Levee     Station=     375      Elevation=  2777.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2781.91    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              11.20    Wt. n-Val.                            0.013
```

W.S. Elev (ft)	2770.71	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2774.06	Flow Area (sq ft)		125.83	
E.G. Slope (ft/ft)	0.009326	Area (sq ft)		125.83	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	29.12	Top Width (ft)		29.12	
Vel Total (ft/s)	26.86	Avg. Vel. (ft/s)		26.86	
Max Chl Dpth (ft)	5.70	Hydr. Depth (ft)		4.32	
Conv. Total (cfs)	34999.7	Conv. (cfs)		34999.7	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		33.15	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		2.21	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01	8.07	
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	2.49	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2780.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.44	Wt. n-Val.		0.013	
W.S. Elev (ft)	2769.93	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2773.02	Flow Area (sq ft)		104.12	
E.G. Slope (ft/ft)	0.010101	Area (sq ft)		104.12	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	27.21	Top Width (ft)		27.21	
Vel Total (ft/s)	25.93	Avg. Vel. (ft/s)		25.93	
Max Chl Dpth (ft)	4.93	Hydr. Depth (ft)		3.83	
Conv. Total (cfs)	26865.2	Conv. (cfs)		26865.2	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		30.70	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		2.14	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.00	6.82	
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	2.34	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2774.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.013	
W.S. Elev (ft)	2773.80	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2770.75	Flow Area (sq ft)		227.88	
E.G. Slope (ft/ft)	0.000359	Area (sq ft)		227.88	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	36.78	Top Width (ft)		36.78	
Vel Total (ft/s)	6.58	Avg. Vel. (ft/s)		6.58	
Max Chl Dpth (ft)	8.80	Hydr. Depth (ft)		6.20	
Conv. Total (cfs)	79167.6	Conv. (cfs)		79167.6	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		43.00	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	4.76	
C & E Loss (ft)	0.14	Cum SA (acres)	0.00	2.11	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2769.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2769.07	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2766.70	Flow Area (sq ft)		81.54	
E.G. Slope (ft/ft)	0.000110	Area (sq ft)		81.54	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.07	Top Width (ft)		25.07	
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)		2.45	
Max Chl Dpth (ft)	4.07	Hydr. Depth (ft)		3.25	
Conv. Total (cfs)	19029.2	Conv. (cfs)		19029.2	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		27.95	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.35	
C & E Loss (ft)	0.06	Cum SA (acres)		1.64	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2774.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.71	Wt. n-Val.		0.013	
W.S. Elev (ft)	2774.04	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2770.96	Flow Area (sq ft)		236.52	
E.G. Slope (ft/ft)	0.000369	Area (sq ft)		236.52	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	37.36	Top Width (ft)		37.36	
Vel Total (ft/s)	6.76	Avg. Vel. (ft/s)		6.76	
Max Chl Dpth (ft)	9.04	Hydr. Depth (ft)		6.33	
Conv. Total (cfs)	83279.8	Conv. (cfs)		83279.8	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		43.75	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	5.03	
C & E Loss (ft)	0.14	Cum SA (acres)	0.00	2.14	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2773.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.013	
W.S. Elev (ft)	2772.68	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2769.74	Flow Area (sq ft)		188.04	
E.G. Slope (ft/ft)	0.000309	Area (sq ft)		188.04	

Q Total (cfs)	1070.00	Flow (cfs)		1070.00		
Top Width (ft)	33.99	Top Width (ft)		33.99		
Vel Total (ft/s)	5.69	Avg. Vel. (ft/s)		5.69		
Max Chl Dpth (ft)	7.68	Hydr. Depth (ft)		5.53		
Conv. Total (cfs)	60904.5	Conv. (cfs)		60904.5		
Length Wtd. (ft)	8.00	Wetted Per. (ft)		39.42		
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		0.09		
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		4.32		
C & E Loss (ft)	0.12	Cum SA (acres)		2.05		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2771.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.013	
W.S. Elev (ft)	2771.29	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2768.52	Flow Area (sq ft)		143.34	
E.G. Slope (ft/ft)	0.000240	Area (sq ft)		143.34	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	30.57	Top Width (ft)		30.57	
Vel Total (ft/s)	4.53	Avg. Vel. (ft/s)		4.53	
Max Chl Dpth (ft)	6.29	Hydr. Depth (ft)		4.69	
Conv. Total (cfs)	41926.8	Conv. (cfs)		41926.8	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		35.02	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.15	
C & E Loss (ft)	0.10	Cum SA (acres)		1.90	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3720

INPUT
Description: Section 37+20 Chute (D/S)
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
316	2774.7	336	2774.7	348	2766.7	363	2766.7	375	2774.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
316	.016	336	.013	375	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
336	375	199.7	199.7	199.7	.1	.3

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     316     336    2776       T
     375     375    2776       T
Left Levee      Station=     336      Elevation=    2776
Right Levee     Station=     375      Elevation=    2776

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2780.92    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               8.09    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2772.82    Reach Len. (ft)           199.70     199.70     199.70
  Crit W.S. (ft)           2775.34    Flow Area (sq ft)                    148.05
  E.G. Slope (ft/ft)      0.006297    Area (sq ft)                         148.05
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             33.37    Top Width (ft)                        33.37
  Vel Total (ft/s)           22.83    Avg. Vel. (ft/s)                      22.83
  Max Chl Dpth (ft)           6.12    Hydr. Depth (ft)                       4.44
  Conv. Total (cfs)        42595.2    Conv. (cfs)                         42595.2
  Length Wtd. (ft)          199.70    Wetted Per. (ft)                      37.07
  Min Ch El (ft)           2766.70    Shear (lb/sq ft)                       1.57
  Alpha                       1.00    Stream Power (lb/ft s)    375.00     336.00     375.00
  Frctn Loss (ft)             0.06    Cum Volume (acre-ft)        0.01       8.05
  C & E Loss (ft)             0.93    Cum SA (acres)              0.02       2.48


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2779.36    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               7.25    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2772.11    Reach Len. (ft)           199.70     199.70     199.70
  Crit W.S. (ft)           2774.44    Flow Area (sq ft)                    124.94
  E.G. Slope (ft/ft)      0.006425    Area (sq ft)                         124.94
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             31.22    Top Width (ft)                        31.22
  Vel Total (ft/s)           21.61    Avg. Vel. (ft/s)                      21.61
  Max Chl Dpth (ft)           5.41    Hydr. Depth (ft)                       4.00
  Conv. Total (cfs)        33683.1    Conv. (cfs)                         33683.1
  Length Wtd. (ft)          199.70    Wetted Per. (ft)                      34.49
  Min Ch El (ft)           2766.70    Shear (lb/sq ft)                       1.45
  Alpha                       1.00    Stream Power (lb/ft s)    375.00     336.00     375.00
  Frctn Loss (ft)             0.06    Cum Volume (acre-ft)        0.00       6.80
  C & E Loss (ft)             0.96    Cum SA (acres)              0.02       2.33


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2774.33    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               2.04    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2772.30    Reach Len. (ft)           199.70     199.70     199.70
```

Crit W.S. (ft)	2772.30	Flow Area (sq ft)		130.91	
E.G. Slope (ft/ft)	0.001742	Area (sq ft)		130.91	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	31.79	Top Width (ft)		31.79	
Vel Total (ft/s)	11.46	Avg. Vel. (ft/s)		11.46	
Max Chl Dpth (ft)	5.60	Hydr. Depth (ft)		4.12	
Conv. Total (cfs)	35934.5	Conv. (cfs)		35934.5	
Length Wtd. (ft)	199.70	Wetted Per. (ft)		35.18	
Min Ch El (ft)	2766.70	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.00	4.73	
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	2.10	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2769.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.		0.013	
W.S. Elev (ft)	2768.36	Reach Len. (ft)	199.70	199.70	199.70
Crit W.S. (ft)	2768.36	Flow Area (sq ft)		29.07	
E.G. Slope (ft/ft)	0.002347	Area (sq ft)		29.07	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	19.99	Top Width (ft)		19.99	
Vel Total (ft/s)	6.88	Avg. Vel. (ft/s)		6.88	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		1.45	
Conv. Total (cfs)	4128.3	Conv. (cfs)		4128.3	
Length Wtd. (ft)	199.70	Wetted Per. (ft)		20.99	
Min Ch El (ft)	2766.70	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)		1.34	
C & E Loss (ft)	0.00	Cum SA (acres)		1.64	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2774.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.10	Wt. n-Val.		0.013	

W.S. Elev (ft)	2772.51	Reach Len. (ft)	199.70	199.70	199.70
Crit W.S. (ft)	2772.51	Flow Area (sq ft)		137.75	
E.G. Slope (ft/ft)	0.001722	Area (sq ft)		137.75	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	32.43	Top Width (ft)		32.43	
Vel Total (ft/s)	11.62	Avg. Vel. (ft/s)		11.62	
Max Chl Dpth (ft)	5.81	Hydr. Depth (ft)		4.25	
Conv. Total (cfs)	38556.8	Conv. (cfs)		38556.8	
Length Wtd. (ft)	199.70	Wetted Per. (ft)		35.94	
Min Ch El (ft)	2766.70	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.00	4.99	
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	2.13	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2773.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.73	Wt. n-Val.		0.013	
W.S. Elev (ft)	2771.32	Reach Len. (ft)	199.70	199.70	199.70
Crit W.S. (ft)	2771.32	Flow Area (sq ft)		101.27	
E.G. Slope (ft/ft)	0.001812	Area (sq ft)		101.27	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	28.86	Top Width (ft)		28.86	
Vel Total (ft/s)	10.57	Avg. Vel. (ft/s)		10.57	
Max Chl Dpth (ft)	4.62	Hydr. Depth (ft)		3.51	
Conv. Total (cfs)	25133.8	Conv. (cfs)		25133.8	
Length Wtd. (ft)	199.70	Wetted Per. (ft)		31.65	
Min Ch El (ft)	2766.70	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)		4.29	
C & E Loss (ft)	0.00	Cum SA (acres)		2.04	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2771.50	Element	Left OB	Channel	Right OB

Vel Head (ft)	1.35	Wt. n-Val.		0.013	
W.S. Elev (ft)	2770.16	Reach Len. (ft)	199.70	199.70	199.70
Crit W.S. (ft)	2770.16	Flow Area (sq ft)		69.78	
E.G. Slope (ft/ft)	0.001916	Area (sq ft)		69.78	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	25.37	Top Width (ft)		25.37	
Vel Total (ft/s)	9.32	Avg. Vel. (ft/s)		9.32	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)		2.75	
Conv. Total (cfs)	14849.9	Conv. (cfs)		14849.9	
Length Wtd. (ft)	199.70	Wetted Per. (ft)		27.46	
Min Ch El (ft)	2766.70	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)	375.00	336.00	375.00
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)		3.13	
C & E Loss (ft)	0.00	Cum SA (acres)		1.89	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3520.3

INPUT
Description: Section 35+20.3
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
291	2769.3	297	2768.3	310	2768.3	316	2769.3	336	2769.3
348	2761.3	363	2761.3	375	2769.3	417.26	2774	424.85	2774
435.64	2774	440.24	2775						

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
291	.03	316	.016	336	.013	375	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
336	375	98.3	98.3	98.3	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
291	336	2770	T
375	440.24	2770	T

Left Levee Station= 336 Elevation= 2770
Right Levee Station= 375 Elevation= 2770

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2778.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.30	Wt. n-Val.		0.013	
W.S. Elev (ft)	2766.55	Reach Len. (ft)	98.30	98.30	98.30
Crit W.S. (ft)	2769.95	Flow Area (sq ft)		120.09	
E.G. Slope (ft/ft)	0.011240	Area (sq ft)		120.09	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	

Top Width (ft)	30.75	Top Width (ft)		30.75	
Vel Total (ft/s)	28.14	Avg. Vel. (ft/s)		28.14	
Max Chl Dpth (ft)	5.25	Hydr. Depth (ft)		3.91	
Conv. Total (cfs)	31881.4	Conv. (cfs)		31881.4	
Length Wtd. (ft)	98.30	Wetted Per. (ft)		33.93	
Min Ch El (ft)	2761.30	Shear (lb/sq ft)		2.48	
Alpha	1.00	Stream Power (lb/ft s)	440.24	336.00	375.00
Frctn Loss (ft)	1.65	Cum Volume (acre-ft)	0.01	7.43	
C & E Loss (ft)	0.42	Cum SA (acres)	0.02	2.33	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2777.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.37	Wt. n-Val.		0.013	
W.S. Elev (ft)	2765.87	Reach Len. (ft)	98.30	98.30	98.30
Crit W.S. (ft)	2769.04	Flow Area (sq ft)		99.80	
E.G. Slope (ft/ft)	0.012024	Area (sq ft)		99.80	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	28.70	Top Width (ft)		28.70	
Vel Total (ft/s)	27.06	Avg. Vel. (ft/s)		27.06	
Max Chl Dpth (ft)	4.57	Hydr. Depth (ft)		3.48	
Conv. Total (cfs)	24622.4	Conv. (cfs)		24622.4	
Length Wtd. (ft)	98.30	Wetted Per. (ft)		31.47	
Min Ch El (ft)	2761.30	Shear (lb/sq ft)		2.38	
Alpha	1.00	Stream Power (lb/ft s)	440.24	336.00	375.00
Frctn Loss (ft)	1.71	Cum Volume (acre-ft)	0.00	6.29	
C & E Loss (ft)	0.41	Cum SA (acres)	0.02	2.20	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2772.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2764.54	Reach Len. (ft)	98.30	98.30	98.30
Crit W.S. (ft)	2766.90	Flow Area (sq ft)		64.43	
E.G. Slope (ft/ft)	0.012813	Area (sq ft)		64.43	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	24.73	Top Width (ft)		24.73	
Vel Total (ft/s)	23.28	Avg. Vel. (ft/s)		23.28	
Max Chl Dpth (ft)	3.24	Hydr. Depth (ft)		2.61	
Conv. Total (cfs)	13251.4	Conv. (cfs)		13251.4	
Length Wtd. (ft)	98.30	Wetted Per. (ft)		26.69	
Min Ch El (ft)	2761.30	Shear (lb/sq ft)		1.93	
Alpha	1.00	Stream Power (lb/ft s)	440.24	336.00	375.00
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)	0.00	4.28	
C & E Loss (ft)	0.64	Cum SA (acres)	0.00	1.97	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2767.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.39	Wt. n-Val.		0.013	
W.S. Elev (ft)	2761.97	Reach Len. (ft)	98.30	98.30	98.30
Crit W.S. (ft)	2762.97	Flow Area (sq ft)		10.73	
E.G. Slope (ft/ft)	0.050663	Area (sq ft)		10.73	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.01	Top Width (ft)		17.01	
Vel Total (ft/s)	18.63	Avg. Vel. (ft/s)		18.63	
Max Chl Dpth (ft)	0.67	Hydr. Depth (ft)		0.63	
Conv. Total (cfs)	888.6	Conv. (cfs)		888.6	
Length Wtd. (ft)	98.30	Wetted Per. (ft)		17.42	
Min Ch El (ft)	2761.30	Shear (lb/sq ft)		1.95	
Alpha	1.00	Stream Power (lb/ft s)	440.24	336.00	375.00
Frctn Loss (ft)	1.27	Cum Volume (acre-ft)		1.24	
C & E Loss (ft)	0.47	Cum SA (acres)		1.55	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2773.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.54	Wt. n-Val.		0.013	
W.S. Elev (ft)	2764.70	Reach Len. (ft)	98.30	98.30	98.30
Crit W.S. (ft)	2767.09	Flow Area (sq ft)		68.22	
E.G. Slope (ft/ft)	0.012380	Area (sq ft)		68.22	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	25.19	Top Width (ft)		25.19	
Vel Total (ft/s)	23.45	Avg. Vel. (ft/s)		23.45	
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)		2.71	
Conv. Total (cfs)	14379.9	Conv. (cfs)		14379.9	
Length Wtd. (ft)	98.30	Wetted Per. (ft)		27.24	
Min Ch El (ft)	2761.30	Shear (lb/sq ft)		1.94	
Alpha	1.00	Stream Power (lb/ft s)	440.24	336.00	375.00
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)	0.00	4.52	
C & E Loss (ft)	0.64	Cum SA (acres)	0.00	2.00	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2771.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.80	Wt. n-Val.		0.013	
W.S. Elev (ft)	2763.84	Reach Len. (ft)	98.30	98.30	98.30
Crit W.S. (ft)	2765.92	Flow Area (sq ft)		47.75	
E.G. Slope (ft/ft)	0.015495	Area (sq ft)		47.75	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	22.62	Top Width (ft)		22.62	
Vel Total (ft/s)	22.41	Avg. Vel. (ft/s)		22.41	
Max Chl Dpth (ft)	2.54	Hydr. Depth (ft)		2.11	
Conv. Total (cfs)	8595.8	Conv. (cfs)		8595.8	
Length Wtd. (ft)	98.30	Wetted Per. (ft)		24.15	
Min Ch El (ft)	2761.30	Shear (lb/sq ft)		1.91	
Alpha	1.00	Stream Power (lb/ft s)	440.24	336.00	375.00
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)		3.95	
C & E Loss (ft)	0.61	Cum SA (acres)		1.92	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2770.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.99	Wt. n-Val.		0.013	
W.S. Elev (ft)	2763.04	Reach Len. (ft)	98.30	98.30	98.30
Crit W.S. (ft)	2764.76	Flow Area (sq ft)		30.63	
E.G. Slope (ft/ft)	0.021206	Area (sq ft)		30.63	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	20.22	Top Width (ft)		20.22	
Vel Total (ft/s)	21.22	Avg. Vel. (ft/s)		21.22	
Max Chl Dpth (ft)	1.74	Hydr. Depth (ft)		1.51	
Conv. Total (cfs)	4463.6	Conv. (cfs)		4463.6	
Length Wtd. (ft)	98.30	Wetted Per. (ft)		21.27	
Min Ch El (ft)	2761.30	Shear (lb/sq ft)		1.91	
Alpha	1.00	Stream Power (lb/ft s)	440.24	336.00	375.00
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)		2.90	
C & E Loss (ft)	0.56	Cum SA (acres)		1.79	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3422

INPUT
Description: Section 34+22
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
182	2776	188	2768	201	2768	207	2770	222	2770
239	2758.3	254	2758.3	266	2766.3				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
182	.03	207	.016	222	.013	266	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
222	266	12	12	12	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
182	222	2770	T
266	266	2767	T

Right Levee Station= 266 Elevation= 2767

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2777.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	14.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2763.30	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	2766.96	Flow Area (sq ft)		111.99	
E.G. Slope (ft/ft)	0.013584	Area (sq ft)		111.99	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	29.77	Top Width (ft)		29.77	
Vel Total (ft/s)	30.18	Avg. Vel. (ft/s)		30.18	
Max Chl Dpth (ft)	5.00	Hydr. Depth (ft)		3.76	
Conv. Total (cfs)	29000.6	Conv. (cfs)		29000.6	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		32.84	
Min Ch El (ft)	2758.30	Shear (lb/sq ft)		2.89	
Alpha	1.00	Stream Power (lb/ft s)	266.00	0.00	266.00
Frctn Loss (ft)	1.21	Cum Volume (acre-ft)	0.01	7.17	
C & E Loss (ft)	0.18	Cum SA (acres)	0.02	2.27	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2775.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	2762.64	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	2766.05	Flow Area (sq ft)		92.89	
E.G. Slope (ft/ft)	0.014632	Area (sq ft)		92.89	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	27.81	Top Width (ft)		27.81	
Vel Total (ft/s)	29.07	Avg. Vel. (ft/s)		29.07	
Max Chl Dpth (ft)	4.34	Hydr. Depth (ft)		3.34	
Conv. Total (cfs)	22320.7	Conv. (cfs)		22320.7	

Length Wtd. (ft)	12.00	Wetted Per. (ft)		30.48	
Min Ch El (ft)	2758.30	Shear (lb/sq ft)		2.78	
Alpha	1.00	Stream Power (lb/ft s)	266.00	0.00	266.00
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)	0.00	6.07	
C & E Loss (ft)	0.18	Cum SA (acres)	0.02	2.13	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2771.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2761.33	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	2763.91	Flow Area (sq ft)		58.97	
E.G. Slope (ft/ft)	0.016449	Area (sq ft)		58.97	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	23.94	Top Width (ft)		23.94	
Vel Total (ft/s)	25.44	Avg. Vel. (ft/s)		25.44	
Max Chl Dpth (ft)	3.03	Hydr. Depth (ft)		2.46	
Conv. Total (cfs)	11695.5	Conv. (cfs)		11695.5	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		25.80	
Min Ch El (ft)	2758.30	Shear (lb/sq ft)		2.35	
Alpha	1.00	Stream Power (lb/ft s)	266.00	0.00	266.00
Frctn Loss (ft)	1.42	Cum Volume (acre-ft)	0.00	4.14	
C & E Loss (ft)	0.16	Cum SA (acres)	0.00	1.92	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2763.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.00	Wt. n-Val.		0.013	
W.S. Elev (ft)	2759.07	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	2759.98	Flow Area (sq ft)		12.47	
E.G. Slope (ft/ft)	0.031555	Area (sq ft)		12.47	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.28	Top Width (ft)		17.28	
Vel Total (ft/s)	16.04	Avg. Vel. (ft/s)		16.04	
Max Chl Dpth (ft)	0.77	Hydr. Depth (ft)		0.72	
Conv. Total (cfs)	1125.9	Conv. (cfs)		1125.9	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		17.76	
Min Ch El (ft)	2758.30	Shear (lb/sq ft)		1.38	
Alpha	1.00	Stream Power (lb/ft s)	266.00	0.00	266.00
Frctn Loss (ft)	3.88	Cum Volume (acre-ft)		1.22	
C & E Loss (ft)	0.42	Cum SA (acres)		1.52	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2771.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2761.47	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	2764.12	Flow Area (sq ft)		62.35	
E.G. Slope (ft/ft)	0.015946	Area (sq ft)		62.35	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	24.36	Top Width (ft)		24.36	
Vel Total (ft/s)	25.66	Avg. Vel. (ft/s)		25.66	
Max Chl Dpth (ft)	3.17	Hydr. Depth (ft)		2.56	
Conv. Total (cfs)	12670.6	Conv. (cfs)		12670.6	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		26.30	
Min Ch El (ft)	2758.30	Shear (lb/sq ft)		2.36	
Alpha	1.00	Stream Power (lb/ft s)	266.00	0.00	266.00
Frctn Loss (ft)	1.38	Cum Volume (acre-ft)	0.00	4.37	
C & E Loss (ft)	0.17	Cum SA (acres)	0.00	1.94	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2769.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	2760.68	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	2762.93	Flow Area (sq ft)		44.15	
E.G. Slope (ft/ft)	0.019400	Area (sq ft)		44.15	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	22.04	Top Width (ft)		22.04	
Vel Total (ft/s)	24.24	Avg. Vel. (ft/s)		24.24	
Max Chl Dpth (ft)	2.38	Hydr. Depth (ft)		2.00	
Conv. Total (cfs)	7682.1	Conv. (cfs)		7682.1	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		23.50	
Min Ch El (ft)	2758.30	Shear (lb/sq ft)		2.28	
Alpha	1.00	Stream Power (lb/ft s)	266.00	0.00	266.00
Frctn Loss (ft)	1.70	Cum Volume (acre-ft)		3.84	
C & E Loss (ft)	0.13	Cum SA (acres)		1.87	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2767.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.75	Wt. n-Val.		0.013	
W.S. Elev (ft)	2759.97	Reach Len. (ft)	12.00	12.00	12.00
Crit W.S. (ft)	2761.76	Flow Area (sq ft)		29.10	
E.G. Slope (ft/ft)	0.024624	Area (sq ft)		29.10	

Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	19.92	Top Width (ft)		19.92	
Vel Total (ft/s)	22.33	Avg. Vel. (ft/s)		22.33	
Max Chl Dpth (ft)	1.67	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	4142.2	Conv. (cfs)		4142.2	
Length Wtd. (ft)	12.00	Wetted Per. (ft)		20.94	
Min Ch El (ft)	2758.30	Shear (lb/sq ft)		2.14	
Alpha	1.00	Stream Power (lb/ft s)	266.00	0.00	266.00
Frctn Loss (ft)	2.24	Cum Volume (acre-ft)		2.83	
C & E Loss (ft)	0.08	Cum SA (acres)		1.75	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3410

INPUT
Description: Section 34+10
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2771.05	110.17	2769.89	182	2770	194	2768	195	2768
207	2770	221	2770	239	2758	254	2758	266	2766
284.96	2764.7	286.78	2765.07	289.17	2765.62	295.27	2767.33	295.61	2767.37
305.93	2768.55	307.95	2768.79	317.85	2769.26	319.77	2769.74	321.07	2770.13
327.53	2772.63								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	182	.03	207	.016	221	.013	266	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
221	266	10	10	10	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	221	2770	T
266	327.53	2766.5	T

Right Levee Station= 266 Elevation= 2766.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2777.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	14.30	Wt. n-Val.		0.013	
W.S. Elev (ft)	2762.96	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2766.87	Flow Area (sq ft)		111.37	
E.G. Slope (ft/ft)	0.013867	Area (sq ft)		111.37	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	29.89	Top Width (ft)		29.89	
Vel Total (ft/s)	30.35	Avg. Vel. (ft/s)		30.35	
Max Chl Dpth (ft)	4.96	Hydr. Depth (ft)		3.73	
Conv. Total (cfs)	28702.8	Conv. (cfs)		28702.8	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		32.89	
Min Ch El (ft)	2758.00	Shear (lb/sq ft)		2.93	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	266.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.01	7.14	
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	2.26	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2775.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.25	Wt. n-Val.		0.013	
W.S. Elev (ft)	2762.31	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2765.74	Flow Area (sq ft)		92.42	
E.G. Slope (ft/ft)	0.014916	Area (sq ft)		92.42	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	27.92	Top Width (ft)		27.92	
Vel Total (ft/s)	29.21	Avg. Vel. (ft/s)		29.21	
Max Chl Dpth (ft)	4.31	Hydr. Depth (ft)		3.31	
Conv. Total (cfs)	22107.2	Conv. (cfs)		22107.2	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		30.53	
Min Ch El (ft)	2758.00	Shear (lb/sq ft)		2.82	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	266.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.00	6.04	
C & E Loss (ft)	0.01	Cum SA (acres)	0.02	2.12	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2771.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.16	Wt. n-Val.		0.013	
W.S. Elev (ft)	2761.01	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2763.60	Flow Area (sq ft)		58.65	
E.G. Slope (ft/ft)	0.016787	Area (sq ft)		58.65	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	24.02	Top Width (ft)		24.02	
Vel Total (ft/s)	25.58	Avg. Vel. (ft/s)		25.58	
Max Chl Dpth (ft)	3.01	Hydr. Depth (ft)		2.44	
Conv. Total (cfs)	11577.4	Conv. (cfs)		11577.4	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		25.84	
Min Ch El (ft)	2758.00	Shear (lb/sq ft)		2.38	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	266.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.00	4.13	
C & E Loss (ft)	0.01	Cum SA (acres)	0.00	1.91	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2762.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.88	Wt. n-Val.		0.013	
W.S. Elev (ft)	2758.78	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2759.65	Flow Area (sq ft)		12.65	
E.G. Slope (ft/ft)	0.030204	Area (sq ft)		12.65	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.35	Top Width (ft)		17.35	
Vel Total (ft/s)	15.81	Avg. Vel. (ft/s)		15.81	
Max Chl Dpth (ft)	0.78	Hydr. Depth (ft)		0.73	
Conv. Total (cfs)	1150.8	Conv. (cfs)		1150.8	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		17.82	
Min Ch El (ft)	2758.00	Shear (lb/sq ft)		1.34	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	266.00
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)		1.22	

C & E Loss (ft)	0.03	Cum SA (acres)	1.51

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2771.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.35	Wt. n-Val.		0.013	
W.S. Elev (ft)	2761.14	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2763.79	Flow Area (sq ft)		61.99	
E.G. Slope (ft/ft)	0.016287	Area (sq ft)		61.99	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	24.43	Top Width (ft)		24.43	
Vel Total (ft/s)	25.81	Avg. Vel. (ft/s)		25.81	
Max Chl Dpth (ft)	3.14	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	12537.2	Conv. (cfs)		12537.2	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		26.34	
Min Ch El (ft)	2758.00	Shear (lb/sq ft)		2.39	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	266.00
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.00	4.35	
C & E Loss (ft)	0.01	Cum SA (acres)	0.00	1.94	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2769.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.19	Wt. n-Val.		0.013	
W.S. Elev (ft)	2760.37	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2762.62	Flow Area (sq ft)		43.99	
E.G. Slope (ft/ft)	0.019684	Area (sq ft)		43.99	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	22.11	Top Width (ft)		22.11	
Vel Total (ft/s)	24.32	Avg. Vel. (ft/s)		24.32	
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)		1.99	
Conv. Total (cfs)	7626.5	Conv. (cfs)		7626.5	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		23.55	
Min Ch El (ft)	2758.00	Shear (lb/sq ft)		2.30	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	266.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)		3.83	
C & E Loss (ft)	0.01	Cum SA (acres)		1.87	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2767.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.76	Wt. n-Val.		0.013	
W.S. Elev (ft)	2759.66	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2761.46	Flow Area (sq ft)		29.08	
E.G. Slope (ft/ft)	0.024765	Area (sq ft)		29.08	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	19.99	Top Width (ft)		19.99	
Vel Total (ft/s)	22.35	Avg. Vel. (ft/s)		22.35	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		1.45	
Conv. Total (cfs)	4130.4	Conv. (cfs)		4130.4	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		20.99	
Min Ch El (ft)	2758.00	Shear (lb/sq ft)		2.14	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	266.00

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  Frctn Loss (ft)            0.30    Cum Volume (acre-ft)                  2.82
  C & E Loss (ft)            0.00    Cum SA (acres)                        1.74


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 3400.*

INPUT
Description: Section 34+00
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2771.05  110.17 2769.89  138.05 2767.95   181.6 2765.83     182    2766
     194    2757     195    2757     207    2766     227    2766     239    2758
     254    2758     266    2766  284.96  2764.7  286.78 2765.07  289.17 2765.62
  295.27 2767.33  295.61 2767.37  305.93 2768.55  307.95 2768.79  317.85 2769.26
  319.77 2769.74  321.07 2770.13  327.53 2772.63

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     182     .03     207    .016     227    .013     266    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           227     266            133.6   133.6   133.6             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     227    2766       T
     266  327.53    2766       F
Left Levee      Station=     227      Elevation=    2766
Right Levee     Station=     266      Elevation=    2766

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)          2777.06    Element                   Left OB    Channel   Right OB
  Vel Head (ft)             14.06    Wt. n-Val.                           0.013
  W.S. Elev (ft)          2762.99    Reach Len. (ft)           133.60     133.60     133.60
  Crit W.S. (ft)          2767.30    Flow Area (sq ft)                    112.32
  E.G. Slope (ft/ft)     0.013542    Area (sq ft)                         112.32
  Q Total (cfs)           3380.00    Flow (cfs)                          3380.00
  Top Width (ft)            29.98    Top Width (ft)                        29.98
  Vel Total (ft/s)          30.09    Avg. Vel. (ft/s)                      30.09
  Max Chl Dpth (ft)          5.99    Hydr. Depth (ft)                       3.75
  Conv. Total (cfs)       29044.7    Conv. (cfs)                         29044.7
  Length Wtd. (ft)         133.60    Wetted Per. (ft)                      33.01
  Min Ch El (ft)          2758.00    Shear (lb/sq ft)                       2.88
  Alpha                      1.00    Stream Power (lb/ft s)    327.53     227.00     266.00
  Frctn Loss (ft)            0.14    Cum Volume (acre-ft)        0.01       7.11
  C & E Loss (ft)            0.07    Cum SA (acres)              0.02       2.25


CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)          2775.34    Element                   Left OB    Channel   Right OB
  Vel Head (ft)             13.00    Wt. n-Val.                           0.013
  W.S. Elev (ft)          2762.34    Reach Len. (ft)           133.60     133.60     133.60
  Crit W.S. (ft)          2765.72    Flow Area (sq ft)                     93.32
  E.G. Slope (ft/ft)     0.014515    Area (sq ft)                          93.32
  Q Total (cfs)           2700.00    Flow (cfs)                          2700.00
  Top Width (ft)            28.02    Top Width (ft)                        28.02
  Vel Total (ft/s)          28.93    Avg. Vel. (ft/s)                      28.93
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Max Chl Dpth (ft)	5.34	Hydr. Depth (ft)		3.33	
Conv. Total (cfs)	22410.9	Conv. (cfs)		22410.9	
Length Wtd. (ft)	133.60	Wetted Per. (ft)		30.64	
Min Ch El (ft)	2758.00	Shear (lb/sq ft)		2.76	
Alpha	1.00	Stream Power (lb/ft s)	327.53	227.00	266.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.00	6.02	
C & E Loss (ft)	0.08	Cum SA (acres)	0.02	2.12	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2770.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.88	Wt. n-Val.		0.013	
W.S. Elev (ft)	2761.04	Reach Len. (ft)	133.60	133.60	133.60
Crit W.S. (ft)	2763.60	Flow Area (sq ft)		59.46	
E.G. Slope (ft/ft)	0.016136	Area (sq ft)		59.46	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	24.12	Top Width (ft)		24.12	
Vel Total (ft/s)	25.23	Avg. Vel. (ft/s)		25.23	
Max Chl Dpth (ft)	4.04	Hydr. Depth (ft)		2.47	
Conv. Total (cfs)	11808.4	Conv. (cfs)		11808.4	
Length Wtd. (ft)	133.60	Wetted Per. (ft)		25.96	
Min Ch El (ft)	2758.00	Shear (lb/sq ft)		2.31	
Alpha	1.00	Stream Power (lb/ft s)	327.53	227.00	266.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.00	4.11	
C & E Loss (ft)	0.08	Cum SA (acres)	0.00	1.90	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2762.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2758.83	Reach Len. (ft)	133.60	133.60	133.60
Crit W.S. (ft)	2759.67	Flow Area (sq ft)		13.47	
E.G. Slope (ft/ft)	0.024807	Area (sq ft)		13.47	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.49	Top Width (ft)		17.49	
Vel Total (ft/s)	14.85	Avg. Vel. (ft/s)		14.85	
Max Chl Dpth (ft)	1.83	Hydr. Depth (ft)		0.77	
Conv. Total (cfs)	1269.8	Conv. (cfs)		1269.8	
Length Wtd. (ft)	133.60	Wetted Per. (ft)		17.99	
Min Ch El (ft)	2758.00	Shear (lb/sq ft)		1.16	
Alpha	1.00	Stream Power (lb/ft s)	327.53	227.00	266.00
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)		1.21	
C & E Loss (ft)	0.14	Cum SA (acres)		1.51	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2771.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2761.18	Reach Len. (ft)	133.60	133.60	133.60
Crit W.S. (ft)	2763.81	Flow Area (sq ft)		62.81	
E.G. Slope (ft/ft)	0.015681	Area (sq ft)		62.81	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	24.53	Top Width (ft)		24.53	

Vel Total (ft/s)	25.47	Avg. Vel. (ft/s)		25.47	
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)		2.56	
Conv. Total (cfs)	12777.2	Conv. (cfs)		12777.2	
Length Wtd. (ft)	133.60	Wetted Per. (ft)		26.46	
Min Ch El (ft)	2758.00	Shear (lb/sq ft)		2.32	
Alpha	1.00	Stream Power (lb/ft s)	327.53	227.00	266.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.00	4.34	
C & E Loss (ft)	0.08	Cum SA (acres)	0.00	1.93	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2769.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.86	Wt. n-Val.		0.013	
W.S. Elev (ft)	2760.41	Reach Len. (ft)	133.60	133.60	133.60
Crit W.S. (ft)	2762.62	Flow Area (sq ft)		44.79	
E.G. Slope (ft/ft)	0.018672	Area (sq ft)		44.79	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	22.22	Top Width (ft)		22.22	
Vel Total (ft/s)	23.89	Avg. Vel. (ft/s)		23.89	
Max Chl Dpth (ft)	3.41	Hydr. Depth (ft)		2.02	
Conv. Total (cfs)	7830.5	Conv. (cfs)		7830.5	
Length Wtd. (ft)	133.60	Wetted Per. (ft)		23.68	
Min Ch El (ft)	2758.00	Shear (lb/sq ft)		2.21	
Alpha	1.00	Stream Power (lb/ft s)	327.53	227.00	266.00
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)		3.82	
C & E Loss (ft)	0.10	Cum SA (acres)		1.86	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2767.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.37	Wt. n-Val.		0.013	
W.S. Elev (ft)	2759.70	Reach Len. (ft)	133.60	133.60	133.60
Crit W.S. (ft)	2761.45	Flow Area (sq ft)		29.84	
E.G. Slope (ft/ft)	0.022914	Area (sq ft)		29.84	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	20.10	Top Width (ft)		20.10	
Vel Total (ft/s)	21.78	Avg. Vel. (ft/s)		21.78	
Max Chl Dpth (ft)	2.70	Hydr. Depth (ft)		1.48	
Conv. Total (cfs)	4294.0	Conv. (cfs)		4294.0	
Length Wtd. (ft)	133.60	Wetted Per. (ft)		21.13	
Min Ch El (ft)	2758.00	Shear (lb/sq ft)		2.02	
Alpha	1.00	Stream Power (lb/ft s)	327.53	227.00	266.00
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)		2.82	
C & E Loss (ft)	0.12	Cum SA (acres)		1.73	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3266.4

INPUT
Description: Section 32+66.4

```
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      95    2770     110  2762.5     119  2756.7     126  2756.7     135  2762.5
     155  2762.5     167  2754.5     182  2754.5     194  2762.5  202.36    2770

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
      95     .03     135    .016     155    .013     194    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           155     194             46.4    46.4    46.4             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
      95     155  2762.5       T
Left Levee      Station=     155      Elevation=  2762.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2774.95    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              15.65    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2759.30    Reach Len. (ft)            46.40      46.40      46.40
  Crit W.S. (ft)           2763.67    Flow Area (sq ft)                    106.45
  E.G. Slope (ft/ft)      0.015728    Area (sq ft)                         106.45
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             29.39    Top Width (ft)                        29.39
  Vel Total (ft/s)           31.75    Avg. Vel. (ft/s)                      31.75
  Max Chl Dpth (ft)           4.80    Hydr. Depth (ft)                       3.62
  Conv. Total (cfs)        26951.1    Conv. (cfs)                        26951.1
  Length Wtd. (ft)           46.40    Wetted Per. (ft)                      32.29
  Min Ch El (ft)           2754.50    Shear (lb/sq ft)                       3.24
  Alpha                       1.00    Stream Power (lb/ft s)    202.36     155.00       0.00
  Frctn Loss (ft)             1.95    Cum Volume (acre-ft)        0.01       6.78
  C & E Loss (ft)             0.16    Cum SA (acres)              0.02       2.16


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2773.10    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              14.44    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2758.67    Reach Len. (ft)            46.40      46.40      46.40
  Crit W.S. (ft)           2762.24    Flow Area (sq ft)                     88.55
  E.G. Slope (ft/ft)      0.016825    Area (sq ft)                          88.55
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             27.50    Top Width (ft)                        27.50
  Vel Total (ft/s)           30.49    Avg. Vel. (ft/s)                      30.49
  Max Chl Dpth (ft)           4.17    Hydr. Depth (ft)                       3.22
  Conv. Total (cfs)        20815.6    Conv. (cfs)                        20815.6
  Length Wtd. (ft)           46.40    Wetted Per. (ft)                      30.02
  Min Ch El (ft)           2754.50    Shear (lb/sq ft)                       3.10
  Alpha                       1.00    Stream Power (lb/ft s)    202.36     155.00       0.00
  Frctn Loss (ft)             2.08    Cum Volume (acre-ft)        0.00       5.74
  C & E Loss (ft)             0.14    Cum SA (acres)              0.02       2.03


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
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Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2768.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2757.40	Reach Len. (ft)	46.40	46.40	46.40
Crit W.S. (ft)	2760.10	Flow Area (sq ft)		56.17	
E.G. Slope (ft/ft)	0.019009	Area (sq ft)		56.17	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	23.71	Top Width (ft)		23.71	
Vel Total (ft/s)	26.70	Avg. Vel. (ft/s)		26.70	
Max Chl Dpth (ft)	2.90	Hydr. Depth (ft)		2.37	
Conv. Total (cfs)	10879.5	Conv. (cfs)		10879.5	
Length Wtd. (ft)	46.40	Wetted Per. (ft)		25.46	
Min Ch El (ft)	2754.50	Shear (lb/sq ft)		2.62	
Alpha	1.00	Stream Power (lb/ft s)	202.36	155.00	0.00
Frctn Loss (ft)	2.34	Cum Volume (acre-ft)	0.00	3.94	
C & E Loss (ft)	0.12	Cum SA (acres)	0.00	1.83	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2758.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.53	Wt. n-Val.		0.013	
W.S. Elev (ft)	2755.32	Reach Len. (ft)	46.40	46.40	46.40
Crit W.S. (ft)	2756.17	Flow Area (sq ft)		13.27	
E.G. Slope (ft/ft)	0.026025	Area (sq ft)		13.27	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.45	Top Width (ft)		17.45	
Vel Total (ft/s)	15.07	Avg. Vel. (ft/s)		15.07	
Max Chl Dpth (ft)	0.82	Hydr. Depth (ft)		0.76	
Conv. Total (cfs)	1239.8	Conv. (cfs)		1239.8	
Length Wtd. (ft)	46.40	Wetted Per. (ft)		17.95	
Min Ch El (ft)	2754.50	Shear (lb/sq ft)		1.20	
Alpha	1.00	Stream Power (lb/ft s)	202.36	155.00	0.00
Frctn Loss (ft)	3.39	Cum Volume (acre-ft)		1.17	
C & E Loss (ft)	0.01	Cum SA (acres)		1.45	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2768.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.32	Wt. n-Val.		0.013	
W.S. Elev (ft)	2757.53	Reach Len. (ft)	46.40	46.40	46.40
Crit W.S. (ft)	2760.31	Flow Area (sq ft)		59.25	
E.G. Slope (ft/ft)	0.018544	Area (sq ft)		59.25	

Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	24.09	Top Width (ft)		24.09	
Vel Total (ft/s)	27.00	Avg. Vel. (ft/s)		27.00	
Max Chl Dpth (ft)	3.03	Hydr. Depth (ft)		2.46	
Conv. Total (cfs)	11749.6	Conv. (cfs)		11749.6	
Length Wtd. (ft)	46.40	Wetted Per. (ft)		25.93	
Min Ch El (ft)	2754.50	Shear (lb/sq ft)		2.65	
Alpha	1.00	Stream Power (lb/ft s)	202.36	155.00	0.00
Frctn Loss (ft)	2.27	Cum Volume (acre-ft)	0.00	4.15	
C & E Loss (ft)	0.12	Cum SA (acres)	0.00	1.86	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2766.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.71	Wt. n-Val.		0.013	
W.S. Elev (ft)	2756.82	Reach Len. (ft)	46.40	46.40	46.40
Crit W.S. (ft)	2759.12	Flow Area (sq ft)		42.79	
E.G. Slope (ft/ft)	0.021345	Area (sq ft)		42.79	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	21.95	Top Width (ft)		21.95	
Vel Total (ft/s)	25.01	Avg. Vel. (ft/s)		25.01	
Max Chl Dpth (ft)	2.32	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	7323.9	Conv. (cfs)		7323.9	
Length Wtd. (ft)	46.40	Wetted Per. (ft)		23.35	
Min Ch El (ft)	2754.50	Shear (lb/sq ft)		2.44	
Alpha	1.00	Stream Power (lb/ft s)	202.36	155.00	0.00
Frctn Loss (ft)	2.66	Cum Volume (acre-ft)		3.69	
C & E Loss (ft)	0.08	Cum SA (acres)		1.79	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2763.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.70	Wt. n-Val.		0.013	
W.S. Elev (ft)	2756.17	Reach Len. (ft)	46.40	46.40	46.40
Crit W.S. (ft)	2757.95	Flow Area (sq ft)		29.19	
E.G. Slope (ft/ft)	0.024493	Area (sq ft)		29.19	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	20.00	Top Width (ft)		20.00	
Vel Total (ft/s)	22.27	Avg. Vel. (ft/s)		22.27	
Max Chl Dpth (ft)	1.67	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	4153.3	Conv. (cfs)		4153.3	
Length Wtd. (ft)	46.40	Wetted Per. (ft)		21.01	
Min Ch El (ft)	2754.50	Shear (lb/sq ft)		2.12	
Alpha	1.00	Stream Power (lb/ft s)	202.36	155.00	0.00
Frctn Loss (ft)	3.16	Cum Volume (acre-ft)		2.73	
C & E Loss (ft)	0.03	Cum SA (acres)		1.67	

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Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 3220

INPUT
Description: Section 32+00 Chute (D/S)
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     135  2761.6     155  2761.6     167  2753.6     182  2753.6     194  2761.6
  202.36    2770

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     135    .016     155    .013     194    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           155     194                8       8       8             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2774.20    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              15.82    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2758.38    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2762.56    Flow Area (sq ft)                    105.89
  E.G. Slope (ft/ft)      0.015964    Area (sq ft)                         105.89
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             29.33    Top Width (ft)                        29.33
  Vel Total (ft/s)           31.92    Avg. Vel. (ft/s)                      31.92
  Max Chl Dpth (ft)           4.78    Hydr. Depth (ft)                       3.61
  Conv. Total (cfs)        26751.0    Conv. (cfs)                         26751.0
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      32.22
  Min Ch El (ft)           2753.60    Shear (lb/sq ft)                       3.28
  Alpha                       1.00    Stream Power (lb/ft s)    202.36       0.00       0.00
  Frctn Loss (ft)             0.74    Cum Volume (acre-ft)        0.01       6.66
  C & E Loss (ft)             0.02    Cum SA (acres)              0.02       2.13


CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2772.31    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              14.55    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2757.75    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2761.31    Flow Area (sq ft)                     88.20
  E.G. Slope (ft/ft)      0.017017    Area (sq ft)                          88.20
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             27.46    Top Width (ft)                        27.46
  Vel Total (ft/s)           30.61    Avg. Vel. (ft/s)                      30.61
  Max Chl Dpth (ft)           4.15    Hydr. Depth (ft)                       3.21
  Conv. Total (cfs)        20697.9    Conv. (cfs)                         20697.9
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      29.98
  Min Ch El (ft)           2753.60    Shear (lb/sq ft)                       3.13
  Alpha                       1.00    Stream Power (lb/ft s)    202.36       0.00       0.00
  Frctn Loss (ft)             0.79    Cum Volume (acre-ft)        0.00       5.65
  C & E Loss (ft)             0.01    Cum SA (acres)              0.02       2.00
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CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2767.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2756.50	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2759.18	Flow Area (sq ft)		56.13	
E.G. Slope (ft/ft)	0.019049	Area (sq ft)		56.13	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	23.70	Top Width (ft)		23.70	
Vel Total (ft/s)	26.72	Avg. Vel. (ft/s)		26.72	
Max Chl Dpth (ft)	2.90	Hydr. Depth (ft)		2.37	
Conv. Total (cfs)	10868.2	Conv. (cfs)		10868.2	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		25.46	
Min Ch El (ft)	2753.60	Shear (lb/sq ft)		2.62	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	0.88	Cum Volume (acre-ft)	0.00	3.88	
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	1.81	

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2757.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.17	Wt. n-Val.		0.013	
W.S. Elev (ft)	2754.46	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2755.26	Flow Area (sq ft)		14.00	
E.G. Slope (ft/ft)	0.022007	Area (sq ft)		14.00	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.58	Top Width (ft)		17.58	
Vel Total (ft/s)	14.29	Avg. Vel. (ft/s)		14.29	
Max Chl Dpth (ft)	0.86	Hydr. Depth (ft)		0.80	
Conv. Total (cfs)	1348.2	Conv. (cfs)		1348.2	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		18.10	
Min Ch El (ft)	2753.60	Shear (lb/sq ft)		1.06	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	1.11	Cum Volume (acre-ft)		1.16	
C & E Loss (ft)	0.11	Cum SA (acres)		1.43	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2767.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.35	Wt. n-Val.		0.013	
W.S. Elev (ft)	2756.63	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2759.37	Flow Area (sq ft)		59.17	
E.G. Slope (ft/ft)	0.018618	Area (sq ft)		59.17	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	24.08	Top Width (ft)		24.08	
Vel Total (ft/s)	27.04	Avg. Vel. (ft/s)		27.04	
Max Chl Dpth (ft)	3.03	Hydr. Depth (ft)		2.46	
Conv. Total (cfs)	11726.1	Conv. (cfs)		11726.1	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		25.92	
Min Ch El (ft)	2753.60	Shear (lb/sq ft)		2.65	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	0.86	Cum Volume (acre-ft)	0.00	4.09	
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	1.83	

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2765.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.57	Wt. n-Val.		0.013	

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  W.S. Elev (ft)           2755.93    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2758.19    Flow Area (sq ft)                     43.10
  E.G. Slope (ft/ft)      0.020904    Area (sq ft)                          43.10
  Q Total (cfs)            1070.00    Flow (cfs)                         1070.00
  Top Width (ft)             21.99    Top Width (ft)                        21.99
  Vel Total (ft/s)           24.83    Avg. Vel. (ft/s)                      24.83
  Max Chl Dpth (ft)           2.33    Hydr. Depth (ft)                       1.96
  Conv. Total (cfs)         7400.7    Conv. (cfs)                          7400.7
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      23.40
  Min Ch El (ft)           2753.60    Shear (lb/sq ft)                       2.40
  Alpha                       1.00    Stream Power (lb/ft s)    202.36       0.00       0.00
  Frctn Loss (ft)             0.98    Cum Volume (acre-ft)                   3.64
  C & E Loss (ft)             0.04    Cum SA (acres)                         1.77


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2762.66    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               7.36    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2755.30    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2757.03    Flow Area (sq ft)                     29.86
  E.G. Slope (ft/ft)      0.022869    Area (sq ft)                          29.86
  Q Total (cfs)             650.00    Flow (cfs)                           650.00
  Top Width (ft)             20.10    Top Width (ft)                        20.10
  Vel Total (ft/s)           21.77    Avg. Vel. (ft/s)                      21.77
  Max Chl Dpth (ft)           1.70    Hydr. Depth (ft)                       1.49
  Conv. Total (cfs)         4298.2    Conv. (cfs)                          4298.2
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      21.13
  Min Ch El (ft)           2753.60    Shear (lb/sq ft)                       2.02
  Alpha                       1.00    Stream Power (lb/ft s)    202.36       0.00       0.00
  Frctn Loss (ft)             1.10    Cum Volume (acre-ft)                   2.70
  C & E Loss (ft)             0.10    Cum SA (acres)                         1.65


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 3212

INPUT
Description: Section 32+12 Chute Sag
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     135  2761.6     155  2761.6     167  2751.7     182  2751.7     194  2761.6
  202.36    2770

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     135    .016     155    .013     194    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           155     194                4       4       4              .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2773.91    Element                   Left OB    Channel   Right OB
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Vel Head (ft)	17.37	Wt. n-Val.		0.013	
W.S. Elev (ft)	2756.54	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2760.76	Flow Area (sq ft)		101.07	
E.G. Slope (ft/ft)	0.017116	Area (sq ft)		101.07	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	26.74	Top Width (ft)		26.74	
Vel Total (ft/s)	33.44	Avg. Vel. (ft/s)		33.44	
Max Chl Dpth (ft)	4.84	Hydr. Depth (ft)		3.78	
Conv. Total (cfs)	25835.6	Conv. (cfs)		25835.6	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		30.22	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		3.57	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.01	6.65	
C & E Loss (ft)	0.15	Cum SA (acres)	0.02	2.12	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2772.00	Element			
Vel Head (ft)	16.13	Wt. n-Val.		0.013	
W.S. Elev (ft)	2755.88	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2759.70	Flow Area (sq ft)		83.78	
E.G. Slope (ft/ft)	0.018544	Area (sq ft)		83.78	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	25.12	Top Width (ft)		25.12	
Vel Total (ft/s)	32.23	Avg. Vel. (ft/s)		32.23	
Max Chl Dpth (ft)	4.18	Hydr. Depth (ft)		3.33	
Conv. Total (cfs)	19827.4	Conv. (cfs)		19827.4	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		28.12	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		3.45	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.00	5.63	
C & E Loss (ft)	0.16	Cum SA (acres)	0.02	2.00	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2767.27	Element			
Vel Head (ft)	12.72	Wt. n-Val.		0.013	
W.S. Elev (ft)	2754.54	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2757.44	Flow Area (sq ft)		52.40	
E.G. Slope (ft/ft)	0.022057	Area (sq ft)		52.40	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	21.89	Top Width (ft)		21.89	
Vel Total (ft/s)	28.63	Avg. Vel. (ft/s)		28.63	
Max Chl Dpth (ft)	2.84	Hydr. Depth (ft)		2.39	
Conv. Total (cfs)	10100.0	Conv. (cfs)		10100.0	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		23.93	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		3.02	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.00	3.87	
C & E Loss (ft)	0.16	Cum SA (acres)	0.00	1.80	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2756.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2755.98	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2753.38	Flow Area (sq ft)		86.42	
E.G. Slope (ft/ft)	0.000093	Area (sq ft)		86.42	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.38	Top Width (ft)		25.38	
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)		2.31	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		3.41	
Conv. Total (cfs)	20715.8	Conv. (cfs)		20715.8	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		28.45	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.15	
C & E Loss (ft)	0.00	Cum SA (acres)		1.43	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2767.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.99	Wt. n-Val.		0.013	
W.S. Elev (ft)	2754.67	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2757.66	Flow Area (sq ft)		55.32	
E.G. Slope (ft/ft)	0.021436	Area (sq ft)		55.32	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	22.21	Top Width (ft)		22.21	
Vel Total (ft/s)	28.92	Avg. Vel. (ft/s)		28.92	
Max Chl Dpth (ft)	2.97	Hydr. Depth (ft)		2.49	
Conv. Total (cfs)	10928.2	Conv. (cfs)		10928.2	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		24.34	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		3.04	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.00	4.08	
C & E Loss (ft)	0.16	Cum SA (acres)	0.00	1.83	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2765.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2753.95	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2756.42	Flow Area (sq ft)		39.83	
E.G. Slope (ft/ft)	0.025126	Area (sq ft)		39.83	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	20.45	Top Width (ft)		20.45	
Vel Total (ft/s)	26.86	Avg. Vel. (ft/s)		26.86	
Max Chl Dpth (ft)	2.25	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	6750.3	Conv. (cfs)		6750.3	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		22.06	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		2.83	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		3.63	
C & E Loss (ft)	0.16	Cum SA (acres)		1.77	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2758.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2758.23	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2755.20	Flow Area (sq ft)		149.61	
E.G. Slope (ft/ft)	0.000212	Area (sq ft)		149.61	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	30.83	Top Width (ft)		30.83	
Vel Total (ft/s)	4.34	Avg. Vel. (ft/s)		4.34	
Max Chl Dpth (ft)	6.53	Hydr. Depth (ft)		4.85	
Conv. Total (cfs)	44602.1	Conv. (cfs)		44602.1	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		35.52	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.68	
C & E Loss (ft)	0.00	Cum SA (acres)		1.65	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

LATERAL STRUCTURE

RIVER: Desert Knolls Wa
REACH: Main RS: 3210

INPUT
Description: Reach 1 Diversion Chute #4
Lateral structure position = Left overbank
Distance from Upstream XS =
Deck/Roadway Width = 20
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2761.6	4	2761.6	12	2761.6	269.4	2758

Weir crest shape = Broad Crested

Number of Culverts = 1

Culvert Name	Shape	Rise	Span
Culvert #1	Circular	2	

FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG

Culvert Upstrm Dist	Length	Top n	Bottom n	Depth Blocked	Entrance Loss Coef	Exit Loss Coef
	346	.013	.013	0	.5	1

Upstream Elevation = 2751.7
Centerline Station = 2
Downstream Elevation = 2751
Centerline Station = 2

LATERAL STRUCTURE OUTPUT Profile #100-yr SBCFCD Culv Group: Culvert #1

E.G. US. (ft)	2773.91	Weir Sta US (ft)	
W.S. US. (ft)	2756.54	Weir Sta DS (ft)	
E.G. DS (ft)	2769.22	Min El Weir Flow (ft)	2758.00
W.S. DS (ft)	2754.97	Wr Top Wdth (ft)	
Q US (cfs)	3380.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	20.22	Weir Avg Depth (ft)	
Q DS (cfs)	3380.00	Weir Flow Area (sq ft)	
Perc Q Leaving	0.60	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	20.22

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  Q Culv (cfs)                    20.22    # Barrels                          1
  Q Lat RC (cfs)                           Culv Length (ft)               346.00
                                           Culv Depth Blocked (ft)
  Q Breach (cfs)                           Culv Inv El Up (ft)          2751.70
  Breach Avg Velocity (ft/s)               Culv Inv El Dn (ft)          2751.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                 2772.00    Weir Sta US (ft)
  W.S. US. (ft)                 2755.88    Weir Sta DS (ft)
  E.G. DS (ft)                  2767.13    Min El Weir Flow (ft)        2758.00
  W.S. DS (ft)                  2754.37    Wr Top Wdth (ft)
  Q US (cfs)                    2700.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)           18.46    Weir Avg Depth (ft)
  Q DS (cfs)                    2700.00    Weir Flow Area (sq ft)
  Perc Q Leaving                   0.68    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                     0.00    Weir Submerg
  Q Gates (cfs)                            Q Culv Group (cfs)             18.46
  Q Culv (cfs)                    18.46    # Barrels                          1
  Q Lat RC (cfs)                           Culv Length (ft)               346.00
                                           Culv Depth Blocked (ft)
  Q Breach (cfs)                           Culv Inv El Up (ft)          2751.70
  Breach Avg Velocity (ft/s)               Culv Inv El Dn (ft)          2751.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                 2767.27    Weir Sta US (ft)
  W.S. US. (ft)                 2754.54    Weir Sta DS (ft)
  E.G. DS (ft)                  2762.20    Min El Weir Flow (ft)        2758.00
  W.S. DS (ft)                  2753.15    Wr Top Wdth (ft)
  Q US (cfs)                    1500.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)           14.50    Weir Avg Depth (ft)
  Q DS (cfs)                    1500.00    Weir Flow Area (sq ft)
  Perc Q Leaving                   0.97    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                     0.00    Weir Submerg
  Q Gates (cfs)                            Q Culv Group (cfs)             14.50
  Q Culv (cfs)                    14.50    # Barrels                          1
  Q Lat RC (cfs)                           Culv Length (ft)               346.00
                                           Culv Depth Blocked (ft)
  Q Breach (cfs)                           Culv Inv El Up (ft)          2751.70
  Breach Avg Velocity (ft/s)               Culv Inv El Dn (ft)          2751.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
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LATERAL STRUCTURE OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2756.06    Weir Sta US (ft)
  W.S. US. (ft)                2755.98    Weir Sta DS (ft)
  E.G. DS (ft)                 2754.31    Min El Weir Flow (ft)        2758.00
  W.S. DS (ft)                 2750.82    Wr Top Wdth (ft)
  Q US (cfs)                    200.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          18.77    Weir Avg Depth (ft)
  Q DS (cfs)                    200.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  9.38    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             18.77
  Q Culv (cfs)                   18.77    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              346.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2751.70
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2751.00
  Breach Flow Area (sq ft)


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

LATERAL STRUCTURE OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2767.66    Weir Sta US (ft)
  W.S. US. (ft)                2754.67    Weir Sta DS (ft)
  E.G. DS (ft)                 2762.66    Min El Weir Flow (ft)        2758.00
  W.S. DS (ft)                 2753.27    Wr Top Wdth (ft)
  Q US (cfs)                   1600.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          14.93    Weir Avg Depth (ft)
  Q DS (cfs)                   1600.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  0.93    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             14.93
  Q Culv (cfs)                   14.93    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              346.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2751.70
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2751.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2765.15    Weir Sta US (ft)
  W.S. US. (ft)                2753.95    Weir Sta DS (ft)
  E.G. DS (ft)                 2759.96    Min El Weir Flow (ft)        2758.00
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  W.S. DS (ft)                  2752.60    Wr Top Wdth (ft)
  Q US (cfs)                    1070.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)           12.36    Weir Avg Depth (ft)
  Q DS (cfs)                    1070.00    Weir Flow Area (sq ft)
  Perc Q Leaving                   1.16    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                     0.00    Weir Submerg
  Q Gates (cfs)                            Q Culv Group (cfs)             12.36
  Q Culv (cfs)                    12.36    # Barrels                           1
  Q Lat RC (cfs)                           Culv Length (ft)              346.00
                                           Culv Depth Blocked (ft)
  Q Breach (cfs)                           Culv Inv El Up (ft)          2751.70
  Breach Avg Velocity (ft/s)               Culv Inv El Dn (ft)          2751.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                 2758.52    Weir Sta US (ft)
  W.S. US. (ft)                 2758.23    Weir Sta DS (ft)
  E.G. DS (ft)                  2756.98    Min El Weir Flow (ft)        2758.00
  W.S. DS (ft)                  2752.02    Wr Top Wdth (ft)
  Q US (cfs)                     650.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)           24.20    Weir Avg Depth (ft)
  Q DS (cfs)                     650.00    Weir Flow Area (sq ft)
  Perc Q Leaving                   3.72    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                     0.00    Weir Submerg
  Q Gates (cfs)                            Q Culv Group (cfs)             24.20
  Q Culv (cfs)                    24.20    # Barrels                           1
  Q Lat RC (cfs)                           Culv Length (ft)              346.00
                                           Culv Depth Blocked (ft)
  Q Breach (cfs)                           Culv Inv El Up (ft)          2751.70
  Breach Avg Velocity (ft/s)               Culv Inv El Dn (ft)          2751.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 3208

INPUT
Description: Section 32+08 Chute Sag
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     135  2761.6     155  2761.6     167  2751.7     182  2751.7     194  2761.6
  202.36    2770
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Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     135    .016     155    .013     194    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           155     194                8       8       8             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2773.81    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              17.25    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2756.56    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2760.76    Flow Area (sq ft)                    101.40
  E.G. Slope (ft/ft)      0.016958    Area (sq ft)                         101.40
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             26.77    Top Width (ft)                        26.77
  Vel Total (ft/s)           33.33    Avg. Vel. (ft/s)                      33.33
  Max Chl Dpth (ft)           4.86    Hydr. Depth (ft)                       3.79
  Conv. Total (cfs)        25955.3    Conv. (cfs)                         25955.3
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      30.26
  Min Ch El (ft)           2751.70    Shear (lb/sq ft)                       3.55
  Alpha                       1.00    Stream Power (lb/ft s)    202.36       0.00       0.00
  Frctn Loss (ft)             0.07    Cum Volume (acre-ft)        0.01       6.64
  C & E Loss (ft)             0.03    Cum SA (acres)              0.02       2.12


CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2771.89    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              16.00    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2755.89    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2759.69    Flow Area (sq ft)                     84.11
  E.G. Slope (ft/ft)      0.018341    Area (sq ft)                          84.11
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             25.16    Top Width (ft)                        25.16
  Vel Total (ft/s)           32.10    Avg. Vel. (ft/s)                      32.10
  Max Chl Dpth (ft)           4.19    Hydr. Depth (ft)                       3.34
  Conv. Total (cfs)        19936.6    Conv. (cfs)                         19936.6
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      28.17
  Min Ch El (ft)           2751.70    Shear (lb/sq ft)                       3.42
  Alpha                       1.00    Stream Power (lb/ft s)    202.36       0.00       0.00
  Frctn Loss (ft)             0.07    Cum Volume (acre-ft)        0.00       5.63
  C & E Loss (ft)             0.04    Cum SA (acres)              0.02       2.00


CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2767.14    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              12.58    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2754.56    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2757.44    Flow Area (sq ft)                     52.70
  E.G. Slope (ft/ft)      0.021694    Area (sq ft)                          52.70
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
  Top Width (ft)             21.92    Top Width (ft)                        21.92
  Vel Total (ft/s)           28.46    Avg. Vel. (ft/s)                      28.46
  Max Chl Dpth (ft)           2.85    Hydr. Depth (ft)                       2.40
  Conv. Total (cfs)        10184.2    Conv. (cfs)                         10184.2
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      23.97
  Min Ch El (ft)           2751.70    Shear (lb/sq ft)                       2.98
  Alpha                       1.00    Stream Power (lb/ft s)    202.36       0.00       0.00
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)        0.00       3.86
  C & E Loss (ft)             0.04    Cum SA (acres)              0.00       1.80
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CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2756.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2755.98	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)		Flow Area (sq ft)		86.40	
E.G. Slope (ft/ft)	0.000093	Area (sq ft)		86.40	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.38	Top Width (ft)		25.38	
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)		2.31	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		3.41	
Conv. Total (cfs)	20711.6	Conv. (cfs)		20711.6	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		28.45	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.14	
C & E Loss (ft)	0.06	Cum SA (acres)		1.43	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2767.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.85	Wt. n-Val.		0.013	
W.S. Elev (ft)	2754.69	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2757.65	Flow Area (sq ft)		55.62	
E.G. Slope (ft/ft)	0.021098	Area (sq ft)		55.62	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	22.24	Top Width (ft)		22.24	
Vel Total (ft/s)	28.77	Avg. Vel. (ft/s)		28.77	
Max Chl Dpth (ft)	2.99	Hydr. Depth (ft)		2.50	
Conv. Total (cfs)	11015.5	Conv. (cfs)		11015.5	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		24.39	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		3.00	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.00	4.07	
C & E Loss (ft)	0.04	Cum SA (acres)	0.00	1.82	

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2765.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2753.96	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2756.41	Flow Area (sq ft)		40.12	
E.G. Slope (ft/ft)	0.024592	Area (sq ft)		40.12	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	20.48	Top Width (ft)		20.48	
Vel Total (ft/s)	26.67	Avg. Vel. (ft/s)		26.67	
Max Chl Dpth (ft)	2.26	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	6823.1	Conv. (cfs)		6823.1	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		22.11	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		2.79	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		3.63	
C & E Loss (ft)	0.05	Cum SA (acres)		1.76	

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2758.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2758.23	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)		Flow Area (sq ft)		149.58	
E.G. Slope (ft/ft)	0.000213	Area (sq ft)		149.58	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	30.83	Top Width (ft)		30.83	
Vel Total (ft/s)	4.35	Avg. Vel. (ft/s)		4.35	
Max Chl Dpth (ft)	6.53	Hydr. Depth (ft)		4.85	
Conv. Total (cfs)	44586.7	Conv. (cfs)		44586.7	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		35.52	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	202.36	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.67	
C & E Loss (ft)	0.11	Cum SA (acres)		1.64	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3200

INPUT
Description: Section 32+00 Chute (D/S)
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
135	2761.6	155	2761.6	167	2753.6	182	2753.6	194	2761.6
202.36	2770								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
135	.016	155	.013	194	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
155	194	257.4	257.4	257.4	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
135	155	2762	T

Left Levee Station= 155 Elevation= 2762

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2772.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	14.18	Wt. n-Val.		0.013	
W.S. Elev (ft)	2758.58	Reach Len. (ft)	257.40	257.40	257.40
Crit W.S. (ft)	2762.56	Flow Area (sq ft)		111.83	
E.G. Slope (ft/ft)	0.013706	Area (sq ft)		111.83	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	29.93	Top Width (ft)		29.93	
Vel Total (ft/s)	30.22	Avg. Vel. (ft/s)		30.22	
Max Chl Dpth (ft)	4.98	Hydr. Depth (ft)		3.74	
Conv. Total (cfs)	28870.9	Conv. (cfs)		28870.9	
Length Wtd. (ft)	257.40	Wetted Per. (ft)		32.95	
Min Ch El (ft)	2753.60	Shear (lb/sq ft)		2.90	
Alpha	1.00	Stream Power (lb/ft s)	202.36	155.00	0.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.01	6.62	
C & E Loss (ft)	0.92	Cum SA (acres)	0.02	2.12	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2770.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.86	Wt. n-Val.		0.013	
W.S. Elev (ft)	2757.96	Reach Len. (ft)	257.40	257.40	257.40
Crit W.S. (ft)	2761.34	Flow Area (sq ft)		93.81	
E.G. Slope (ft/ft)	0.014304	Area (sq ft)		93.81	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	28.07	Top Width (ft)		28.07	
Vel Total (ft/s)	28.78	Avg. Vel. (ft/s)		28.78	
Max Chl Dpth (ft)	4.36	Hydr. Depth (ft)		3.34	
Conv. Total (cfs)	22575.1	Conv. (cfs)		22575.1	
Length Wtd. (ft)	257.40	Wetted Per. (ft)		30.71	
Min Ch El (ft)	2753.60	Shear (lb/sq ft)		2.73	
Alpha	1.00	Stream Power (lb/ft s)	202.36	155.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.00	5.61	
C & E Loss (ft)	0.94	Cum SA (acres)	0.02	1.99	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2766.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2756.72	Reach Len. (ft)	257.40	257.40	257.40
Crit W.S. (ft)	2759.20	Flow Area (sq ft)		61.32	
E.G. Slope (ft/ft)	0.014766	Area (sq ft)		61.32	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	24.35	Top Width (ft)		24.35	
Vel Total (ft/s)	24.46	Avg. Vel. (ft/s)		24.46	
Max Chl Dpth (ft)	3.12	Hydr. Depth (ft)		2.52	
Conv. Total (cfs)	12344.0	Conv. (cfs)		12344.0	
Length Wtd. (ft)	257.40	Wetted Per. (ft)		26.24	
Min Ch El (ft)	2753.60	Shear (lb/sq ft)		2.15	
Alpha	1.00	Stream Power (lb/ft s)	202.36	155.00	0.00
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.00	3.85	
C & E Loss (ft)	0.99	Cum SA (acres)	0.00	1.80	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2756.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.		0.013	
W.S. Elev (ft)	2755.27	Reach Len. (ft)	257.40	257.40	257.40
Crit W.S. (ft)	2755.27	Flow Area (sq ft)		29.22	
E.G. Slope (ft/ft)	0.002311	Area (sq ft)		29.22	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	20.01	Top Width (ft)		20.01	
Vel Total (ft/s)	6.84	Avg. Vel. (ft/s)		6.84	
Max Chl Dpth (ft)	1.67	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	4160.6	Conv. (cfs)		4160.6	
Length Wtd. (ft)	257.40	Wetted Per. (ft)		21.02	
Min Ch El (ft)	2753.60	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	202.36	155.00	0.00
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)		1.13	
C & E Loss (ft)	0.07	Cum SA (acres)		1.42	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2766.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.57	Wt. n-Val.		0.013	
W.S. Elev (ft)	2756.84	Reach Len. (ft)	257.40	257.40	257.40
Crit W.S. (ft)	2759.41	Flow Area (sq ft)		64.44	
E.G. Slope (ft/ft)	0.014571	Area (sq ft)		64.44	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	24.73	Top Width (ft)		24.73	
Vel Total (ft/s)	24.83	Avg. Vel. (ft/s)		24.83	
Max Chl Dpth (ft)	3.24	Hydr. Depth (ft)		2.61	
Conv. Total (cfs)	13254.9	Conv. (cfs)		13254.9	
Length Wtd. (ft)	257.40	Wetted Per. (ft)		26.70	
Min Ch El (ft)	2753.60	Shear (lb/sq ft)		2.20	
Alpha	1.00	Stream Power (lb/ft s)	202.36	155.00	0.00
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.00	4.06	
C & E Loss (ft)	0.98	Cum SA (acres)	0.00	1.82	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2763.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.71	Wt. n-Val.		0.013	
W.S. Elev (ft)	2756.15	Reach Len. (ft)	257.40	257.40	257.40
Crit W.S. (ft)	2758.22	Flow Area (sq ft)		48.03	
E.G. Slope (ft/ft)	0.015227	Area (sq ft)		48.03	

Q Total (cfs)	1070.00	Flow (cfs)			1070.00	
Top Width (ft)	22.65	Top Width (ft)			22.65	
Vel Total (ft/s)	22.28	Avg. Vel. (ft/s)			22.28	
Max Chl Dpth (ft)	2.55	Hydr. Depth (ft)			2.12	
Conv. Total (cfs)	8671.3	Conv. (cfs)			8671.3	
Length Wtd. (ft)	257.40	Wetted Per. (ft)			24.20	
Min Ch El (ft)	2753.60	Shear (lb/sq ft)			1.89	
Alpha	1.00	Stream Power (lb/ft s)	202.36		155.00	0.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)			3.62	
C & E Loss (ft)	1.00	Cum SA (acres)			1.76	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2758.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2756.99	Reach Len. (ft)	257.40	257.40	257.40
Crit W.S. (ft)	2756.99	Flow Area (sq ft)		68.08	
E.G. Slope (ft/ft)	0.002055	Area (sq ft)		68.08	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	25.17	Top Width (ft)		25.17	
Vel Total (ft/s)	9.55	Avg. Vel. (ft/s)		9.55	
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)		2.70	
Conv. Total (cfs)	14337.3	Conv. (cfs)		14337.3	
Length Wtd. (ft)	257.40	Wetted Per. (ft)		27.22	
Min Ch El (ft)	2753.60	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)	202.36	155.00	0.00
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)		2.65	
C & E Loss (ft)	0.13	Cum SA (acres)		1.64	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2942.6

INPUT
Description: Section 29+42.6
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2765	105.22	2764	133.32	2764	142.51	2764	183.84	2764.55
225.16	2764	233.85	2763	242.53	2762	248.78	2761	267.5	2761

```
   321.3    2762  331.53    2763     360    2758     364  2756.1     381  2756.1
     385    2758     405    2758     417    2750     432    2750     444    2758
  466.32    2764  469.85    2764  480.65    2765

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     360     .03     385    .016     405    .013     444    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           405     444             32.6    32.6    32.6             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     100     405    2758       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2769.22    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              14.25    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2754.97    Reach Len. (ft)            32.60      32.60      32.60
  Crit W.S. (ft)           2758.98    Flow Area (sq ft)                    111.59
  E.G. Slope (ft/ft)      0.013791    Area (sq ft)                         111.59
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             29.91    Top Width (ft)                        29.91
  Vel Total (ft/s)           30.29    Avg. Vel. (ft/s)                      30.29
  Max Chl Dpth (ft)           4.97    Hydr. Depth (ft)                       3.73
  Conv. Total (cfs)        28781.5    Conv. (cfs)                         28781.5
  Length Wtd. (ft)           32.60    Wetted Per. (ft)                      32.92
  Min Ch El (ft)           2750.00    Shear (lb/sq ft)                       2.92
  Alpha                       1.00    Stream Power (lb/ft s)    480.65       0.00       0.00
  Frctn Loss (ft)             3.54    Cum Volume (acre-ft)        0.01       5.96
  C & E Loss (ft)             0.01    Cum SA (acres)              0.02       1.94


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2767.13    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              12.76    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2754.37    Reach Len. (ft)            32.60      32.60      32.60
  Crit W.S. (ft)           2757.72    Flow Area (sq ft)                     94.20
  E.G. Slope (ft/ft)      0.014138    Area (sq ft)                          94.20
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             28.11    Top Width (ft)                        28.11
  Vel Total (ft/s)           28.66    Avg. Vel. (ft/s)                      28.66
  Max Chl Dpth (ft)           4.37    Hydr. Depth (ft)                       3.35
  Conv. Total (cfs)        22707.4    Conv. (cfs)                         22707.4
  Length Wtd. (ft)           32.60    Wetted Per. (ft)                      30.76
  Min Ch El (ft)           2750.00    Shear (lb/sq ft)                       2.70
  Alpha                       1.00    Stream Power (lb/ft s)    480.65       0.00       0.00
  Frctn Loss (ft)             3.66    Cum Volume (acre-ft)        0.00       5.05
  C & E Loss (ft)             0.03    Cum SA (acres)              0.02       1.83


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2762.20    Element                   Left OB    Channel   Right OB
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Vel Head (ft)	9.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2753.15	Reach Len. (ft)	32.60	32.60	32.60
Crit W.S. (ft)	2755.60	Flow Area (sq ft)		62.12	
E.G. Slope (ft/ft)	0.014228	Area (sq ft)		62.12	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	24.45	Top Width (ft)		24.45	
Vel Total (ft/s)	24.15	Avg. Vel. (ft/s)		24.15	
Max Chl Dpth (ft)	3.15	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	12575.3	Conv. (cfs)		12575.3	
Length Wtd. (ft)	32.60	Wetted Per. (ft)		26.36	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	3.73	Cum Volume (acre-ft)	0.00	3.49	
C & E Loss (ft)	0.07	Cum SA (acres)	0.00	1.65	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2754.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.49	Wt. n-Val.		0.013	
W.S. Elev (ft)	2750.82	Reach Len. (ft)	32.60	32.60	32.60
Crit W.S. (ft)	2751.67	Flow Area (sq ft)		13.34	
E.G. Slope (ft/ft)	0.025610	Area (sq ft)		13.34	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.46	Top Width (ft)		17.46	
Vel Total (ft/s)	15.00	Avg. Vel. (ft/s)		15.00	
Max Chl Dpth (ft)	0.82	Hydr. Depth (ft)		0.76	
Conv. Total (cfs)	1249.7	Conv. (cfs)		1249.7	
Length Wtd. (ft)	32.60	Wetted Per. (ft)		17.96	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.19	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	1.41	Cum Volume (acre-ft)		1.00	
C & E Loss (ft)	0.28	Cum SA (acres)		1.31	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2762.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.39	Wt. n-Val.		0.013	
W.S. Elev (ft)	2753.27	Reach Len. (ft)	32.60	32.60	32.60
Crit W.S. (ft)	2755.81	Flow Area (sq ft)		65.06	
E.G. Slope (ft/ft)	0.014179	Area (sq ft)		65.06	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	24.81	Top Width (ft)		24.81	
Vel Total (ft/s)	24.59	Avg. Vel. (ft/s)		24.59	
Max Chl Dpth (ft)	3.27	Hydr. Depth (ft)		2.62	
Conv. Total (cfs)	13436.9	Conv. (cfs)		13436.9	
Length Wtd. (ft)	32.60	Wetted Per. (ft)		26.79	

Min Ch El (ft)	2750.00	Shear (lb/sq ft)		2.15	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	3.70	Cum Volume (acre-ft)	0.00	3.68	
C & E Loss (ft)	0.05	Cum SA (acres)	0.00	1.67	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2759.96	Element			
Vel Head (ft)	7.35	Wt. n-Val.		0.013	
W.S. Elev (ft)	2752.60	Reach Len. (ft)	32.60	32.60	32.60
Crit W.S. (ft)	2754.62	Flow Area (sq ft)		49.17	
E.G. Slope (ft/ft)	0.014224	Area (sq ft)		49.17	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	22.80	Top Width (ft)		22.80	
Vel Total (ft/s)	21.76	Avg. Vel. (ft/s)		21.76	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		2.16	
Conv. Total (cfs)	8971.7	Conv. (cfs)		8971.7	
Length Wtd. (ft)	32.60	Wetted Per. (ft)		24.38	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.79	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	3.79	Cum Volume (acre-ft)		3.33	
C & E Loss (ft)	0.11	Cum SA (acres)		1.63	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2756.98	Element			
Vel Head (ft)	4.96	Wt. n-Val.		0.013	
W.S. Elev (ft)	2752.02	Reach Len. (ft)	32.60	32.60	32.60
Crit W.S. (ft)	2753.45	Flow Area (sq ft)		36.37	
E.G. Slope (ft/ft)	0.012710	Area (sq ft)		36.37	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	21.05	Top Width (ft)		21.05	
Vel Total (ft/s)	17.87	Avg. Vel. (ft/s)		17.87	
Max Chl Dpth (ft)	2.02	Hydr. Depth (ft)		1.73	
Conv. Total (cfs)	5765.5	Conv. (cfs)		5765.5	
Length Wtd. (ft)	32.60	Wetted Per. (ft)		22.28	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	1.08	Cum Volume (acre-ft)		2.34	
C & E Loss (ft)	0.35	Cum SA (acres)		1.50	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2910

INPUT
Description: Section 29+10
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2765	105.22	2764	133.32	2764	142.51	2764	183.84	2764.55
225.16	2764	233.85	2763	242.53	2762	248.78	2761	267.5	2761
321.3	2762	331.53	2763	360	2758	372	2756	374	2756
385	2758	405	2758	417	2750	432	2750	444	2758
445.74	2760	449.54	2762	451.37	2763	459.93	2763	466.32	2764
469.85	2764	480.65	2765						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	360	.03	385	.016	405	.013	444	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
405	444	10	10	10	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
100	405	2758.5	T

Left Levee Station= 405 Elevation= 2758.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2768.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.48	Wt. n-Val.		0.013	
W.S. Elev (ft)	2755.07	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2759.23	Flow Area (sq ft)		114.70	
E.G. Slope (ft/ft)	0.012774	Area (sq ft)		114.70	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	30.22	Top Width (ft)		30.22	
Vel Total (ft/s)	29.47	Avg. Vel. (ft/s)		29.47	
Max Chl Dpth (ft)	5.07	Hydr. Depth (ft)		3.80	
Conv. Total (cfs)	29906.1	Conv. (cfs)		29906.1	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		33.29	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		2.75	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	0.01	5.87	
C & E Loss (ft)	0.23	Cum SA (acres)	0.02	1.92	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2766.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.98	Wt. n-Val.		0.013	
W.S. Elev (ft)	2754.48	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2757.74	Flow Area (sq ft)		97.21	
E.G. Slope (ft/ft)	0.012944	Area (sq ft)		97.21	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	28.43	Top Width (ft)		28.43	
Vel Total (ft/s)	27.78	Avg. Vel. (ft/s)		27.78	

Max Chl Dpth (ft)	4.48	Hydr. Depth (ft)		3.42	
Conv. Total (cfs)	23732.2	Conv. (cfs)		23732.2	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		31.14	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		2.52	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	0.00	4.98	
C & E Loss (ft)	0.23	Cum SA (acres)	0.02	1.80	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2761.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.28	Wt. n-Val.		0.013	
W.S. Elev (ft)	2753.27	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2755.60	Flow Area (sq ft)		64.97	
E.G. Slope (ft/ft)	0.012512	Area (sq ft)		64.97	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	24.80	Top Width (ft)		24.80	
Vel Total (ft/s)	23.09	Avg. Vel. (ft/s)		23.09	
Max Chl Dpth (ft)	3.27	Hydr. Depth (ft)		2.62	
Conv. Total (cfs)	13410.1	Conv. (cfs)		13410.1	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		26.77	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.90	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	0.00	3.44	
C & E Loss (ft)	0.23	Cum SA (acres)	0.00	1.63	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2753.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2750.98	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2751.67	Flow Area (sq ft)		16.08	
E.G. Slope (ft/ft)	0.014299	Area (sq ft)		16.08	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.93	Top Width (ft)		17.93	
Vel Total (ft/s)	12.44	Avg. Vel. (ft/s)		12.44	
Max Chl Dpth (ft)	0.98	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	1672.5	Conv. (cfs)		1672.5	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		18.52	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.61	Cum Volume (acre-ft)		0.99	
C & E Loss (ft)	0.33	Cum SA (acres)		1.30	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2762.00	Element	Left OB	Channel	Right OB

Vel Head (ft)	8.62	Wt. n-Val.		0.013	
W.S. Elev (ft)	2753.38	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2755.81	Flow Area (sq ft)		67.92	
E.G. Slope (ft/ft)	0.012538	Area (sq ft)		67.92	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	25.15	Top Width (ft)		25.15	
Vel Total (ft/s)	23.56	Avg. Vel. (ft/s)		23.56	
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)		2.70	
Conv. Total (cfs)	14289.3	Conv. (cfs)		14289.3	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		27.20	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.95	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)	0.00	3.63	
C & E Loss (ft)	0.23	Cum SA (acres)	0.00	1.66	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2759.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.57	Wt. n-Val.		0.013	
W.S. Elev (ft)	2752.73	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2754.62	Flow Area (sq ft)		52.03	
E.G. Slope (ft/ft)	0.012069	Area (sq ft)		52.03	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	23.18	Top Width (ft)		23.18	
Vel Total (ft/s)	20.56	Avg. Vel. (ft/s)		20.56	
Max Chl Dpth (ft)	2.73	Hydr. Depth (ft)		2.24	
Conv. Total (cfs)	9739.8	Conv. (cfs)		9739.8	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		24.83	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.58	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)		3.30	
C & E Loss (ft)	0.24	Cum SA (acres)		1.61	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2756.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2752.16	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2753.46	Flow Area (sq ft)		39.37	
E.G. Slope (ft/ft)	0.010065	Area (sq ft)		39.37	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	21.48	Top Width (ft)		21.48	
Vel Total (ft/s)	16.51	Avg. Vel. (ft/s)		16.51	
Max Chl Dpth (ft)	2.16	Hydr. Depth (ft)		1.83	
Conv. Total (cfs)	6478.9	Conv. (cfs)		6478.9	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		22.78	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.09	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)		2.31	
C & E Loss (ft)	0.22	Cum SA (acres)		1.49	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2900

INPUT
Description: Section 29+00
Station Elevation Data num= 27

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2765	105.22	2764	133.32	2764	142.51	2764	183.84	2764.55
225.16	2764	233.85	2763	242.53	2762	248.78	2761	267.5	2761
321.3	2762	331.53	2763	360	2758	372	2751	374	2751
385	2758	405	2758	417	2750	432	2750	444	2758
445.74	2760	449.54	2762	451.37	2763	459.93	2763	466.32	2764
469.85	2764	480.65	2765						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	360	.03	385	.016	405	.013	444	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
405	444	130	130	130	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
100	405	2758.5	T

Left Levee Station= 405 Elevation= 2758.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2768.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.26	Wt. n-Val.		0.013	
W.S. Elev (ft)	2755.11	Reach Len. (ft)	130.00	130.00	130.00
Crit W.S. (ft)	2759.22	Flow Area (sq ft)		115.67	
E.G. Slope (ft/ft)	0.012478	Area (sq ft)		115.67	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	30.31	Top Width (ft)		30.31	
Vel Total (ft/s)	29.22	Avg. Vel. (ft/s)		29.22	
Max Chl Dpth (ft)	5.10	Hydr. Depth (ft)		3.82	
Conv. Total (cfs)	30258.2	Conv. (cfs)		30258.2	
Length Wtd. (ft)	130.00	Wetted Per. (ft)		33.41	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		2.70	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.01	5.85	
C & E Loss (ft)	0.07	Cum SA (acres)	0.02	1.91	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2766.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.75	Wt. n-Val.		0.013	
W.S. Elev (ft)	2754.51	Reach Len. (ft)	130.00	130.00	130.00
Crit W.S. (ft)	2757.74	Flow Area (sq ft)		98.15	
E.G. Slope (ft/ft)	0.012597	Area (sq ft)		98.15	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	28.53	Top Width (ft)		28.53	
Vel Total (ft/s)	27.51	Avg. Vel. (ft/s)		27.51	

Max Chl Dpth (ft)	4.51	Hydr. Depth (ft)		3.44	
Conv. Total (cfs)	24056.6	Conv. (cfs)		24056.6	
Length Wtd. (ft)	130.00	Wetted Per. (ft)		31.26	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		2.47	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.00	4.96	
C & E Loss (ft)	0.07	Cum SA (acres)	0.02	1.80	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2761.35	Element			
Vel Head (ft)	8.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2753.30	Reach Len. (ft)	130.00	130.00	130.00
Crit W.S. (ft)	2755.60	Flow Area (sq ft)		65.88	
E.G. Slope (ft/ft)	0.012023	Area (sq ft)		65.88	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	24.91	Top Width (ft)		24.91	
Vel Total (ft/s)	22.77	Avg. Vel. (ft/s)		22.77	
Max Chl Dpth (ft)	3.30	Hydr. Depth (ft)		2.65	
Conv. Total (cfs)	13679.7	Conv. (cfs)		13679.7	
Length Wtd. (ft)	130.00	Wetted Per. (ft)		26.90	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.84	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.00	3.42	
C & E Loss (ft)	0.07	Cum SA (acres)	0.00	1.63	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2753.17	Element			
Vel Head (ft)	2.15	Wt. n-Val.		0.013	
W.S. Elev (ft)	2751.03	Reach Len. (ft)	130.00	130.00	130.00
Crit W.S. (ft)	2751.67	Flow Area (sq ft)		17.02	
E.G. Slope (ft/ft)	0.012001	Area (sq ft)		17.02	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.09	Top Width (ft)		18.09	
Vel Total (ft/s)	11.75	Avg. Vel. (ft/s)		11.75	
Max Chl Dpth (ft)	1.03	Hydr. Depth (ft)		0.94	
Conv. Total (cfs)	1825.7	Conv. (cfs)		1825.7	
Length Wtd. (ft)	130.00	Wetted Per. (ft)		18.71	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)		0.99	
C & E Loss (ft)	0.08	Cum SA (acres)		1.30	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2761.81	Element			
Vel Head (ft)	8.39	Wt. n-Val.		0.013	
W.S. Elev (ft)	2753.42	Reach Len. (ft)	130.00	130.00	130.00
Crit W.S. (ft)	2755.81	Flow Area (sq ft)		68.83	
E.G. Slope (ft/ft)	0.012070	Area (sq ft)		68.83	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	25.26	Top Width (ft)		25.26	

Vel Total (ft/s)	23.25	Avg. Vel. (ft/s)		23.25	
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)		2.73	
Conv. Total (cfs)	14563.6	Conv. (cfs)		14563.6	
Length Wtd. (ft)	130.00	Wetted Per. (ft)		27.33	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.90	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.00	3.62	
C & E Loss (ft)	0.07	Cum SA (acres)	0.00	1.65	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2759.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.34	Wt. n-Val.		0.013	
W.S. Elev (ft)	2752.77	Reach Len. (ft)	130.00	130.00	130.00
Crit W.S. (ft)	2754.62	Flow Area (sq ft)		52.94	
E.G. Slope (ft/ft)	0.011479	Area (sq ft)		52.94	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	23.29	Top Width (ft)		23.29	
Vel Total (ft/s)	20.21	Avg. Vel. (ft/s)		20.21	
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)		2.27	
Conv. Total (cfs)	9986.9	Conv. (cfs)		9986.9	
Length Wtd. (ft)	130.00	Wetted Per. (ft)		24.97	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.52	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)		3.28	
C & E Loss (ft)	0.07	Cum SA (acres)		1.60	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2756.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.03	Wt. n-Val.		0.013	
W.S. Elev (ft)	2752.20	Reach Len. (ft)	130.00	130.00	130.00
Crit W.S. (ft)	2753.46	Flow Area (sq ft)		40.34	
E.G. Slope (ft/ft)	0.009363	Area (sq ft)		40.34	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	21.61	Top Width (ft)		21.61	
Vel Total (ft/s)	16.11	Avg. Vel. (ft/s)		16.11	
Max Chl Dpth (ft)	2.20	Hydr. Depth (ft)		1.87	
Conv. Total (cfs)	6717.4	Conv. (cfs)		6717.4	
Length Wtd. (ft)	130.00	Wetted Per. (ft)		22.95	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.03	
Alpha	1.00	Stream Power (lb/ft s)	480.65	405.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		2.30	
C & E Loss (ft)	0.06	Cum SA (acres)		1.48	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2770

INPUT
Description: Section 27+70

```
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     125  2755.9     145  2755.9     157  2747.9     172  2747.9     184  2755.9
     185    2760

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     125     .16     145    .013     184    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           145     184                8       8       8             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     125     145    2756       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2766.66    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              13.72    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2752.94    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2756.58    Flow Area (sq ft)                    113.73
  E.G. Slope (ft/ft)      0.013080    Area (sq ft)                         113.73
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             30.12    Top Width (ft)                        30.12
  Vel Total (ft/s)           29.72    Avg. Vel. (ft/s)                      29.72
  Max Chl Dpth (ft)           5.04    Hydr. Depth (ft)                       3.78
  Conv. Total (cfs)        29553.6    Conv. (cfs)                        29553.6
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      33.17
  Min Ch El (ft)           2747.90    Shear (lb/sq ft)                       2.80
  Alpha                       1.00    Stream Power (lb/ft s)    185.00       0.00       0.00
  Frctn Loss (ft)             1.66    Cum Volume (acre-ft)        0.01       5.50
  C & E Loss (ft)             0.05    Cum SA (acres)              0.02       1.82


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2764.53    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              12.19    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2752.35    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2755.64    Flow Area (sq ft)                     96.38
  E.G. Slope (ft/ft)      0.013257    Area (sq ft)                          96.38
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             28.34    Top Width (ft)                        28.34
  Vel Total (ft/s)           28.01    Avg. Vel. (ft/s)                      28.01
  Max Chl Dpth (ft)           4.45    Hydr. Depth (ft)                       3.40
  Conv. Total (cfs)        23450.2    Conv. (cfs)                        23450.2
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      31.04
  Min Ch El (ft)           2747.90    Shear (lb/sq ft)                       2.57
  Alpha                       1.00    Stream Power (lb/ft s)    185.00       0.00       0.00
  Frctn Loss (ft)             1.68    Cum Volume (acre-ft)        0.00       4.67
  C & E Loss (ft)             0.04    Cum SA (acres)              0.02       1.71


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS
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E.G. Elev (ft)	2759.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.55	Wt. n-Val.		0.013	
W.S. Elev (ft)	2751.12	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2753.50	Flow Area (sq ft)		63.92	
E.G. Slope (ft/ft)	0.013106	Area (sq ft)		63.92	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	24.67	Top Width (ft)		24.67	
Vel Total (ft/s)	23.47	Avg. Vel. (ft/s)		23.47	
Max Chl Dpth (ft)	3.22	Hydr. Depth (ft)		2.59	
Conv. Total (cfs)	13102.4	Conv. (cfs)		13102.4	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		26.62	
Min Ch El (ft)	2747.90	Shear (lb/sq ft)		1.96	
Alpha	1.00	Stream Power (lb/ft s)	185.00	0.00	0.00
Frctn Loss (ft)	1.63	Cum Volume (acre-ft)	0.00	3.23	
C & E Loss (ft)	0.05	Cum SA (acres)	0.00	1.55	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2751.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.52	Wt. n-Val.		0.013	
W.S. Elev (ft)	2748.86	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2749.58	Flow Area (sq ft)		15.69	
E.G. Slope (ft/ft)	0.015415	Area (sq ft)		15.69	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.87	Top Width (ft)		17.87	
Vel Total (ft/s)	12.74	Avg. Vel. (ft/s)		12.74	
Max Chl Dpth (ft)	0.96	Hydr. Depth (ft)		0.88	
Conv. Total (cfs)	1610.9	Conv. (cfs)		1610.9	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		18.44	
Min Ch El (ft)	2747.90	Shear (lb/sq ft)		0.82	
Alpha	1.00	Stream Power (lb/ft s)	185.00	0.00	0.00
Frctn Loss (ft)	1.76	Cum Volume (acre-ft)		0.94	
C & E Loss (ft)	0.04	Cum SA (acres)		1.24	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2760.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.89	Wt. n-Val.		0.013	
W.S. Elev (ft)	2751.24	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2753.71	Flow Area (sq ft)		66.88	
E.G. Slope (ft/ft)	0.013100	Area (sq ft)		66.88	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	25.03	Top Width (ft)		25.03	
Vel Total (ft/s)	23.92	Avg. Vel. (ft/s)		23.92	
Max Chl Dpth (ft)	3.34	Hydr. Depth (ft)		2.67	
Conv. Total (cfs)	13979.2	Conv. (cfs)		13979.2	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		27.05	
Min Ch El (ft)	2747.90	Shear (lb/sq ft)		2.02	
Alpha	1.00	Stream Power (lb/ft s)	185.00	0.00	0.00
Frctn Loss (ft)	1.63	Cum Volume (acre-ft)	0.00	3.41	
C & E Loss (ft)	0.05	Cum SA (acres)	0.00	1.57	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2757.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.90	Wt. n-Val.		0.013	
W.S. Elev (ft)	2750.57	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2752.52	Flow Area (sq ft)		50.78	
E.G. Slope (ft/ft)	0.012956	Area (sq ft)		50.78	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	23.01	Top Width (ft)		23.01	
Vel Total (ft/s)	21.07	Avg. Vel. (ft/s)		21.07	
Max Chl Dpth (ft)	2.67	Hydr. Depth (ft)		2.21	
Conv. Total (cfs)	9400.3	Conv. (cfs)		9400.3	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		24.63	
Min Ch El (ft)	2747.90	Shear (lb/sq ft)		1.67	
Alpha	1.00	Stream Power (lb/ft s)	185.00	0.00	0.00
Frctn Loss (ft)	1.58	Cum Volume (acre-ft)		3.13	
C & E Loss (ft)	0.06	Cum SA (acres)		1.53	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2754.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.83	Wt. n-Val.		0.013	
W.S. Elev (ft)	2749.94	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2751.33	Flow Area (sq ft)		36.86	
E.G. Slope (ft/ft)	0.012223	Area (sq ft)		36.86	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	21.12	Top Width (ft)		21.12	
Vel Total (ft/s)	17.63	Avg. Vel. (ft/s)		17.63	
Max Chl Dpth (ft)	2.04	Hydr. Depth (ft)		1.75	
Conv. Total (cfs)	5879.3	Conv. (cfs)		5879.3	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		22.36	
Min Ch El (ft)	2747.90	Shear (lb/sq ft)		1.26	
Alpha	1.00	Stream Power (lb/ft s)	185.00	0.00	0.00
Frctn Loss (ft)	1.38	Cum Volume (acre-ft)		2.18	
C & E Loss (ft)	0.08	Cum SA (acres)		1.42	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 2762

INPUT
Description: Section 27+58
Station Elevation Data    num=       6
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     125  2755.9     145  2755.9     157    2746     172    2746     184  2755.9
     185    2760

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     125     .16     145    .013     184    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           145     184                4       4       4             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     125     145    2757       T
Left Levee      Station=     145      Elevation=    2757

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2766.38    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              15.29    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2751.09    Reach Len. (ft)             4.00       4.00       4.00
  Crit W.S. (ft)           2755.10    Flow Area (sq ft)                    107.70
  E.G. Slope (ft/ft)      0.014323    Area (sq ft)                         107.70
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             27.33    Top Width (ft)                        27.33
  Vel Total (ft/s)           31.38    Avg. Vel. (ft/s)                      31.38
  Max Chl Dpth (ft)           5.09    Hydr. Depth (ft)                       3.94
  Conv. Total (cfs)        28242.6    Conv. (cfs)                         28242.6
  Length Wtd. (ft)            4.00    Wetted Per. (ft)                      30.99
  Min Ch El (ft)           2746.00    Shear (lb/sq ft)                       3.11
  Alpha                       1.00    Stream Power (lb/ft s)    185.00     145.00       0.00
  Frctn Loss (ft)             0.11    Cum Volume (acre-ft)        0.01       5.48
  C & E Loss (ft)             0.16    Cum SA (acres)              0.02       1.81


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2764.26    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              13.82    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2750.44    Reach Len. (ft)             4.00       4.00       4.00
  Crit W.S. (ft)           2754.04    Flow Area (sq ft)                     90.51
  E.G. Slope (ft/ft)      0.014902    Area (sq ft)                          90.51
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             25.77    Top Width (ft)                        25.77
  Vel Total (ft/s)           29.83    Avg. Vel. (ft/s)                      29.83
  Max Chl Dpth (ft)           4.44    Hydr. Depth (ft)                       3.51
  Conv. Total (cfs)        22117.8    Conv. (cfs)                         22117.8
  Length Wtd. (ft)            4.00    Wetted Per. (ft)                      28.96
  Min Ch El (ft)           2746.00    Shear (lb/sq ft)                       2.91
  Alpha                       1.00    Stream Power (lb/ft s)    185.00     145.00       0.00
  Frctn Loss (ft)             0.11    Cum Volume (acre-ft)        0.00       4.65
  C & E Loss (ft)             0.16    Cum SA (acres)              0.02       1.71
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2759.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.28	Wt. n-Val.		0.013	
W.S. Elev (ft)	2749.11	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2751.76	Flow Area (sq ft)		58.31	
E.G. Slope (ft/ft)	0.016170	Area (sq ft)		58.31	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	22.53	Top Width (ft)		22.53	
Vel Total (ft/s)	25.72	Avg. Vel. (ft/s)		25.72	
Max Chl Dpth (ft)	3.11	Hydr. Depth (ft)		2.59	
Conv. Total (cfs)	11795.9	Conv. (cfs)		11795.9	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		24.77	
Min Ch El (ft)	2746.00	Shear (lb/sq ft)		2.38	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.00	3.22	
C & E Loss (ft)	0.17	Cum SA (acres)	0.00	1.55	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2750.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2750.28	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2747.69	Flow Area (sq ft)		86.44	
E.G. Slope (ft/ft)	0.000093	Area (sq ft)		86.44	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.38	Top Width (ft)		25.38	
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)		2.31	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		3.41	
Conv. Total (cfs)	20724.4	Conv. (cfs)		20724.4	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		28.46	
Min Ch El (ft)	2746.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.93	
C & E Loss (ft)	0.00	Cum SA (acres)		1.24	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2759.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.61	Wt. n-Val.		0.013	
W.S. Elev (ft)	2749.24	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2751.97	Flow Area (sq ft)		61.21	
E.G. Slope (ft/ft)	0.015992	Area (sq ft)		61.21	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	22.84	Top Width (ft)		22.84	
Vel Total (ft/s)	26.14	Avg. Vel. (ft/s)		26.14	
Max Chl Dpth (ft)	3.23	Hydr. Depth (ft)		2.68	
Conv. Total (cfs)	12652.4	Conv. (cfs)		12652.4	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		25.17	

Min Ch El (ft)	2746.00	Shear (lb/sq ft)		2.43	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.00	3.40	
C & E Loss (ft)	0.17	Cum SA (acres)	0.00	1.57	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2754.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.013	
W.S. Elev (ft)	2753.92	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2750.75	Flow Area (sq ft)		194.74	
E.G. Slope (ft/ft)	0.000279	Area (sq ft)		194.74	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	34.19	Top Width (ft)		34.19	
Vel Total (ft/s)	5.49	Avg. Vel. (ft/s)		5.49	
Max Chl Dpth (ft)	7.92	Hydr. Depth (ft)		5.70	
Conv. Total (cfs)	64064.6	Conv. (cfs)		64064.6	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		39.88	
Min Ch El (ft)	2746.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.11	
C & E Loss (ft)	0.00	Cum SA (acres)		1.53	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2752.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2752.52	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2749.52	Flow Area (sq ft)		149.33	
E.G. Slope (ft/ft)	0.000214	Area (sq ft)		149.33	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	30.81	Top Width (ft)		30.81	
Vel Total (ft/s)	4.35	Avg. Vel. (ft/s)		4.35	
Max Chl Dpth (ft)	6.52	Hydr. Depth (ft)		4.85	
Conv. Total (cfs)	44484.9	Conv. (cfs)		44484.9	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		35.49	
Min Ch El (ft)	2746.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.17	
C & E Loss (ft)	0.00	Cum SA (acres)		1.41	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

LATERAL STRUCTURE

RIVER: Desert Knolls Wa
REACH: Main RS: 2760

INPUT
Description: Reach 1 Diversion Chute #3

```
Lateral structure position     = Left overbank
Distance from Upstream XS =
Deck/Roadway Width        =      20
Weir Coefficient          =       2
Weir Flow Reference       = Water Surface
 Weir Embankment Coordinates    num =        5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
       0  2755.9       4  2755.9      12  2755.9    31.2  2755.6   248.1  2752.9

Weir crest shape                           = Broad Crested


Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                       400     .013     .013        0                   .5                1
Upstream   Elevation =  2746
           Centerline Station =  2
Downstream Elevation =  2745
           Centerline Station =  2

LATERAL STRUCTURE OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2766.38    Weir Sta US (ft)
  W.S. US. (ft)                2751.09    Weir Sta DS (ft)
  E.G. DS (ft)                 2762.58    Min El Weir Flow (ft)        2752.90
  W.S. DS (ft)                 2750.13    Wr Top Wdth (ft)
  Q US (cfs)                   3380.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          20.46    Weir Avg Depth (ft)
  Q DS (cfs)                   3380.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  0.61    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             20.46
  Q Culv (cfs)                   20.46    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              400.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2746.00
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2745.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2764.26    Weir Sta US (ft)
  W.S. US. (ft)                2750.44    Weir Sta DS (ft)
  E.G. DS (ft)                 2760.44    Min El Weir Flow (ft)        2752.90
  W.S. DS (ft)                 2749.54    Wr Top Wdth (ft)
  Q US (cfs)                   2700.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          18.97    Weir Avg Depth (ft)
  Q DS (cfs)                   2700.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  0.70    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             18.97
  Q Culv (cfs)                   18.97    # Barrels                          1
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  Q Lat RC (cfs)                          Culv Length (ft)              400.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2746.00
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2745.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2759.38    Weir Sta US (ft)
  W.S. US. (ft)                2749.11    Weir Sta DS (ft)
  E.G. DS (ft)                 2755.72    Min El Weir Flow (ft)        2752.90
  W.S. DS (ft)                 2748.31    Wr Top Wdth (ft)
  Q US (cfs)                   1500.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          15.55    Weir Avg Depth (ft)
  Q DS (cfs)                   1500.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  1.04    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             15.55
  Q Culv (cfs)                   15.55    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              400.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2746.00
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2745.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2750.37    Weir Sta US (ft)
  W.S. US. (ft)                2750.28    Weir Sta DS (ft)
  E.G. DS (ft)                 2748.28    Min El Weir Flow (ft)        2752.90
  W.S. DS (ft)                 2745.88    Wr Top Wdth (ft)
  Q US (cfs)                    200.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          18.58    Weir Avg Depth (ft)
  Q DS (cfs)                    200.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  9.29    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             18.58
  Q Culv (cfs)                   18.58    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              400.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2746.00
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2745.00
  Breach Flow Area (sq ft)


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

LATERAL STRUCTURE OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2759.85    Weir Sta US (ft)
  W.S. US. (ft)                2749.24    Weir Sta DS (ft)
  E.G. DS (ft)                 2756.17    Min El Weir Flow (ft)        2752.90
  W.S. DS (ft)                 2748.43    Wr Top Wdth (ft)
  Q US (cfs)                   1600.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          15.91    Weir Avg Depth (ft)
  Q DS (cfs)                   1600.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  0.99    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             15.91
  Q Culv (cfs)                   15.91    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              400.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2746.00
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2745.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2754.39    Weir Sta US (ft)
  W.S. US. (ft)                2753.92    Weir Sta DS (ft)
  E.G. DS (ft)                 2752.87    Min El Weir Flow (ft)        2752.90
  W.S. DS (ft)                 2747.97    Wr Top Wdth (ft)
  Q US (cfs)                   1070.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          26.22    Weir Avg Depth (ft)
  Q DS (cfs)                   1070.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  2.45    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             26.22
  Q Culv (cfs)                   26.22    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              400.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2746.00
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2745.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1
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E.G. US. (ft)	2752.81	Weir Sta US (ft)	
W.S. US. (ft)	2752.52	Weir Sta DS (ft)	
E.G. DS (ft)	2751.18	Min El Weir Flow (ft)	2752.90
W.S. DS (ft)	2747.09	Wr Top Wdth (ft)	
Q US (cfs)	650.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	23.50	Weir Avg Depth (ft)	
Q DS (cfs)	650.00	Weir Flow Area (sq ft)	
Perc Q Leaving	3.62	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	23.50
Q Culv (cfs)	23.50	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	400.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2746.00
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2745.00
Breach Flow Area (sq ft)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2758

INPUT
Description: Section 27+58
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
125	2755.9	145	2755.9	157	2746	172	2746	184	2755.9
185	2760								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
125	.16	145	.013	184	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
145	184	8	8	8	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
125	145	2757	T

Left Levee Station= 145 Elevation= 2757

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2766.31	Element			
Vel Head (ft)	15.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2751.10	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2755.10	Flow Area (sq ft)		108.00	
E.G. Slope (ft/ft)	0.014211	Area (sq ft)		108.00	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	27.36	Top Width (ft)		27.36	
Vel Total (ft/s)	31.30	Avg. Vel. (ft/s)		31.30	
Max Chl Dpth (ft)	5.10	Hydr. Depth (ft)		3.95	
Conv. Total (cfs)	28353.0	Conv. (cfs)		28353.0	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		31.02	
Min Ch El (ft)	2746.00	Shear (lb/sq ft)		3.09	

Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.01	5.47	
C & E Loss (ft)	0.03	Cum SA (acres)	0.02	1.81	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2764.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.71	Wt. n-Val.		0.013	
W.S. Elev (ft)	2750.45	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2754.04	Flow Area (sq ft)		90.85	
E.G. Slope (ft/ft)	0.014745	Area (sq ft)		90.85	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	25.80	Top Width (ft)		25.80	
Vel Total (ft/s)	29.72	Avg. Vel. (ft/s)		29.72	
Max Chl Dpth (ft)	4.45	Hydr. Depth (ft)		3.52	
Conv. Total (cfs)	22235.2	Conv. (cfs)		22235.2	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		29.00	
Min Ch El (ft)	2746.00	Shear (lb/sq ft)		2.88	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.00	4.64	
C & E Loss (ft)	0.03	Cum SA (acres)	0.02	1.71	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2759.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.16	Wt. n-Val.		0.013	
W.S. Elev (ft)	2749.12	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2751.76	Flow Area (sq ft)		58.63	
E.G. Slope (ft/ft)	0.015917	Area (sq ft)		58.63	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	22.57	Top Width (ft)		22.57	
Vel Total (ft/s)	25.58	Avg. Vel. (ft/s)		25.58	
Max Chl Dpth (ft)	3.12	Hydr. Depth (ft)		2.60	
Conv. Total (cfs)	11889.6	Conv. (cfs)		11889.6	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		24.81	
Min Ch El (ft)	2746.00	Shear (lb/sq ft)		2.35	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.00	3.21	
C & E Loss (ft)	0.03	Cum SA (acres)	0.00	1.55	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2750.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2750.28	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2747.69	Flow Area (sq ft)		86.42	
E.G. Slope (ft/ft)	0.000093	Area (sq ft)		86.42	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.38	Top Width (ft)		25.38	
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)		2.31	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		3.41	
Conv. Total (cfs)	20718.1	Conv. (cfs)		20718.1	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		28.45	

Min Ch El (ft)	2746.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.92	
C & E Loss (ft)	0.07	Cum SA (acres)		1.24	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2759.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.50	Wt. n-Val.		0.013	
W.S. Elev (ft)	2749.25	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2751.97	Flow Area (sq ft)		61.53	
E.G. Slope (ft/ft)	0.015750	Area (sq ft)		61.53	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	22.88	Top Width (ft)		22.88	
Vel Total (ft/s)	26.00	Avg. Vel. (ft/s)		26.00	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	12749.1	Conv. (cfs)		12749.1	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		25.21	
Min Ch El (ft)	2746.00	Shear (lb/sq ft)		2.40	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.00	3.40	
C & E Loss (ft)	0.03	Cum SA (acres)	0.00	1.57	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2754.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.013	
W.S. Elev (ft)	2753.92	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2750.75	Flow Area (sq ft)		194.69	
E.G. Slope (ft/ft)	0.000279	Area (sq ft)		194.69	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	34.19	Top Width (ft)		34.19	
Vel Total (ft/s)	5.50	Avg. Vel. (ft/s)		5.50	
Max Chl Dpth (ft)	7.92	Hydr. Depth (ft)		5.69	
Conv. Total (cfs)	64042.1	Conv. (cfs)		64042.1	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		39.88	
Min Ch El (ft)	2746.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.09	
C & E Loss (ft)	0.13	Cum SA (acres)		1.53	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2752.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2752.52	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2749.52	Flow Area (sq ft)		149.29	
E.G. Slope (ft/ft)	0.000214	Area (sq ft)		149.29	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	30.80	Top Width (ft)		30.80	
Vel Total (ft/s)	4.35	Avg. Vel. (ft/s)		4.35	
Max Chl Dpth (ft)	6.52	Hydr. Depth (ft)		4.85	
Conv. Total (cfs)	44469.5	Conv. (cfs)		44469.5	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		35.49	
Min Ch El (ft)	2746.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.15	
C & E Loss (ft)	0.11	Cum SA (acres)		1.41	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2750

INPUT
Description: Section 27+50
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
125	2755.9	145	2755.9	157	2747.9	172	2747.9	184	2755.9
185	2760								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
125	.16	145	.013	184	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
145	184	19.2	19.2	19.2	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
125	145	2756.5	T

Left Levee Station= 145 Elevation= 2756.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2765.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2753.18	Reach Len. (ft)	19.20	19.20	19.20
Crit W.S. (ft)	2756.50	Flow Area (sq ft)		121.15	
E.G. Slope (ft/ft)	0.010969	Area (sq ft)		121.15	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	30.85	Top Width (ft)		30.85	
Vel Total (ft/s)	27.90	Avg. Vel. (ft/s)		27.90	
Max Chl Dpth (ft)	5.28	Hydr. Depth (ft)		3.93	
Conv. Total (cfs)	32273.2	Conv. (cfs)		32273.2	
Length Wtd. (ft)	19.20	Wetted Per. (ft)		34.05	
Min Ch El (ft)	2747.90	Shear (lb/sq ft)		2.44	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.01	5.45	

C & E Loss (ft)	0.94	Cum SA (acres)	0.02	1.81

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2763.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.50	Wt. n-Val.		0.013	
W.S. Elev (ft)	2752.61	Reach Len. (ft)	19.20	19.20	19.20
Crit W.S. (ft)	2755.62	Flow Area (sq ft)		103.85	
E.G. Slope (ft/ft)	0.010755	Area (sq ft)		103.85	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	29.12	Top Width (ft)		29.12	
Vel Total (ft/s)	26.00	Avg. Vel. (ft/s)		26.00	
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)		3.57	
Conv. Total (cfs)	26035.5	Conv. (cfs)		26035.5	
Length Wtd. (ft)	19.20	Wetted Per. (ft)		31.97	
Min Ch El (ft)	2747.90	Shear (lb/sq ft)		2.18	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.00	4.63	
C & E Loss (ft)	0.97	Cum SA (acres)	0.02	1.70	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2758.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.71	Wt. n-Val.		0.013	
W.S. Elev (ft)	2751.45	Reach Len. (ft)	19.20	19.20	19.20
Crit W.S. (ft)	2753.49	Flow Area (sq ft)		72.17	
E.G. Slope (ft/ft)	0.009267	Area (sq ft)		72.17	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	25.65	Top Width (ft)		25.65	
Vel Total (ft/s)	20.78	Avg. Vel. (ft/s)		20.78	
Max Chl Dpth (ft)	3.55	Hydr. Depth (ft)		2.81	
Conv. Total (cfs)	15582.2	Conv. (cfs)		15582.2	
Length Wtd. (ft)	19.20	Wetted Per. (ft)		27.80	
Min Ch El (ft)	2747.90	Shear (lb/sq ft)		1.50	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.00	3.20	
C & E Loss (ft)	1.04	Cum SA (acres)	0.00	1.54	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2750.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.		0.013	
W.S. Elev (ft)	2749.56	Reach Len. (ft)	19.20	19.20	19.20
Crit W.S. (ft)	2749.56	Flow Area (sq ft)		29.04	
E.G. Slope (ft/ft)	0.002355	Area (sq ft)		29.04	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	19.98	Top Width (ft)		19.98	
Vel Total (ft/s)	6.89	Avg. Vel. (ft/s)		6.89	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		1.45	
Conv. Total (cfs)	4121.1	Conv. (cfs)		4121.1	
Length Wtd. (ft)	19.20	Wetted Per. (ft)		20.99	
Min Ch El (ft)	2747.90	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		0.91	
C & E Loss (ft)	0.00	Cum SA (acres)		1.23	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2758.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2751.56	Reach Len. (ft)	19.20	19.20	19.20
Crit W.S. (ft)	2753.71	Flow Area (sq ft)		75.00	
E.G. Slope (ft/ft)	0.009451	Area (sq ft)		75.00	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	25.98	Top Width (ft)		25.98	
Vel Total (ft/s)	21.33	Avg. Vel. (ft/s)		21.33	
Max Chl Dpth (ft)	3.66	Hydr. Depth (ft)		2.89	
Conv. Total (cfs)	16458.1	Conv. (cfs)		16458.1	
Length Wtd. (ft)	19.20	Wetted Per. (ft)		28.20	
Min Ch El (ft)	2747.90	Shear (lb/sq ft)		1.57	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.00	3.38	
C & E Loss (ft)	1.03	Cum SA (acres)	0.00	1.56	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2754.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.76	Wt. n-Val.		0.013	
W.S. Elev (ft)	2752.49	Reach Len. (ft)	19.20	19.20	19.20
Crit W.S. (ft)	2752.49	Flow Area (sq ft)		100.49	
E.G. Slope (ft/ft)	0.001852	Area (sq ft)		100.49	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	

Top Width (ft)	28.77	Top Width (ft)			28.77	
Vel Total (ft/s)	10.65	Avg. Vel. (ft/s)			10.65	
Max Chl Dpth (ft)	4.59	Hydr. Depth (ft)			3.49	
Conv. Total (cfs)	24862.8	Conv. (cfs)			24862.8	
Length Wtd. (ft)	19.20	Wetted Per. (ft)			31.55	
Min Ch El (ft)	2747.90	Shear (lb/sq ft)			0.37	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00		0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)			3.06	
C & E Loss (ft)	0.01	Cum SA (acres)			1.52	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2752.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.35	Wt. n-Val.		0.013	
W.S. Elev (ft)	2751.36	Reach Len. (ft)	19.20	19.20	19.20
Crit W.S. (ft)	2751.36	Flow Area (sq ft)		69.77	
E.G. Slope (ft/ft)	0.001916	Area (sq ft)		69.77	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	25.37	Top Width (ft)		25.37	
Vel Total (ft/s)	9.32	Avg. Vel. (ft/s)		9.32	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)		2.75	
Conv. Total (cfs)	14848.0	Conv. (cfs)		14848.0	
Length Wtd. (ft)	19.20	Wetted Per. (ft)		27.46	
Min Ch El (ft)	2747.90	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		2.13	
C & E Loss (ft)	0.01	Cum SA (acres)		1.41	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2730.8

INPUT
Description: Section 27+30.8
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
99	2760	100	2758.7	112	2750.7	117	2750.7	125	2755.6
145	2755.6	157	2747.6	172	2747.6	184	2755.6	185	2760

```
Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
      99    .035     100     .03     125     .16     145    .013     184    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           145     184            216.9   216.9   216.9             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
      99     145    2756       F
Left Levee      Station=     145      Elevation=    2756
```

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2765.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.18	Wt. n-Val.		0.013	
W.S. Elev (ft)	2752.87	Reach Len. (ft)	216.90	216.90	216.90
Crit W.S. (ft)	2756.01	Flow Area (sq ft)		120.67	
E.G. Slope (ft/ft)	0.011091	Area (sq ft)		120.67	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	30.81	Top Width (ft)		30.81	
Vel Total (ft/s)	28.01	Avg. Vel. (ft/s)		28.01	
Max Chl Dpth (ft)	5.27	Hydr. Depth (ft)		3.92	
Conv. Total (cfs)	32095.1	Conv. (cfs)		32095.1	
Length Wtd. (ft)	216.90	Wetted Per. (ft)		34.00	
Min Ch El (ft)	2747.60	Shear (lb/sq ft)		2.46	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	0.01	5.40	
C & E Loss (ft)	0.01	Cum SA (acres)	0.02	1.79	

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2762.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.59	Wt. n-Val.		0.013	
W.S. Elev (ft)	2752.29	Reach Len. (ft)	216.90	216.90	216.90
Crit W.S. (ft)	2755.34	Flow Area (sq ft)		103.39	
E.G. Slope (ft/ft)	0.010890	Area (sq ft)		103.39	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	29.07	Top Width (ft)		29.07	
Vel Total (ft/s)	26.11	Avg. Vel. (ft/s)		26.11	
Max Chl Dpth (ft)	4.69	Hydr. Depth (ft)		3.56	
Conv. Total (cfs)	25873.7	Conv. (cfs)		25873.7	
Length Wtd. (ft)	216.90	Wetted Per. (ft)		31.92	
Min Ch El (ft)	2747.60	Shear (lb/sq ft)		2.20	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	0.00	4.58	
C & E Loss (ft)	0.01	Cum SA (acres)	0.02	1.69	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2757.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.84	Wt. n-Val.		0.013	
W.S. Elev (ft)	2751.12	Reach Len. (ft)	216.90	216.90	216.90
Crit W.S. (ft)	2753.20	Flow Area (sq ft)		71.45	
E.G. Slope (ft/ft)	0.009537	Area (sq ft)		71.45	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	25.57	Top Width (ft)		25.57	
Vel Total (ft/s)	20.99	Avg. Vel. (ft/s)		20.99	
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)		2.79	
Conv. Total (cfs)	15359.7	Conv. (cfs)		15359.7	
Length Wtd. (ft)	216.90	Wetted Per. (ft)		27.70	

Min Ch El (ft)	2747.60	Shear (lb/sq ft)		1.54	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.00	3.17	
C & E Loss (ft)	0.01	Cum SA (acres)	0.00	1.53	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2750.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.		0.013	
W.S. Elev (ft)	2748.91	Reach Len. (ft)	216.90	216.90	216.90
Crit W.S. (ft)	2749.27	Flow Area (sq ft)		22.19	
E.G. Slope (ft/ft)	0.005309	Area (sq ft)		22.19	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.93	Top Width (ft)		18.93	
Vel Total (ft/s)	9.01	Avg. Vel. (ft/s)		9.01	
Max Chl Dpth (ft)	1.31	Hydr. Depth (ft)		1.17	
Conv. Total (cfs)	2744.8	Conv. (cfs)		2744.8	
Length Wtd. (ft)	216.90	Wetted Per. (ft)		19.72	
Min Ch El (ft)	2747.60	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)		0.90	
C & E Loss (ft)	0.05	Cum SA (acres)		1.22	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2758.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.20	Wt. n-Val.		0.013	
W.S. Elev (ft)	2751.23	Reach Len. (ft)	216.90	216.90	216.90
Crit W.S. (ft)	2753.41	Flow Area (sq ft)		74.31	
E.G. Slope (ft/ft)	0.009703	Area (sq ft)		74.31	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	25.90	Top Width (ft)		25.90	
Vel Total (ft/s)	21.53	Avg. Vel. (ft/s)		21.53	
Max Chl Dpth (ft)	3.63	Hydr. Depth (ft)		2.87	
Conv. Total (cfs)	16243.3	Conv. (cfs)		16243.3	
Length Wtd. (ft)	216.90	Wetted Per. (ft)		28.10	
Min Ch El (ft)	2747.60	Shear (lb/sq ft)		1.60	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.00	3.35	
C & E Loss (ft)	0.01	Cum SA (acres)	0.00	1.55	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2754.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.53	Wt. n-Val.		0.013	
W.S. Elev (ft)	2751.59	Reach Len. (ft)	216.90	216.90	216.90
Crit W.S. (ft)	2752.22	Flow Area (sq ft)		83.85	
E.G. Slope (ft/ft)	0.003082	Area (sq ft)		83.85	

Q Total (cfs)	1070.00	Flow (cfs)			1070.00	
Top Width (ft)	26.98	Top Width (ft)			26.98	
Vel Total (ft/s)	12.76	Avg. Vel. (ft/s)			12.76	
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)			3.11	
Conv. Total (cfs)	19273.4	Conv. (cfs)			19273.4	
Length Wtd. (ft)	216.90	Wetted Per. (ft)			29.40	
Min Ch El (ft)	2747.60	Shear (lb/sq ft)			0.55	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00		0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)			3.02	
C & E Loss (ft)	0.08	Cum SA (acres)			1.51	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2752.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2750.51	Reach Len. (ft)	216.90	216.90	216.90
Crit W.S. (ft)	2750.99	Flow Area (sq ft)		56.25	
E.G. Slope (ft/ft)	0.003556	Area (sq ft)		56.25	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	23.72	Top Width (ft)		23.72	
Vel Total (ft/s)	11.56	Avg. Vel. (ft/s)		11.56	
Max Chl Dpth (ft)	2.91	Hydr. Depth (ft)		2.37	
Conv. Total (cfs)	10900.5	Conv. (cfs)		10900.5	
Length Wtd. (ft)	216.90	Wetted Per. (ft)		25.48	
Min Ch El (ft)	2747.60	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	185.00	145.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		2.11	
C & E Loss (ft)	0.07	Cum SA (acres)		1.39	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2513.9

INPUT
Description: Section 25+13.9
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2760	107.69	2759	116.25	2758	141.84	2757	163.76	2757
187.19	2755	234.08	2755	289.28	2755	307.85	2754	319.63	2754
327.06	2755	345.27	2755	383.03	2756	517	2758.2	523	2752.9
529	2750.2	542	2750.2	548	2752.9	568	2752.9	580	2744.9
595	2744.9	607	2752.9	707.55	2758	718.12	2759	729.11	2760

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	523	.03	548	.016	568	.013	607	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
568	607	103.9	103.9	103.9	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent

```
     100     568  2753.5       F
     607  729.11  2753.5       F
Left Levee      Station=     568      Elevation=  2753.5
Right Levee     Station=     607      Elevation=  2753.5
```

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2762.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.45	Wt. n-Val.		0.013	
W.S. Elev (ft)	2750.13	Reach Len. (ft)	103.90	103.90	103.90
Crit W.S. (ft)	2753.78	Flow Area (sq ft)		119.35	
E.G. Slope (ft/ft)	0.011435	Area (sq ft)		119.35	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	30.68	Top Width (ft)		30.68	
Vel Total (ft/s)	28.32	Avg. Vel. (ft/s)		28.32	
Max Chl Dpth (ft)	5.23	Hydr. Depth (ft)		3.89	
Conv. Total (cfs)	31607.8	Conv. (cfs)		31607.8	
Length Wtd. (ft)	103.90	Wetted Per. (ft)		33.84	
Min Ch El (ft)	2744.90	Shear (lb/sq ft)		2.52	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	2.44	Cum Volume (acre-ft)	0.01	4.80	
C & E Loss (ft)	0.03	Cum SA (acres)	0.02	1.64	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2760.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.90	Wt. n-Val.		0.013	
W.S. Elev (ft)	2749.54	Reach Len. (ft)	103.90	103.90	103.90
Crit W.S. (ft)	2752.62	Flow Area (sq ft)		101.91	
E.G. Slope (ft/ft)	0.011338	Area (sq ft)		101.91	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	28.92	Top Width (ft)		28.92	
Vel Total (ft/s)	26.49	Avg. Vel. (ft/s)		26.49	
Max Chl Dpth (ft)	4.64	Hydr. Depth (ft)		3.52	
Conv. Total (cfs)	25357.1	Conv. (cfs)		25357.1	
Length Wtd. (ft)	103.90	Wetted Per. (ft)		31.73	
Min Ch El (ft)	2744.90	Shear (lb/sq ft)		2.27	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	2.41	Cum Volume (acre-ft)	0.00	4.07	
C & E Loss (ft)	0.03	Cum SA (acres)	0.02	1.54	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2755.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.41	Wt. n-Val.		0.013	
W.S. Elev (ft)	2748.31	Reach Len. (ft)	103.90	103.90	103.90
Crit W.S. (ft)	2750.49	Flow Area (sq ft)		68.68	
E.G. Slope (ft/ft)	0.010674	Area (sq ft)		68.68	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	25.24	Top Width (ft)		25.24	
Vel Total (ft/s)	21.84	Avg. Vel. (ft/s)		21.84	
Max Chl Dpth (ft)	3.41	Hydr. Depth (ft)		2.72	
Conv. Total (cfs)	14519.0	Conv. (cfs)		14519.0	

Length Wtd. (ft)	103.90	Wetted Per. (ft)		27.31	
Min Ch El (ft)	2744.90	Shear (lb/sq ft)		1.68	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	2.19	Cum Volume (acre-ft)	0.00	2.82	
C & E Loss (ft)	0.06	Cum SA (acres)	0.00	1.40	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2748.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2745.88	Reach Len. (ft)	103.90	103.90	103.90
Crit W.S. (ft)	2746.56	Flow Area (sq ft)		16.08	
E.G. Slope (ft/ft)	0.014299	Area (sq ft)		16.08	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.93	Top Width (ft)		17.93	
Vel Total (ft/s)	12.44	Avg. Vel. (ft/s)		12.44	
Max Chl Dpth (ft)	0.98	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	1672.5	Conv. (cfs)		1672.5	
Length Wtd. (ft)	103.90	Wetted Per. (ft)		18.52	
Min Ch El (ft)	2744.90	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	1.78	Cum Volume (acre-ft)		0.80	
C & E Loss (ft)	0.11	Cum SA (acres)		1.13	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2756.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.74	Wt. n-Val.		0.013	
W.S. Elev (ft)	2748.43	Reach Len. (ft)	103.90	103.90	103.90
Crit W.S. (ft)	2750.71	Flow Area (sq ft)		71.67	
E.G. Slope (ft/ft)	0.010754	Area (sq ft)		71.67	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	25.59	Top Width (ft)		25.59	
Vel Total (ft/s)	22.32	Avg. Vel. (ft/s)		22.32	
Max Chl Dpth (ft)	3.53	Hydr. Depth (ft)		2.80	
Conv. Total (cfs)	15428.6	Conv. (cfs)		15428.6	
Length Wtd. (ft)	103.90	Wetted Per. (ft)		27.73	
Min Ch El (ft)	2744.90	Shear (lb/sq ft)		1.74	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	2.21	Cum Volume (acre-ft)	0.00	2.99	
C & E Loss (ft)	0.05	Cum SA (acres)	0.00	1.42	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2752.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.90	Wt. n-Val.		0.013	
W.S. Elev (ft)	2747.97	Reach Len. (ft)	103.90	103.90	103.90
Crit W.S. (ft)	2749.49	Flow Area (sq ft)		60.24	
E.G. Slope (ft/ft)	0.007909	Area (sq ft)		60.24	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	24.22	Top Width (ft)		24.22	
Vel Total (ft/s)	17.76	Avg. Vel. (ft/s)		17.76	
Max Chl Dpth (ft)	3.07	Hydr. Depth (ft)		2.49	
Conv. Total (cfs)	12031.5	Conv. (cfs)		12031.5	
Length Wtd. (ft)	103.90	Wetted Per. (ft)		26.08	
Min Ch El (ft)	2744.90	Shear (lb/sq ft)		1.14	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	1.01	Cum Volume (acre-ft)		2.66	
C & E Loss (ft)	0.24	Cum SA (acres)		1.38	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2751.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2747.09	Reach Len. (ft)	103.90	103.90	103.90
Crit W.S. (ft)	2748.36	Flow Area (sq ft)		40.03	
E.G. Slope (ft/ft)	0.009579	Area (sq ft)		40.03	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	21.57	Top Width (ft)		21.57	
Vel Total (ft/s)	16.24	Avg. Vel. (ft/s)		16.24	
Max Chl Dpth (ft)	2.19	Hydr. Depth (ft)		1.86	
Conv. Total (cfs)	6641.3	Conv. (cfs)		6641.3	
Length Wtd. (ft)	103.90	Wetted Per. (ft)		22.89	
Min Ch El (ft)	2744.90	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)		1.87	
C & E Loss (ft)	0.20	Cum SA (acres)		1.28	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2410

INPUT
Description: Section 24+10
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2760	107.69	2759	116.25	2758	141.84	2757	163.76	2757
187.19	2755	234.08	2755	289.28	2755	307.85	2754	319.63	2754
327.06	2755	345.27	2755	383.03	2756	426.7	2756	438.09	2755
465.01	2755	481.87	2754.66	512.42	2755	516.98	2756	520.63	2756
523	2751.5	533	2750	538	2750	548	2751.5	568	2751.5
580	2743.5	595	2743.5	607	2751.5	626.07	2753	628.58	2754
631.17	2755	643.77	2755	685.62	2755	692.43	2756	698.86	2757
707.55	2758	718.12	2759	729.11	2760				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	523	.03	548	.016	568	.013	607	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
568	607	10	10	10	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
100	568	2752	F

Left Levee Station= 568 Elevation= 2752
Right Levee Station= 607 Elevation= 2752

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2761.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.66	Wt. n-Val.		0.013	
W.S. Elev (ft)	2748.69	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2752.64	Flow Area (sq ft)		118.36	
E.G. Slope (ft/ft)	0.011702	Area (sq ft)		118.36	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	30.58	Top Width (ft)		30.58	
Vel Total (ft/s)	28.56	Avg. Vel. (ft/s)		28.56	
Max Chl Dpth (ft)	5.19	Hydr. Depth (ft)		3.87	
Conv. Total (cfs)	31244.8	Conv. (cfs)		31244.8	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		33.73	
Min Ch El (ft)	2743.50	Shear (lb/sq ft)		2.56	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	1.20	Cum Volume (acre-ft)	0.01	4.52	
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	1.57	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2759.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	2748.11	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2751.24	Flow Area (sq ft)		100.91	
E.G. Slope (ft/ft)	0.011656	Area (sq ft)		100.91	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	

Top Width (ft)	28.82	Top Width (ft)		28.82	
Vel Total (ft/s)	26.76	Avg. Vel. (ft/s)		26.76	
Max Chl Dpth (ft)	4.61	Hydr. Depth (ft)		3.50	
Conv. Total (cfs)	25009.1	Conv. (cfs)		25009.1	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		31.61	
Min Ch El (ft)	2743.50	Shear (lb/sq ft)		2.32	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)	0.00	3.83	
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	1.48	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2754.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.69	Wt. n-Val.		0.013	
W.S. Elev (ft)	2746.86	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2749.10	Flow Area (sq ft)		67.42	
E.G. Slope (ft/ft)	0.011253	Area (sq ft)		67.42	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	25.09	Top Width (ft)		25.09	
Vel Total (ft/s)	22.25	Avg. Vel. (ft/s)		22.25	
Max Chl Dpth (ft)	3.36	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	14140.3	Conv. (cfs)		14140.3	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		27.13	
Min Ch El (ft)	2743.50	Shear (lb/sq ft)		1.75	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	1.14	Cum Volume (acre-ft)	0.00	2.66	
C & E Loss (ft)	0.03	Cum SA (acres)	0.00	1.34	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2746.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.32	Wt. n-Val.		0.013	
W.S. Elev (ft)	2744.49	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2745.17	Flow Area (sq ft)		16.35	
E.G. Slope (ft/ft)	0.013587	Area (sq ft)		16.35	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.97	Top Width (ft)		17.97	
Vel Total (ft/s)	12.24	Avg. Vel. (ft/s)		12.24	
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)		0.91	
Conv. Total (cfs)	1715.8	Conv. (cfs)		1715.8	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		18.57	
Min Ch El (ft)	2743.50	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	1.45	Cum Volume (acre-ft)		0.77	
C & E Loss (ft)	0.02	Cum SA (acres)		1.09	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2755.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2746.98	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2749.31	Flow Area (sq ft)		70.44	
E.G. Slope (ft/ft)	0.011300	Area (sq ft)		70.44	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	25.45	Top Width (ft)		25.45	
Vel Total (ft/s)	22.71	Avg. Vel. (ft/s)		22.71	
Max Chl Dpth (ft)	3.48	Hydr. Depth (ft)		2.77	
Conv. Total (cfs)	15051.7	Conv. (cfs)		15051.7	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		27.56	
Min Ch El (ft)	2743.50	Shear (lb/sq ft)		1.80	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	1.15	Cum Volume (acre-ft)	0.00	2.82	
C & E Loss (ft)	0.03	Cum SA (acres)	0.00	1.36	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2751.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.49	Wt. n-Val.		0.013	
W.S. Elev (ft)	2746.43	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2748.12	Flow Area (sq ft)		56.91	
E.G. Slope (ft/ft)	0.009316	Area (sq ft)		56.91	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	23.80	Top Width (ft)		23.80	
Vel Total (ft/s)	18.80	Avg. Vel. (ft/s)		18.80	
Max Chl Dpth (ft)	2.93	Hydr. Depth (ft)		2.39	
Conv. Total (cfs)	11085.9	Conv. (cfs)		11085.9	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		25.58	
Min Ch El (ft)	2743.50	Shear (lb/sq ft)		1.29	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	0.89	Cum Volume (acre-ft)		2.52	
C & E Loss (ft)	0.06	Cum SA (acres)		1.32	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2750.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.48	Wt. n-Val.		0.013	
W.S. Elev (ft)	2745.61	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2746.96	Flow Area (sq ft)		38.28	
E.G. Slope (ft/ft)	0.010931	Area (sq ft)		38.28	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	21.32	Top Width (ft)		21.32	
Vel Total (ft/s)	16.98	Avg. Vel. (ft/s)		16.98	
Max Chl Dpth (ft)	2.11	Hydr. Depth (ft)		1.80	
Conv. Total (cfs)	6217.0	Conv. (cfs)		6217.0	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		22.60	

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  Min Ch El (ft)           2743.50    Shear (lb/sq ft)                        1.16
  Alpha                       1.00    Stream Power (lb/ft s)    729.11     568.00     607.00
  Frctn Loss (ft)             1.06    Cum Volume (acre-ft)                    1.77
  C & E Loss (ft)             0.04    Cum SA (acres)                          1.23


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 2400

INPUT
Description: Section 24+00
Station Elevation Data    num=      38
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2760  107.69    2759  116.25    2758  141.84    2757  163.76    2757
  187.19    2755  234.08    2755  289.28    2755  307.85    2754  319.63    2754
  327.06    2755  345.27    2755  383.03    2756   426.7    2756  438.09    2755
  465.01    2755  481.87 2754.66  512.42    2755  516.98    2756  520.63    2756
     523  2751.5     533    2745     538    2745     548  2751.5     568  2751.5
     580  2743.5     595  2743.5     607  2751.5  626.07    2753  628.58    2754
  631.17    2755  643.77    2755  685.62    2755  692.43    2756  698.86    2757
  707.55    2758  718.12    2759  729.11    2760

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     523     .03     548    .016     568    .013     607    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           568     607               80      80      80             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     100     568    2752       F
Left Levee      Station=     568      Elevation=    2752
Right Levee     Station=     607      Elevation=    2752

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2761.18    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              12.45    Wt. n-Val.                           0.013
  W.S. Elev (ft)           2748.73    Reach Len. (ft)            80.00      80.00      80.00
  Crit W.S. (ft)           2752.01    Flow Area (sq ft)                    119.37
  E.G. Slope (ft/ft)      0.011431    Area (sq ft)                         119.37
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             30.68    Top Width (ft)                        30.68
  Vel Total (ft/s)           28.32    Avg. Vel. (ft/s)                      28.32
  Max Chl Dpth (ft)           5.23    Hydr. Depth (ft)                       3.89
  Conv. Total (cfs)        31613.3    Conv. (cfs)                         31613.3
  Length Wtd. (ft)           80.00    Wetted Per. (ft)                      33.84
  Min Ch El (ft)           2743.50    Shear (lb/sq ft)                       2.52
  Alpha                       1.00    Stream Power (lb/ft s)    729.11     568.00     607.00
  Frctn Loss (ft)             0.12    Cum Volume (acre-ft)        0.01       4.49
  C & E Loss (ft)             0.06    Cum SA (acres)              0.02       1.56


CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2759.04    Element                   Left OB    Channel   Right OB
```

Vel Head (ft)	10.90	Wt. n-Val.		0.013	
W.S. Elev (ft)	2748.14	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)	2751.24	Flow Area (sq ft)		101.89	
E.G. Slope (ft/ft)	0.011344	Area (sq ft)		101.89	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	28.92	Top Width (ft)		28.92	
Vel Total (ft/s)	26.50	Avg. Vel. (ft/s)		26.50	
Max Chl Dpth (ft)	4.64	Hydr. Depth (ft)		3.52	
Conv. Total (cfs)	25349.7	Conv. (cfs)		25349.7	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		31.73	
Min Ch El (ft)	2743.50	Shear (lb/sq ft)		2.27	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.00	3.81	
C & E Loss (ft)	0.06	Cum SA (acres)	0.02	1.47	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2754.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.47	Wt. n-Val.		0.013	
W.S. Elev (ft)	2746.90	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)	2749.10	Flow Area (sq ft)		68.37	
E.G. Slope (ft/ft)	0.010814	Area (sq ft)		68.37	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	25.20	Top Width (ft)		25.20	
Vel Total (ft/s)	21.94	Avg. Vel. (ft/s)		21.94	
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)		2.71	
Conv. Total (cfs)	14424.3	Conv. (cfs)		14424.3	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		27.26	
Min Ch El (ft)	2743.50	Shear (lb/sq ft)		1.69	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.00	2.64	
C & E Loss (ft)	0.06	Cum SA (acres)	0.00	1.34	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2746.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2744.54	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)	2745.17	Flow Area (sq ft)		17.30	
E.G. Slope (ft/ft)	0.011395	Area (sq ft)		17.30	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.13	Top Width (ft)		18.13	
Vel Total (ft/s)	11.56	Avg. Vel. (ft/s)		11.56	
Max Chl Dpth (ft)	1.04	Hydr. Depth (ft)		0.95	
Conv. Total (cfs)	1873.6	Conv. (cfs)		1873.6	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		18.77	
Min Ch El (ft)	2743.50	Shear (lb/sq ft)		0.66	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)		0.76	
C & E Loss (ft)	0.07	Cum SA (acres)		1.08	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2754.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.80	Wt. n-Val.		0.013	
W.S. Elev (ft)	2747.02	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)	2749.31	Flow Area (sq ft)		71.39	
E.G. Slope (ft/ft)	0.010878	Area (sq ft)		71.39	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	25.56	Top Width (ft)		25.56	
Vel Total (ft/s)	22.41	Avg. Vel. (ft/s)		22.41	
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)		2.79	
Conv. Total (cfs)	15340.6	Conv. (cfs)		15340.6	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		27.69	
Min Ch El (ft)	2743.50	Shear (lb/sq ft)		1.75	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.00	2.80	
C & E Loss (ft)	0.06	Cum SA (acres)	0.00	1.36	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2751.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.30	Wt. n-Val.		0.013	
W.S. Elev (ft)	2746.48	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)	2748.12	Flow Area (sq ft)		57.91	
E.G. Slope (ft/ft)	0.008856	Area (sq ft)		57.91	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	23.93	Top Width (ft)		23.93	
Vel Total (ft/s)	18.48	Avg. Vel. (ft/s)		18.48	
Max Chl Dpth (ft)	2.98	Hydr. Depth (ft)		2.42	
Conv. Total (cfs)	11370.0	Conv. (cfs)		11370.0	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		25.73	
Min Ch El (ft)	2743.50	Shear (lb/sq ft)		1.24	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		2.51	
C & E Loss (ft)	0.06	Cum SA (acres)		1.32	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2749.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.26	Wt. n-Val.		0.013	
W.S. Elev (ft)	2745.65	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)	2746.96	Flow Area (sq ft)		39.22	
E.G. Slope (ft/ft)	0.010173	Area (sq ft)		39.22	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	21.46	Top Width (ft)		21.46	
Vel Total (ft/s)	16.57	Avg. Vel. (ft/s)		16.57	
Max Chl Dpth (ft)	2.15	Hydr. Depth (ft)		1.83	
Conv. Total (cfs)	6444.7	Conv. (cfs)		6444.7	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		22.76	
Min Ch El (ft)	2743.50	Shear (lb/sq ft)		1.09	
Alpha	1.00	Stream Power (lb/ft s)	729.11	568.00	607.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)		1.76	
C & E Loss (ft)	0.06	Cum SA (acres)		1.23	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 2320

INPUT
Description: Section 23+20
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     261  2750.2     281  2750.2     293  2742.2     308  2742.2     320  2750.2
  402.64    2751  426.55    2751  431.33    2752  441.68    2755

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     261    .016     281    .013     320    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           281     320                8       8       8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     261     281  2750.5       F
     320  441.68  2750.5       F
Left Levee      Station=     281      Elevation=  2750.5
Right Levee     Station=     320      Elevation=  2750.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)          2760.20    Element                   Left OB    Channel   Right OB
  Vel Head (ft)             12.83    Wt. n-Val.                            0.013
  W.S. Elev (ft)          2747.37    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)          2751.69    Flow Area (sq ft)                    117.57
  E.G. Slope (ft/ft)      0.011925   Area (sq ft)                         117.57
  Q Total (cfs)           3380.00    Flow (cfs)                          3380.00
  Top Width (ft)            30.50    Top Width (ft)                        30.50
  Vel Total (ft/s)          28.75    Avg. Vel. (ft/s)                      28.75
  Max Chl Dpth (ft)          5.17    Hydr. Depth (ft)                       3.85
  Conv. Total (cfs)       30952.3    Conv. (cfs)                         30952.3
  Length Wtd. (ft)           8.00    Wetted Per. (ft)                      33.63
  Min Ch El (ft)          2742.20    Shear (lb/sq ft)                       2.60
  Alpha                      1.00    Stream Power (lb/ft s)    441.68     281.00     320.00
  Frctn Loss (ft)            0.93    Cum Volume (acre-ft)        0.01       4.27
  C & E Loss (ft)            0.04    Cum SA (acres)              0.02       1.50


CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)          2758.07    Element                   Left OB    Channel   Right OB
  Vel Head (ft)             11.29    Wt. n-Val.                            0.013
  W.S. Elev (ft)          2746.78    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)          2749.94    Flow Area (sq ft)                    100.12
  E.G. Slope (ft/ft)      0.011916   Area (sq ft)                         100.12
  Q Total (cfs)           2700.00    Flow (cfs)                          2700.00
  Top Width (ft)            28.74    Top Width (ft)                        28.74
  Vel Total (ft/s)          26.97    Avg. Vel. (ft/s)                      26.97
  Max Chl Dpth (ft)          4.58    Hydr. Depth (ft)                       3.48
  Conv. Total (cfs)       24734.0    Conv. (cfs)                         24734.0
  Length Wtd. (ft)           8.00    Wetted Per. (ft)                      31.51
  Min Ch El (ft)          2742.20    Shear (lb/sq ft)                       2.36
  Alpha                      1.00    Stream Power (lb/ft s)    441.68     281.00     320.00
  Frctn Loss (ft)            0.93    Cum Volume (acre-ft)        0.00       3.62
  C & E Loss (ft)            0.04    Cum SA (acres)              0.02       1.42


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.
```

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2753.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.91	Wt. n-Val.		0.013	
W.S. Elev (ft)	2745.53	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2747.79	Flow Area (sq ft)		66.47	
E.G. Slope (ft/ft)	0.011720	Area (sq ft)		66.47	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	24.98	Top Width (ft)		24.98	
Vel Total (ft/s)	22.57	Avg. Vel. (ft/s)		22.57	
Max Chl Dpth (ft)	3.33	Hydr. Depth (ft)		2.66	
Conv. Total (cfs)	13855.4	Conv. (cfs)		13855.4	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		26.99	
Min Ch El (ft)	2742.20	Shear (lb/sq ft)		1.80	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	0.00	2.52	
C & E Loss (ft)	0.04	Cum SA (acres)	0.00	1.29	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2745.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.39	Wt. n-Val.		0.013	
W.S. Elev (ft)	2743.18	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2743.86	Flow Area (sq ft)		16.11	
E.G. Slope (ft/ft)	0.014215	Area (sq ft)		16.11	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.93	Top Width (ft)		17.93	
Vel Total (ft/s)	12.41	Avg. Vel. (ft/s)		12.41	
Max Chl Dpth (ft)	0.98	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	1677.5	Conv. (cfs)		1677.5	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		18.53	
Min Ch El (ft)	2742.20	Shear (lb/sq ft)		0.77	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	1.02	Cum Volume (acre-ft)		0.73	
C & E Loss (ft)	0.03	Cum SA (acres)		1.05	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2753.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2745.65	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2748.01	Flow Area (sq ft)		69.50	
E.G. Slope (ft/ft)	0.011739	Area (sq ft)		69.50	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	25.34	Top Width (ft)		25.34	
Vel Total (ft/s)	23.02	Avg. Vel. (ft/s)		23.02	
Max Chl Dpth (ft)	3.45	Hydr. Depth (ft)		2.74	
Conv. Total (cfs)	14767.3	Conv. (cfs)		14767.3	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		27.42	
Min Ch El (ft)	2742.20	Shear (lb/sq ft)		1.86	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	0.00	2.67	
C & E Loss (ft)	0.04	Cum SA (acres)	0.00	1.31	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2750.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.89	Wt. n-Val.		0.013	
W.S. Elev (ft)	2745.05	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2746.80	Flow Area (sq ft)		54.92	
E.G. Slope (ft/ft)	0.010323	Area (sq ft)		54.92	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	23.55	Top Width (ft)		23.55	
Vel Total (ft/s)	19.48	Avg. Vel. (ft/s)		19.48	
Max Chl Dpth (ft)	2.85	Hydr. Depth (ft)		2.33	
Conv. Total (cfs)	10531.2	Conv. (cfs)		10531.2	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		25.27	
Min Ch El (ft)	2742.20	Shear (lb/sq ft)		1.40	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.76	Cum Volume (acre-ft)		2.41	
C & E Loss (ft)	0.06	Cum SA (acres)		1.27	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2748.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.73	Wt. n-Val.		0.013	
W.S. Elev (ft)	2744.26	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2745.66	Flow Area (sq ft)		37.24	
E.G. Slope (ft/ft)	0.011856	Area (sq ft)		37.24	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	21.18	Top Width (ft)		21.18	
Vel Total (ft/s)	17.45	Avg. Vel. (ft/s)		17.45	
Max Chl Dpth (ft)	2.06	Hydr. Depth (ft)		1.76	
Conv. Total (cfs)	5969.7	Conv. (cfs)		5969.7	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		22.42	
Min Ch El (ft)	2742.20	Shear (lb/sq ft)		1.23	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.88	Cum Volume (acre-ft)		1.69	
C & E Loss (ft)	0.05	Cum SA (acres)		1.19	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2312

INPUT
Description: Section 23+12
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
261	2750.2	281	2750.2	293	2740.3	308	2740.3	320	2750.2
402.64	2751	426.55	2751	431.33	2752	441.68	2755		

Manning's n Values num= 3

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     Sta   n Val     Sta   n Val     Sta   n Val
     261    .016     281    .013     320    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           281     320                4       4       4             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     261     281  2751.5       F
     320  441.68  2751.5       F
Left Levee      Station=     281      Elevation=  2751.5
Right Levee     Station=     320      Elevation=  2751.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2759.94    Element                    Left OB    Channel   Right OB
  Vel Head (ft)              14.43    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2745.50    Reach Len. (ft)              4.00       4.00       4.00
  Crit W.S. (ft)           2749.40    Flow Area (sq ft)                     110.86
  E.G. Slope (ft/ft)      0.013207    Area (sq ft)                          110.86
  Q Total (cfs)            3380.00    Flow (cfs)                           3380.00
  Top Width (ft)             27.61    Top Width (ft)                         27.61
  Vel Total (ft/s)           30.49    Avg. Vel. (ft/s)                       30.49
  Max Chl Dpth (ft)           5.20    Hydr. Depth (ft)                        4.01
  Conv. Total (cfs)        29411.2    Conv. (cfs)                          29411.2
  Length Wtd. (ft)            4.00    Wetted Per. (ft)                       31.35
  Min Ch El (ft)           2740.30    Shear (lb/sq ft)                        2.92
  Alpha                       1.00    Stream Power (lb/ft s)    441.68     281.00     320.00
  Frctn Loss (ft)             0.10    Cum Volume (acre-ft)        0.01       4.25
  C & E Loss (ft)             0.16    Cum SA (acres)              0.02       1.50


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2757.81    Element                    Left OB    Channel   Right OB
  Vel Head (ft)              12.95    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2744.86    Reach Len. (ft)              4.00       4.00       4.00
  Crit W.S. (ft)           2748.32    Flow Area (sq ft)                      93.48
  E.G. Slope (ft/ft)      0.013606    Area (sq ft)                           93.48
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             26.04    Top Width (ft)                         26.04
  Vel Total (ft/s)           28.88    Avg. Vel. (ft/s)                       28.88
  Max Chl Dpth (ft)           4.56    Hydr. Depth (ft)                        3.59
  Conv. Total (cfs)        23147.6    Conv. (cfs)                          23147.6
  Length Wtd. (ft)            4.00    Wetted Per. (ft)                       29.32
  Min Ch El (ft)           2740.30    Shear (lb/sq ft)                        2.71
  Alpha                       1.00    Stream Power (lb/ft s)    441.68     281.00     320.00
  Frctn Loss (ft)             0.10    Cum Volume (acre-ft)        0.00       3.60
  C & E Loss (ft)             0.17    Cum SA (acres)              0.02       1.41


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2753.15    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               9.66    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2743.49    Reach Len. (ft)              4.00       4.00       4.00
```

Crit W.S. (ft)	2746.06	Flow Area (sq ft)		60.13	
E.G. Slope (ft/ft)	0.014796	Area (sq ft)		60.13	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	22.73	Top Width (ft)		22.73	
Vel Total (ft/s)	24.95	Avg. Vel. (ft/s)		24.95	
Max Chl Dpth (ft)	3.19	Hydr. Depth (ft)		2.65	
Conv. Total (cfs)	12331.5	Conv. (cfs)		12331.5	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		25.02	
Min Ch El (ft)	2740.30	Shear (lb/sq ft)		2.22	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.00	2.51	
C & E Loss (ft)	0.18	Cum SA (acres)	0.00	1.29	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2744.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2744.58	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2741.99	Flow Area (sq ft)		86.47	
E.G. Slope (ft/ft)	0.000093	Area (sq ft)		86.47	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.38	Top Width (ft)		25.38	
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)		2.31	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		3.41	
Conv. Total (cfs)	20732.8	Conv. (cfs)		20732.8	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		28.46	
Min Ch El (ft)	2740.30	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.72	
C & E Loss (ft)	0.00	Cum SA (acres)		1.05	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2753.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.97	Wt. n-Val.		0.013	
W.S. Elev (ft)	2743.62	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2746.26	Flow Area (sq ft)		63.13	
E.G. Slope (ft/ft)	0.014628	Area (sq ft)		63.13	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	23.05	Top Width (ft)		23.05	
Vel Total (ft/s)	25.35	Avg. Vel. (ft/s)		25.35	
Max Chl Dpth (ft)	3.32	Hydr. Depth (ft)		2.74	
Conv. Total (cfs)	13229.2	Conv. (cfs)		13229.2	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		25.43	
Min Ch El (ft)	2740.30	Shear (lb/sq ft)		2.27	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.00	2.66	
C & E Loss (ft)	0.17	Cum SA (acres)	0.00	1.31	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2748.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.013	
W.S. Elev (ft)	2748.21	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2745.05	Flow Area (sq ft)		194.64	
E.G. Slope (ft/ft)	0.000279	Area (sq ft)		194.64	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	34.19	Top Width (ft)		34.19	
Vel Total (ft/s)	5.50	Avg. Vel. (ft/s)		5.50	
Max Chl Dpth (ft)	7.91	Hydr. Depth (ft)		5.69	
Conv. Total (cfs)	64019.6	Conv. (cfs)		64019.6	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		39.87	
Min Ch El (ft)	2740.30	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.38	
C & E Loss (ft)	0.00	Cum SA (acres)		1.27	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2747.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2746.82	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2743.82	Flow Area (sq ft)		149.33	
E.G. Slope (ft/ft)	0.000214	Area (sq ft)		149.33	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	30.81	Top Width (ft)		30.81	
Vel Total (ft/s)	4.35	Avg. Vel. (ft/s)		4.35	
Max Chl Dpth (ft)	6.52	Hydr. Depth (ft)		4.85	
Conv. Total (cfs)	44484.9	Conv. (cfs)		44484.9	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		35.49	
Min Ch El (ft)	2740.30	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.68	
C & E Loss (ft)	0.00	Cum SA (acres)		1.18	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

LATERAL STRUCTURE

RIVER: Desert Knolls Wa
REACH: Main RS: 2310

INPUT
Description: Reach 1 Diversion Chute #2
Lateral structure position = Left overbank
Distance from Upstream XS =
Deck/Roadway Width = 20
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2750.2	4	2750.2	12	2750.2	71.6	2749.5	325.4	2745.9

Weir crest shape = Broad Crested

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Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                       420     .013     .013        0                  .5                1
Upstream   Elevation =  2740.3
           Centerline Station =  2
Downstream Elevation =  2739
           Centerline Station =  2

LATERAL STRUCTURE OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2759.94    Weir Sta US (ft)
  W.S. US. (ft)                2745.50    Weir Sta DS (ft)
  E.G. DS (ft)                 2755.46    Min El Weir Flow (ft)        2745.90
  W.S. DS (ft)                 2743.29    Wr Top Wdth (ft)
  Q US (cfs)                   3380.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          21.01    Weir Avg Depth (ft)
  Q DS (cfs)                   3480.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  0.62    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             21.01
  Q Culv (cfs)                   21.01    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              420.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2740.30
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2739.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2757.81    Weir Sta US (ft)
  W.S. US. (ft)                2744.86    Weir Sta DS (ft)
  E.G. DS (ft)                 2753.29    Min El Weir Flow (ft)        2745.90
  W.S. DS (ft)                 2742.57    Wr Top Wdth (ft)
  Q US (cfs)                   2700.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          19.61    Weir Avg Depth (ft)
  Q DS (cfs)                   2700.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  0.73    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             19.61
  Q Culv (cfs)                   19.61    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              420.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2740.30
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2739.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
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Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2753.15    Weir Sta US (ft)
  W.S. US. (ft)                2743.49    Weir Sta DS (ft)
  E.G. DS (ft)                 2748.79    Min El Weir Flow (ft)        2745.90
  W.S. DS (ft)                 2741.30    Wr Top Wdth (ft)
  Q US (cfs)                   1500.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          16.34    Weir Avg Depth (ft)
  Q DS (cfs)                   1500.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  1.09    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             16.34
  Q Culv (cfs)                   16.34    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              420.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2740.30
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2739.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2744.67    Weir Sta US (ft)
  W.S. US. (ft)                2744.58    Weir Sta DS (ft)
  E.G. DS (ft)                 2741.31    Min El Weir Flow (ft)        2745.90
  W.S. DS (ft)                 2738.87    Wr Top Wdth (ft)
  Q US (cfs)                    200.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          18.97    Weir Avg Depth (ft)
  Q DS (cfs)                    200.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  9.48    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             18.97
  Q Culv (cfs)                   18.97    # Barrels                          1
  Q Lat RC (cfs)                          Culv Length (ft)              420.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2740.30
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2739.00
  Breach Flow Area (sq ft)


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

LATERAL STRUCTURE OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1
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  E.G. US. (ft)                2753.59    Weir Sta US (ft)
  W.S. US. (ft)                2743.62    Weir Sta DS (ft)
  E.G. DS (ft)                 2749.26    Min El Weir Flow (ft)        2745.90
  W.S. DS (ft)                 2741.52    Wr Top Wdth (ft)
  Q US (cfs)                   1600.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          16.66    Weir Avg Depth (ft)
  Q DS (cfs)                   1650.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  1.04    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             16.66
  Q Culv (cfs)                   16.66    # Barrels                           1
  Q Lat RC (cfs)                          Culv Length (ft)              420.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2740.30
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2739.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2748.68    Weir Sta US (ft)
  W.S. US. (ft)                2748.21    Weir Sta DS (ft)
  E.G. DS (ft)                 2746.44    Min El Weir Flow (ft)        2745.90
  W.S. DS (ft)                 2740.94    Wr Top Wdth (ft)
  Q US (cfs)                   1070.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          26.27    Weir Avg Depth (ft)
  Q DS (cfs)                   1120.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  2.46    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             26.27
  Q Culv (cfs)                   26.27    # Barrels                           1
  Q Lat RC (cfs)                          Culv Length (ft)              420.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2740.30
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2739.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2747.11    Weir Sta US (ft)
  W.S. US. (ft)                2746.82    Weir Sta DS (ft)
  E.G. DS (ft)                 2744.62    Min El Weir Flow (ft)        2745.90
  W.S. DS (ft)                 2740.08    Wr Top Wdth (ft)
  Q US (cfs)                    650.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          23.67    Weir Avg Depth (ft)
  Q DS (cfs)                    680.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  3.64    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             23.67
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  Q Culv (cfs)                    23.67    # Barrels                          1
  Q Lat RC (cfs)                           Culv Length (ft)              420.00
                                           Culv Depth Blocked (ft)
  Q Breach (cfs)                           Culv Inv El Up (ft)          2740.30
  Breach Avg Velocity (ft/s)               Culv Inv El Dn (ft)          2739.00
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 2308

INPUT
Description: Section 23+08
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     261  2750.2     281  2750.2     293  2740.3     308  2740.3     320  2750.2
  402.64    2751  426.55    2751  431.33    2752  441.68    2755

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     261    .016     281    .013     320    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           281     320                8       8       8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     261     281  2751.5       F
     320  441.68  2751.5       F
Left Levee      Station=     281      Elevation=  2751.5
Right Levee     Station=     320      Elevation=  2751.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2759.87    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              14.36    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2745.51    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2749.40    Flow Area (sq ft)                    111.17
  E.G. Slope (ft/ft)      0.013107    Area (sq ft)                         111.17
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             27.64    Top Width (ft)                        27.64
  Vel Total (ft/s)           30.41    Avg. Vel. (ft/s)                      30.41
  Max Chl Dpth (ft)           5.21    Hydr. Depth (ft)                       4.02
  Conv. Total (cfs)        29523.8    Conv. (cfs)                         29523.8
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      31.39
  Min Ch El (ft)           2740.30    Shear (lb/sq ft)                       2.90
  Alpha                       1.00    Stream Power (lb/ft s)    441.68     281.00     320.00
  Frctn Loss (ft)             0.05    Cum Volume (acre-ft)        0.01       4.24
  C & E Loss (ft)             0.02    Cum SA (acres)              0.02       1.50


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.
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CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2757.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.87	Wt. n-Val.		0.013	
W.S. Elev (ft)	2744.87	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2748.32	Flow Area (sq ft)		93.77	
E.G. Slope (ft/ft)	0.013486	Area (sq ft)		93.77	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	26.07	Top Width (ft)		26.07	
Vel Total (ft/s)	28.79	Avg. Vel. (ft/s)		28.79	
Max Chl Dpth (ft)	4.57	Hydr. Depth (ft)		3.60	
Conv. Total (cfs)	23249.8	Conv. (cfs)		23249.8	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		29.35	
Min Ch El (ft)	2740.30	Shear (lb/sq ft)		2.69	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.00	3.59	
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	1.41	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2753.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.56	Wt. n-Val.		0.013	
W.S. Elev (ft)	2743.50	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2746.06	Flow Area (sq ft)		60.46	
E.G. Slope (ft/ft)	0.014566	Area (sq ft)		60.46	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	22.76	Top Width (ft)		22.76	
Vel Total (ft/s)	24.81	Avg. Vel. (ft/s)		24.81	
Max Chl Dpth (ft)	3.20	Hydr. Depth (ft)		2.66	
Conv. Total (cfs)	12428.7	Conv. (cfs)		12428.7	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		25.06	
Min Ch El (ft)	2740.30	Shear (lb/sq ft)		2.19	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.00	2.50	
C & E Loss (ft)	0.03	Cum SA (acres)	0.00	1.29	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2744.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2744.58	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2741.99	Flow Area (sq ft)		86.45	
E.G. Slope (ft/ft)	0.000093	Area (sq ft)		86.45	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.38	Top Width (ft)		25.38	
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)		2.31	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		3.41	
Conv. Total (cfs)	20728.6	Conv. (cfs)		20728.6	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		28.46	
Min Ch El (ft)	2740.30	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.71	
C & E Loss (ft)	0.07	Cum SA (acres)		1.05	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2753.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.87	Wt. n-Val.		0.013	
W.S. Elev (ft)	2743.63	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2746.26	Flow Area (sq ft)		63.46	
E.G. Slope (ft/ft)	0.014412	Area (sq ft)		63.46	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	23.08	Top Width (ft)		23.08	
Vel Total (ft/s)	25.21	Avg. Vel. (ft/s)		25.21	
Max Chl Dpth (ft)	3.33	Hydr. Depth (ft)		2.75	
Conv. Total (cfs)	13327.9	Conv. (cfs)		13327.9	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		25.47	
Min Ch El (ft)	2740.30	Shear (lb/sq ft)		2.24	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.00	2.65	
C & E Loss (ft)	0.03	Cum SA (acres)	0.00	1.30	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2748.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.013	
W.S. Elev (ft)	2748.21	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2745.05	Flow Area (sq ft)		194.59	
E.G. Slope (ft/ft)	0.000280	Area (sq ft)		194.59	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	34.18	Top Width (ft)		34.18	
Vel Total (ft/s)	5.50	Avg. Vel. (ft/s)		5.50	
Max Chl Dpth (ft)	7.91	Hydr. Depth (ft)		5.69	
Conv. Total (cfs)	63997.1	Conv. (cfs)		63997.1	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		39.87	
Min Ch El (ft)	2740.30	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.37	
C & E Loss (ft)	0.13	Cum SA (acres)		1.27	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2747.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.013	
W.S. Elev (ft)	2746.82	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2743.82	Flow Area (sq ft)		149.29	
E.G. Slope (ft/ft)	0.000214	Area (sq ft)		149.29	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	30.80	Top Width (ft)		30.80	
Vel Total (ft/s)	4.35	Avg. Vel. (ft/s)		4.35	

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  Max Chl Dpth (ft)           6.52    Hydr. Depth (ft)                      4.85
  Conv. Total (cfs)        44469.4    Conv. (cfs)                        44469.4
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                     35.49
  Min Ch El (ft)           2740.30    Shear (lb/sq ft)                      0.06
  Alpha                       1.00    Stream Power (lb/ft s)    441.68     281.00     320.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)                  1.66
  C & E Loss (ft)             0.11    Cum SA (acres)                        1.18


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 2300

INPUT
Description: Section 23+00
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     261  2750.2     281  2750.2     293  2742.2     308  2742.2     320  2750.2
  402.64    2751  426.55    2751  431.33    2752  441.68    2755

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     261    .016     281    .013     320    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           281     320             39.6    39.6    39.6             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     261     281    2751       F
     320  441.68    2751       F
Left Levee      Station=     281      Elevation=    2751
Right Levee     Station=     320      Elevation=    2751

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2758.84    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              11.20    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2747.64    Reach Len. (ft)            39.60      39.60      39.60
  Crit W.S. (ft)           2750.84    Flow Area (sq ft)                    125.83
  E.G. Slope (ft/ft)      0.009874    Area (sq ft)                         125.83
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             31.30    Top Width (ft)                        31.30
  Vel Total (ft/s)           26.86    Avg. Vel. (ft/s)                      26.86
  Max Chl Dpth (ft)           5.43    Hydr. Depth (ft)                       4.02
  Conv. Total (cfs)        34014.8    Conv. (cfs)                        34014.8
  Length Wtd. (ft)           39.60    Wetted Per. (ft)                      34.60
  Min Ch El (ft)           2742.20    Shear (lb/sq ft)                       2.24
  Alpha                       1.00    Stream Power (lb/ft s)    441.68     281.00     320.00
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)        0.01       4.22
  C & E Loss (ft)             0.95    Cum SA (acres)              0.02       1.49


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
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Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2756.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.60	Wt. n-Val.		0.013	
W.S. Elev (ft)	2747.07	Reach Len. (ft)	39.60	39.60	39.60
Crit W.S. (ft)	2749.94	Flow Area (sq ft)		108.59	
E.G. Slope (ft/ft)	0.009496	Area (sq ft)		108.59	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	29.61	Top Width (ft)		29.61	
Vel Total (ft/s)	24.87	Avg. Vel. (ft/s)		24.87	
Max Chl Dpth (ft)	4.87	Hydr. Depth (ft)		3.67	
Conv. Total (cfs)	27707.7	Conv. (cfs)		27707.7	
Length Wtd. (ft)	39.60	Wetted Per. (ft)		32.55	
Min Ch El (ft)	2742.20	Shear (lb/sq ft)		1.98	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.00	3.57	
C & E Loss (ft)	0.98	Cum SA (acres)	0.02	1.40	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2751.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.02	Wt. n-Val.		0.013	
W.S. Elev (ft)	2745.91	Reach Len. (ft)	39.60	39.60	39.60
Crit W.S. (ft)	2747.79	Flow Area (sq ft)		76.21	
E.G. Slope (ft/ft)	0.007940	Area (sq ft)		76.21	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	26.12	Top Width (ft)		26.12	
Vel Total (ft/s)	19.68	Avg. Vel. (ft/s)		19.68	
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)		2.92	
Conv. Total (cfs)	16834.0	Conv. (cfs)		16834.0	
Length Wtd. (ft)	39.60	Wetted Per. (ft)		28.36	
Min Ch El (ft)	2742.20	Shear (lb/sq ft)		1.33	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.00	2.49	
C & E Loss (ft)	1.06	Cum SA (acres)	0.00	1.28	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2744.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.		0.013	
W.S. Elev (ft)	2743.85	Reach Len. (ft)	39.60	39.60	39.60

Crit W.S. (ft)	2743.85	Flow Area (sq ft)		28.88	
E.G. Slope (ft/ft)	0.002394	Area (sq ft)		28.88	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	19.96	Top Width (ft)		19.96	
Vel Total (ft/s)	6.93	Avg. Vel. (ft/s)		6.93	
Max Chl Dpth (ft)	1.65	Hydr. Depth (ft)		1.45	
Conv. Total (cfs)	4087.9	Conv. (cfs)		4087.9	
Length Wtd. (ft)	39.60	Wetted Per. (ft)		20.96	
Min Ch El (ft)	2742.20	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		0.70	
C & E Loss (ft)	0.00	Cum SA (acres)		1.04	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2752.37	Element			
Vel Head (ft)	6.36	Wt. n-Val.		0.013	
W.S. Elev (ft)	2746.02	Reach Len. (ft)	39.60	39.60	39.60
Crit W.S. (ft)	2748.01	Flow Area (sq ft)		79.09	
E.G. Slope (ft/ft)	0.008131	Area (sq ft)		79.09	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	26.45	Top Width (ft)		26.45	
Vel Total (ft/s)	20.23	Avg. Vel. (ft/s)		20.23	
Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)		2.99	
Conv. Total (cfs)	17743.6	Conv. (cfs)		17743.6	
Length Wtd. (ft)	39.60	Wetted Per. (ft)		28.76	
Min Ch El (ft)	2742.20	Shear (lb/sq ft)		1.40	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.00	2.64	
C & E Loss (ft)	1.06	Cum SA (acres)	0.00	1.30	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2748.55	Element			
Vel Head (ft)	1.74	Wt. n-Val.		0.013	
W.S. Elev (ft)	2746.82	Reach Len. (ft)	39.60	39.60	39.60
Crit W.S. (ft)	2746.82	Flow Area (sq ft)		101.20	
E.G. Slope (ft/ft)	0.001816	Area (sq ft)		101.20	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	28.85	Top Width (ft)		28.85	
Vel Total (ft/s)	10.57	Avg. Vel. (ft/s)		10.57	
Max Chl Dpth (ft)	4.62	Hydr. Depth (ft)		3.51	
Conv. Total (cfs)	25109.3	Conv. (cfs)		25109.3	
Length Wtd. (ft)	39.60	Wetted Per. (ft)		31.64	

Min Ch El (ft)	2742.20	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)		2.34	
C & E Loss (ft)	0.00	Cum SA (acres)		1.26	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2747.00	Element			
Vel Head (ft)	1.35	Wt. n-Val.		0.013	
W.S. Elev (ft)	2745.66	Reach Len. (ft)	39.60	39.60	39.60
Crit W.S. (ft)	2745.66	Flow Area (sq ft)		69.73	
E.G. Slope (ft/ft)	0.001920	Area (sq ft)		69.73	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	25.36	Top Width (ft)		25.36	
Vel Total (ft/s)	9.32	Avg. Vel. (ft/s)		9.32	
Max Chl Dpth (ft)	3.45	Hydr. Depth (ft)		2.75	
Conv. Total (cfs)	14834.8	Conv. (cfs)		14834.8	
Length Wtd. (ft)	39.60	Wetted Per. (ft)		27.46	
Min Ch El (ft)	2742.20	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)		1.64	
C & E Loss (ft)	0.00	Cum SA (acres)		1.17	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2260.4

INPUT
Description: Section 22+60.4
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2753	136.02	2752	172.59	2752	236	2752.7	242	2744.7
255	2744.7	261	2749.5	281	2749.5	293	2741.5	308	2741.5
320	2749.5	402.64	2751	426.55	2751	431.33	2752	441.68	2755

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	236	.03	261	.016	281	.013	320	.035

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           281     320            273.8   273.8   273.8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     281    2750       F
     320  441.68    2750       F
Left Levee      Station=     281      Elevation=    2750
Right Levee     Station=     320      Elevation=    2750
```

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2758.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.53	Wt. n-Val.		0.013	
W.S. Elev (ft)	2746.88	Reach Len. (ft)	273.80	273.80	273.80
Crit W.S. (ft)	2750.01	Flow Area (sq ft)		124.04	
E.G. Slope (ft/ft)	0.010275	Area (sq ft)		124.04	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	31.13	Top Width (ft)		31.13	
Vel Total (ft/s)	27.25	Avg. Vel. (ft/s)		27.25	
Max Chl Dpth (ft)	5.38	Hydr. Depth (ft)		3.98	
Conv. Total (cfs)	33344.7	Conv. (cfs)		33344.7	
Length Wtd. (ft)	273.80	Wetted Per. (ft)		34.39	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		2.31	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.01	4.11	
C & E Loss (ft)	0.03	Cum SA (acres)	0.02	1.46	

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2756.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.94	Wt. n-Val.		0.013	
W.S. Elev (ft)	2746.31	Reach Len. (ft)	273.80	273.80	273.80
Crit W.S. (ft)	2749.24	Flow Area (sq ft)		106.70	
E.G. Slope (ft/ft)	0.009972	Area (sq ft)		106.70	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	29.41	Top Width (ft)		29.41	
Vel Total (ft/s)	25.31	Avg. Vel. (ft/s)		25.31	
Max Chl Dpth (ft)	4.80	Hydr. Depth (ft)		3.63	
Conv. Total (cfs)	27037.4	Conv. (cfs)		27037.4	
Length Wtd. (ft)	273.80	Wetted Per. (ft)		32.32	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		2.06	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	0.00	3.48	
C & E Loss (ft)	0.03	Cum SA (acres)	0.02	1.38	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2751.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.44	Wt. n-Val.		0.013	
W.S. Elev (ft)	2745.11	Reach Len. (ft)	273.80	273.80	273.80
Crit W.S. (ft)	2747.10	Flow Area (sq ft)		73.64	
E.G. Slope (ft/ft)	0.008752	Area (sq ft)		73.64	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	25.82	Top Width (ft)		25.82	
Vel Total (ft/s)	20.37	Avg. Vel. (ft/s)		20.37	
Max Chl Dpth (ft)	3.61	Hydr. Depth (ft)		2.85	
Conv. Total (cfs)	16033.8	Conv. (cfs)		16033.8	
Length Wtd. (ft)	273.80	Wetted Per. (ft)		28.01	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		1.44	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00

Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	0.00	2.42
C & E Loss (ft)	0.04	Cum SA (acres)	0.00	1.26

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2744.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.69	Wt. n-Val.		0.013	
W.S. Elev (ft)	2742.65	Reach Len. (ft)	273.80	273.80	273.80
Crit W.S. (ft)	2743.17	Flow Area (sq ft)		19.15	
E.G. Slope (ft/ft)	0.008336	Area (sq ft)		19.15	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.44	Top Width (ft)		18.44	
Vel Total (ft/s)	10.44	Avg. Vel. (ft/s)		10.44	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)		1.04	
Conv. Total (cfs)	2190.6	Conv. (cfs)		2190.6	
Length Wtd. (ft)	273.80	Wetted Per. (ft)		19.13	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		0.52	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		0.68	
C & E Loss (ft)	0.09	Cum SA (acres)		1.02	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2751.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.77	Wt. n-Val.		0.013	
W.S. Elev (ft)	2745.22	Reach Len. (ft)	273.80	273.80	273.80
Crit W.S. (ft)	2747.31	Flow Area (sq ft)		76.62	
E.G. Slope (ft/ft)	0.008896	Area (sq ft)		76.62	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	26.17	Top Width (ft)		26.17	
Vel Total (ft/s)	20.88	Avg. Vel. (ft/s)		20.88	
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)		2.93	
Conv. Total (cfs)	16964.2	Conv. (cfs)		16964.2	
Length Wtd. (ft)	273.80	Wetted Per. (ft)		28.42	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		1.50	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	0.00	2.57	
C & E Loss (ft)	0.04	Cum SA (acres)	0.00	1.28	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2748.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.13	Wt. n-Val.		0.013	
W.S. Elev (ft)	2745.18	Reach Len. (ft)	273.80	273.80	273.80
Crit W.S. (ft)	2746.12	Flow Area (sq ft)		75.42	
E.G. Slope (ft/ft)	0.004160	Area (sq ft)		75.42	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	

Top Width (ft)	26.03	Top Width (ft)			26.03	
Vel Total (ft/s)	14.19	Avg. Vel. (ft/s)			14.19	
Max Chl Dpth (ft)	3.68	Hydr. Depth (ft)			2.90	
Conv. Total (cfs)	16588.9	Conv. (cfs)			16588.9	
Length Wtd. (ft)	273.80	Wetted Per. (ft)			28.26	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)			0.69	
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00	
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)			2.26	
C & E Loss (ft)	0.14	Cum SA (acres)			1.24	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2746.76	Element	Left OB	Channel	Right OB	
Vel Head (ft)	2.61	Wt. n-Val.		0.013		
W.S. Elev (ft)	2744.14	Reach Len. (ft)	273.80	273.80	273.80	
Crit W.S. (ft)	2744.96	Flow Area (sq ft)		50.10		
E.G. Slope (ft/ft)	0.004970	Area (sq ft)		50.10		
Q Total (cfs)	650.00	Flow (cfs)		650.00		
Top Width (ft)	22.93	Top Width (ft)		22.93		
Vel Total (ft/s)	12.97	Avg. Vel. (ft/s)		12.97		
Max Chl Dpth (ft)	2.64	Hydr. Depth (ft)		2.19		
Conv. Total (cfs)	9219.9	Conv. (cfs)		9219.9		
Length Wtd. (ft)	273.80	Wetted Per. (ft)		24.53		
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		0.63		
Alpha	1.00	Stream Power (lb/ft s)	441.68	281.00	320.00	
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)		1.59		
C & E Loss (ft)	0.13	Cum SA (acres)		1.15		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1986.6

INPUT
Description: Section 19+86.6
Station Elevation Data num= 22

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2750	125.77	2749	151.52	2748	185.75	2748	213.11	2747.25
245.77	2748	275.91	2748	337.17	2747	339.72	2746	351.01	2745
375.07	2746	401.99	2746	421.26	2745	459	2745.9	465	2744.2
478	2744.2	484	2745.9	504	2745.9	516	2737.9	531	2737.9
543	2745.9	586.21	2755						

Manning's n Values num= 5

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     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     459     .03     484    .016     504    .013     543    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           504     543             76.6    76.6    76.6             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     100     504  2746.5       F
Left Levee      Station=     504      Elevation=  2746.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2755.46    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              12.17    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2743.29    Reach Len. (ft)            76.60      76.60      76.60
  Crit W.S. (ft)           2747.07    Flow Area (sq ft)                    124.30
  E.G. Slope (ft/ft)      0.010827    Area (sq ft)                         124.30
  Q Total (cfs)            3480.00    Flow (cfs)                          3480.00
  Top Width (ft)             31.16    Top Width (ft)                        31.16
  Vel Total (ft/s)           28.00    Avg. Vel. (ft/s)                      28.00
  Max Chl Dpth (ft)           5.39    Hydr. Depth (ft)                       3.99
  Conv. Total (cfs)        33444.1    Conv. (cfs)                         33444.1
  Length Wtd. (ft)           76.60    Wetted Per. (ft)                      34.42
  Min Ch El (ft)           2737.90    Shear (lb/sq ft)                       2.44
  Alpha                       1.00    Stream Power (lb/ft s)    586.21     504.00       0.00
  Frctn Loss (ft)             2.89    Cum Volume (acre-ft)        0.01       3.33
  C & E Loss (ft)             0.06    Cum SA (acres)              0.02       1.27


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2753.29    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              10.72    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2742.57    Reach Len. (ft)            76.60      76.60      76.60
  Crit W.S. (ft)           2745.62    Flow Area (sq ft)                    102.77
  E.G. Slope (ft/ft)      0.011076    Area (sq ft)                         102.77
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             29.01    Top Width (ft)                        29.01
  Vel Total (ft/s)           26.27    Avg. Vel. (ft/s)                      26.27
  Max Chl Dpth (ft)           4.67    Hydr. Depth (ft)                       3.54
  Conv. Total (cfs)        25655.5    Conv. (cfs)                         25655.5
  Length Wtd. (ft)           76.60    Wetted Per. (ft)                      31.84
  Min Ch El (ft)           2737.90    Shear (lb/sq ft)                       2.23
  Alpha                       1.00    Stream Power (lb/ft s)    586.21     504.00       0.00
  Frctn Loss (ft)             2.88    Cum Volume (acre-ft)        0.00       2.82
  C & E Loss (ft)             0.08    Cum SA (acres)              0.02       1.19


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2748.79    Element                   Left OB    Channel   Right OB
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Vel Head (ft)	7.49	Wt. n-Val.		0.013	
W.S. Elev (ft)	2741.30	Reach Len. (ft)	76.60	76.60	76.60
Crit W.S. (ft)	2743.49	Flow Area (sq ft)		68.31	
E.G. Slope (ft/ft)	0.010842	Area (sq ft)		68.31	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	25.20	Top Width (ft)		25.20	
Vel Total (ft/s)	21.96	Avg. Vel. (ft/s)		21.96	
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)		2.71	
Conv. Total (cfs)	14405.8	Conv. (cfs)		14405.8	
Length Wtd. (ft)	76.60	Wetted Per. (ft)		27.25	
Min Ch El (ft)	2737.90	Shear (lb/sq ft)		1.70	
Alpha	1.00	Stream Power (lb/ft s)	586.21	504.00	0.00
Frctn Loss (ft)	2.66	Cum Volume (acre-ft)	0.00	1.98	
C & E Loss (ft)	0.10	Cum SA (acres)	0.00	1.10	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2741.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.43	Wt. n-Val.		0.013	
W.S. Elev (ft)	2738.87	Reach Len. (ft)	76.60	76.60	76.60
Crit W.S. (ft)	2739.56	Flow Area (sq ft)		15.97	
E.G. Slope (ft/ft)	0.014593	Area (sq ft)		15.97	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	17.91	Top Width (ft)		17.91	
Vel Total (ft/s)	12.52	Avg. Vel. (ft/s)		12.52	
Max Chl Dpth (ft)	0.97	Hydr. Depth (ft)		0.89	
Conv. Total (cfs)	1655.6	Conv. (cfs)		1655.6	
Length Wtd. (ft)	76.60	Wetted Per. (ft)		18.50	
Min Ch El (ft)	2737.90	Shear (lb/sq ft)		0.79	
Alpha	1.00	Stream Power (lb/ft s)	586.21	504.00	0.00
Frctn Loss (ft)	2.96	Cum Volume (acre-ft)		0.57	
C & E Loss (ft)	0.07	Cum SA (acres)		0.91	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2749.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.74	Wt. n-Val.		0.013	
W.S. Elev (ft)	2741.52	Reach Len. (ft)	76.60	76.60	76.60
Crit W.S. (ft)	2743.80	Flow Area (sq ft)		73.88	
E.G. Slope (ft/ft)	0.010490	Area (sq ft)		73.88	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	25.85	Top Width (ft)		25.85	
Vel Total (ft/s)	22.33	Avg. Vel. (ft/s)		22.33	
Max Chl Dpth (ft)	3.62	Hydr. Depth (ft)		2.86	
Conv. Total (cfs)	16110.0	Conv. (cfs)		16110.0	
Length Wtd. (ft)	76.60	Wetted Per. (ft)		28.04	
Min Ch El (ft)	2737.90	Shear (lb/sq ft)		1.73	

Alpha	1.00	Stream Power (lb/ft s)	586.21	504.00	0.00
Frctn Loss (ft)	2.64	Cum Volume (acre-ft)	0.00	2.10	
C & E Loss (ft)	0.10	Cum SA (acres)	0.00	1.11	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2746.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.50	Wt. n-Val.		0.013	
W.S. Elev (ft)	2740.94	Reach Len. (ft)	76.60	76.60	76.60
Crit W.S. (ft)	2742.65	Flow Area (sq ft)		59.53	
E.G. Slope (ft/ft)	0.008965	Area (sq ft)		59.53	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	24.13	Top Width (ft)		24.13	
Vel Total (ft/s)	18.81	Avg. Vel. (ft/s)		18.81	
Max Chl Dpth (ft)	3.04	Hydr. Depth (ft)		2.47	
Conv. Total (cfs)	11828.6	Conv. (cfs)		11828.6	
Length Wtd. (ft)	76.60	Wetted Per. (ft)		25.97	
Min Ch El (ft)	2737.90	Shear (lb/sq ft)		1.28	
Alpha	1.00	Stream Power (lb/ft s)	586.21	504.00	0.00
Frctn Loss (ft)	1.63	Cum Volume (acre-ft)		1.83	
C & E Loss (ft)	0.24	Cum SA (acres)		1.08	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2744.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.54	Wt. n-Val.		0.013	
W.S. Elev (ft)	2740.08	Reach Len. (ft)	76.60	76.60	76.60
Crit W.S. (ft)	2741.44	Flow Area (sq ft)		39.75	
E.G. Slope (ft/ft)	0.010706	Area (sq ft)		39.75	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	21.53	Top Width (ft)		21.53	
Vel Total (ft/s)	17.11	Avg. Vel. (ft/s)		17.11	
Max Chl Dpth (ft)	2.18	Hydr. Depth (ft)		1.85	
Conv. Total (cfs)	6572.0	Conv. (cfs)		6572.0	
Length Wtd. (ft)	76.60	Wetted Per. (ft)		22.85	
Min Ch El (ft)	2737.90	Shear (lb/sq ft)		1.16	
Alpha	1.00	Stream Power (lb/ft s)	586.21	504.00	0.00
Frctn Loss (ft)	1.94	Cum Volume (acre-ft)		1.31	
C & E Loss (ft)	0.19	Cum SA (acres)		1.01	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 1910

INPUT
Description: Section 19+10
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2750  125.77    2749  151.52    2748  185.75    2748  213.11 2747.25
  245.77    2748  275.91    2748  337.17    2747  339.72    2746  351.01    2745
  375.07    2746  401.99    2746     459  2745.1     465    2744     478    2744
     484  2745.1     504  2745.1     516  2737.1     531  2737.1     543  2745.1
  586.21    2755

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     459     .03     484    .016     504    .013     543    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           504     543               10      10      10             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     100     504  2745.5       F
Left Levee      Station=     504      Elevation=  2745.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2754.62    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              12.12    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2742.49    Reach Len. (ft)            10.00      10.00      10.00
  Crit W.S. (ft)           2746.68    Flow Area (sq ft)                    124.54
  E.G. Slope (ft/ft)      0.010770    Area (sq ft)                         124.54
  Q Total (cfs)            3480.00    Flow (cfs)                          3480.00
  Top Width (ft)             31.18    Top Width (ft)                        31.18
  Vel Total (ft/s)           27.94    Avg. Vel. (ft/s)                      27.94
  Max Chl Dpth (ft)           5.39    Hydr. Depth (ft)                       3.99
  Conv. Total (cfs)        33532.2    Conv. (cfs)                        33532.2
  Length Wtd. (ft)           10.00    Wetted Per. (ft)                      34.45
  Min Ch El (ft)           2737.10    Shear (lb/sq ft)                       2.43
  Alpha                       1.00    Stream Power (lb/ft s)    586.21     504.00       0.00
  Frctn Loss (ft)             0.83    Cum Volume (acre-ft)        0.01       3.11
  C & E Loss (ft)             0.01    Cum SA (acres)              0.02       1.21


CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2752.43    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              10.64    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2741.78    Reach Len. (ft)            10.00      10.00      10.00
  Crit W.S. (ft)           2744.84    Flow Area (sq ft)                    103.13
  E.G. Slope (ft/ft)      0.010967    Area (sq ft)                         103.13
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             29.05    Top Width (ft)                        29.05
  Vel Total (ft/s)           26.18    Avg. Vel. (ft/s)                      26.18
```

Max Chl Dpth (ft)	4.68	Hydr. Depth (ft)		3.55	
Conv. Total (cfs)	25781.9	Conv. (cfs)		25781.9	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		31.88	
Min Ch El (ft)	2737.10	Shear (lb/sq ft)		2.21	
Alpha	1.00	Stream Power (lb/ft s)	586.21	504.00	0.00
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)	0.00	2.64	
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	1.14	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2747.94	Element			
Vel Head (ft)	7.43	Wt. n-Val.		0.013	
W.S. Elev (ft)	2740.51	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2742.70	Flow Area (sq ft)		68.55	
E.G. Slope (ft/ft)	0.010731	Area (sq ft)		68.55	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	25.23	Top Width (ft)		25.23	
Vel Total (ft/s)	21.88	Avg. Vel. (ft/s)		21.88	
Max Chl Dpth (ft)	3.41	Hydr. Depth (ft)		2.72	
Conv. Total (cfs)	14480.0	Conv. (cfs)		14480.0	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		27.29	
Min Ch El (ft)	2737.10	Shear (lb/sq ft)		1.68	
Alpha	1.00	Stream Power (lb/ft s)	586.21	504.00	0.00
Frctn Loss (ft)	0.83	Cum Volume (acre-ft)	0.00	1.85	
C & E Loss (ft)	0.02	Cum SA (acres)	0.00	1.05	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2740.21	Element			
Vel Head (ft)	2.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2738.15	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2738.77	Flow Area (sq ft)		17.36	
E.G. Slope (ft/ft)	0.011279	Area (sq ft)		17.36	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.14	Top Width (ft)		18.14	
Vel Total (ft/s)	11.52	Avg. Vel. (ft/s)		11.52	
Max Chl Dpth (ft)	1.05	Hydr. Depth (ft)		0.96	
Conv. Total (cfs)	1883.2	Conv. (cfs)		1883.2	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		18.78	
Min Ch El (ft)	2737.10	Shear (lb/sq ft)		0.65	
Alpha	1.00	Stream Power (lb/ft s)	586.21	504.00	0.00
Frctn Loss (ft)	0.98	Cum Volume (acre-ft)		0.54	
C & E Loss (ft)	0.11	Cum SA (acres)		0.88	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2748.45	Element			
Vel Head (ft)	7.73	Wt. n-Val.		0.013	
W.S. Elev (ft)	2740.72	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2742.95	Flow Area (sq ft)		73.95	

E.G. Slope (ft/ft)	0.010465	Area (sq ft)		73.95	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	25.86	Top Width (ft)		25.86	
Vel Total (ft/s)	22.31	Avg. Vel. (ft/s)		22.31	
Max Chl Dpth (ft)	3.62	Hydr. Depth (ft)		2.86	
Conv. Total (cfs)	16129.6	Conv. (cfs)		16129.6	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		28.05	
Min Ch El (ft)	2737.10	Shear (lb/sq ft)		1.72	
Alpha	1.00	Stream Power (lb/ft s)	586.21	504.00	0.00
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)	0.00	1.97	
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	1.07	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2745.73	Element			
Vel Head (ft)	5.62	Wt. n-Val.		0.013	
W.S. Elev (ft)	2740.12	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2741.85	Flow Area (sq ft)		58.89	
E.G. Slope (ft/ft)	0.009246	Area (sq ft)		58.89	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	24.05	Top Width (ft)		24.05	
Vel Total (ft/s)	19.02	Avg. Vel. (ft/s)		19.02	
Max Chl Dpth (ft)	3.02	Hydr. Depth (ft)		2.45	
Conv. Total (cfs)	11647.4	Conv. (cfs)		11647.4	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		25.88	
Min Ch El (ft)	2737.10	Shear (lb/sq ft)		1.31	
Alpha	1.00	Stream Power (lb/ft s)	586.21	504.00	0.00
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)		1.73	
C & E Loss (ft)	0.01	Cum SA (acres)		1.04	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2743.79	Element			
Vel Head (ft)	4.51	Wt. n-Val.		0.013	
W.S. Elev (ft)	2739.28	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2740.64	Flow Area (sq ft)		39.91	
E.G. Slope (ft/ft)	0.010582	Area (sq ft)		39.91	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	21.55	Top Width (ft)		21.55	
Vel Total (ft/s)	17.04	Avg. Vel. (ft/s)		17.04	
Max Chl Dpth (ft)	2.18	Hydr. Depth (ft)		1.85	
Conv. Total (cfs)	6610.5	Conv. (cfs)		6610.5	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		22.87	
Min Ch El (ft)	2737.10	Shear (lb/sq ft)		1.15	
Alpha	1.00	Stream Power (lb/ft s)	586.21	504.00	0.00
Frctn Loss (ft)	0.82	Cum Volume (acre-ft)		1.24	
C & E Loss (ft)	0.01	Cum SA (acres)		0.97	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1900

```
INPUT
Description: Section 19+00
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2750  125.77    2749  151.52    2748  185.75    2748  213.11 2747.25
  245.77    2748  275.91    2748  337.17    2747  339.72    2746  351.01    2745
  375.07    2746  401.99    2746     459    2745     468    2739     475    2739
     484    2745     504    2745     516    2737     531    2737     543    2745
   554.7    2748  565.62    2749   574.4    2750

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     459     .03     484    .016     504    .013     543    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           504     543              180     180     180             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     100     504  2745.5       F
Left Levee      Station=     504      Elevation=  2745.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2754.52    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              12.12    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2742.39    Reach Len. (ft)           180.00     180.00     180.00
  Crit W.S. (ft)           2745.54    Flow Area (sq ft)                    124.54
  E.G. Slope (ft/ft)      0.010770    Area (sq ft)                         124.54
  Q Total (cfs)            3480.00    Flow (cfs)                          3480.00
  Top Width (ft)             31.18    Top Width (ft)                        31.18
  Vel Total (ft/s)           27.94    Avg. Vel. (ft/s)                      27.94
  Max Chl Dpth (ft)           5.39    Hydr. Depth (ft)                       3.99
  Conv. Total (cfs)        33532.2    Conv. (cfs)                         33532.2
  Length Wtd. (ft)          180.00    Wetted Per. (ft)                      34.45
  Min Ch El (ft)           2737.00    Shear (lb/sq ft)                       2.43
  Alpha                       1.00    Stream Power (lb/ft s)    574.40     504.00       0.00
  Frctn Loss (ft)             0.11    Cum Volume (acre-ft)        0.01       3.08
  C & E Loss (ft)             0.00    Cum SA (acres)              0.02       1.20


CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2752.33    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              10.64    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2741.68    Reach Len. (ft)           180.00     180.00     180.00
  Crit W.S. (ft)           2744.74    Flow Area (sq ft)                    103.13
  E.G. Slope (ft/ft)      0.010967    Area (sq ft)                         103.13
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             29.05    Top Width (ft)                        29.05
  Vel Total (ft/s)           26.18    Avg. Vel. (ft/s)                      26.18
  Max Chl Dpth (ft)           4.68    Hydr. Depth (ft)                       3.55
  Conv. Total (cfs)        25781.9    Conv. (cfs)                         25781.9
  Length Wtd. (ft)          180.00    Wetted Per. (ft)                      31.88
  Min Ch El (ft)           2737.00    Shear (lb/sq ft)                       2.21
  Alpha                       1.00    Stream Power (lb/ft s)    574.40     504.00       0.00
  Frctn Loss (ft)             0.11    Cum Volume (acre-ft)        0.00       2.61
  C & E Loss (ft)             0.00    Cum SA (acres)              0.02       1.13


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS
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E.G. Elev (ft)	2747.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.43	Wt. n-Val.		0.013	
W.S. Elev (ft)	2740.41	Reach Len. (ft)	180.00	180.00	180.00
Crit W.S. (ft)	2742.60	Flow Area (sq ft)		68.55	
E.G. Slope (ft/ft)	0.010731	Area (sq ft)		68.55	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	25.23	Top Width (ft)		25.23	
Vel Total (ft/s)	21.88	Avg. Vel. (ft/s)		21.88	
Max Chl Dpth (ft)	3.41	Hydr. Depth (ft)		2.72	
Conv. Total (cfs)	14480.0	Conv. (cfs)		14480.0	
Length Wtd. (ft)	180.00	Wetted Per. (ft)		27.29	
Min Ch El (ft)	2737.00	Shear (lb/sq ft)		1.68	
Alpha	1.00	Stream Power (lb/ft s)	574.40	504.00	0.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.00	1.84	
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	1.05	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2740.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2738.05	Reach Len. (ft)	180.00	180.00	180.00
Crit W.S. (ft)	2738.67	Flow Area (sq ft)		17.42	
E.G. Slope (ft/ft)	0.011164	Area (sq ft)		17.42	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.15	Top Width (ft)		18.15	
Vel Total (ft/s)	11.48	Avg. Vel. (ft/s)		11.48	
Max Chl Dpth (ft)	1.05	Hydr. Depth (ft)		0.96	
Conv. Total (cfs)	1892.8	Conv. (cfs)		1892.8	
Length Wtd. (ft)	180.00	Wetted Per. (ft)		18.79	
Min Ch El (ft)	2737.00	Shear (lb/sq ft)		0.65	
Alpha	1.00	Stream Power (lb/ft s)	574.40	504.00	0.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)		0.54	
C & E Loss (ft)	0.00	Cum SA (acres)		0.87	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2748.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.73	Wt. n-Val.		0.013	
W.S. Elev (ft)	2740.62	Reach Len. (ft)	180.00	180.00	180.00
Crit W.S. (ft)	2742.90	Flow Area (sq ft)		73.95	
E.G. Slope (ft/ft)	0.010465	Area (sq ft)		73.95	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	25.86	Top Width (ft)		25.86	
Vel Total (ft/s)	22.31	Avg. Vel. (ft/s)		22.31	
Max Chl Dpth (ft)	3.62	Hydr. Depth (ft)		2.86	
Conv. Total (cfs)	16129.6	Conv. (cfs)		16129.6	
Length Wtd. (ft)	180.00	Wetted Per. (ft)		28.05	
Min Ch El (ft)	2737.00	Shear (lb/sq ft)		1.72	
Alpha	1.00	Stream Power (lb/ft s)	574.40	504.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.00	1.95	
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	1.06	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2745.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.63	Wt. n-Val.		0.013	
W.S. Elev (ft)	2740.01	Reach Len. (ft)	180.00	180.00	180.00
Crit W.S. (ft)	2741.75	Flow Area (sq ft)		58.80	
E.G. Slope (ft/ft)	0.009289	Area (sq ft)		58.80	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	24.04	Top Width (ft)		24.04	
Vel Total (ft/s)	19.05	Avg. Vel. (ft/s)		19.05	
Max Chl Dpth (ft)	3.01	Hydr. Depth (ft)		2.45	
Conv. Total (cfs)	11620.7	Conv. (cfs)		11620.7	
Length Wtd. (ft)	180.00	Wetted Per. (ft)		25.86	
Min Ch El (ft)	2737.00	Shear (lb/sq ft)		1.32	
Alpha	1.00	Stream Power (lb/ft s)	574.40	504.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)		1.72	
C & E Loss (ft)	0.00	Cum SA (acres)		1.03	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2743.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.51	Wt. n-Val.		0.013	
W.S. Elev (ft)	2739.18	Reach Len. (ft)	180.00	180.00	180.00
Crit W.S. (ft)	2740.54	Flow Area (sq ft)		39.91	
E.G. Slope (ft/ft)	0.010582	Area (sq ft)		39.91	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	21.55	Top Width (ft)		21.55	
Vel Total (ft/s)	17.04	Avg. Vel. (ft/s)		17.04	
Max Chl Dpth (ft)	2.18	Hydr. Depth (ft)		1.85	
Conv. Total (cfs)	6610.5	Conv. (cfs)		6610.5	
Length Wtd. (ft)	180.00	Wetted Per. (ft)		22.87	
Min Ch El (ft)	2737.00	Shear (lb/sq ft)		1.15	
Alpha	1.00	Stream Power (lb/ft s)	574.40	504.00	0.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)		1.23	
C & E Loss (ft)	0.00	Cum SA (acres)		0.97	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1720

INPUT
Description: Section 17+20
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
207	2745	209	2743.5	216.5	2738.5	226.5	2738.5	234	2743.4
254	2743.4	266	2735.4	281	2735.4	293	2743.4	316.86	2745

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
207	.03	234	.016	254	.013	293	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
254	293	8	8	8	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
207	254	2744	F

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Left Levee      Station=     254      Elevation=    2744
Right Levee     Station=     293      Elevation=    2744

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2752.49    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              11.61    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2740.88    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2744.01    Flow Area (sq ft)                    127.29
  E.G. Slope (ft/ft)      0.010137    Area (sq ft)                         127.29
  Q Total (cfs)            3480.00    Flow (cfs)                          3480.00
  Top Width (ft)             31.44    Top Width (ft)                        31.44
  Vel Total (ft/s)           27.34    Avg. Vel. (ft/s)                      27.34
  Max Chl Dpth (ft)           5.48    Hydr. Depth (ft)                       4.05
  Conv. Total (cfs)        34564.6    Conv. (cfs)                        34564.6
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      34.76
  Min Ch El (ft)           2735.40    Shear (lb/sq ft)                       2.32
  Alpha                       1.00    Stream Power (lb/ft s)    316.86     254.00     293.00
  Frctn Loss (ft)             1.88    Cum Volume (acre-ft)        0.01       2.56
  C & E Loss (ft)             0.16    Cum SA (acres)              0.02       1.07


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2750.26    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              10.08    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2740.18    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2743.14    Flow Area (sq ft)                    105.99
  E.G. Slope (ft/ft)      0.010158    Area (sq ft)                         105.99
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             29.34    Top Width (ft)                        29.34
  Vel Total (ft/s)           25.47    Avg. Vel. (ft/s)                      25.47
  Max Chl Dpth (ft)           4.78    Hydr. Depth (ft)                       3.61
  Conv. Total (cfs)        26788.9    Conv. (cfs)                        26788.9
  Length Wtd. (ft)            8.00    Wetted Per. (ft)                      32.24
  Min Ch El (ft)           2735.40    Shear (lb/sq ft)                       2.09
  Alpha                       1.00    Stream Power (lb/ft s)    316.86     254.00     293.00
  Frctn Loss (ft)             1.90    Cum Volume (acre-ft)        0.00       2.18
  C & E Loss (ft)             0.17    Cum SA (acres)              0.02       1.01


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2745.87    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               6.97    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2738.90    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)           2741.00    Flow Area (sq ft)                     70.81
  E.G. Slope (ft/ft)      0.009783    Area (sq ft)                          70.81
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
```

Top Width (ft)	25.49	Top Width (ft)		25.49	
Vel Total (ft/s)	21.18	Avg. Vel. (ft/s)		21.18	
Max Chl Dpth (ft)	3.50	Hydr. Depth (ft)		2.78	
Conv. Total (cfs)	15165.4	Conv. (cfs)		15165.4	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		27.61	
Min Ch El (ft)	2735.40	Shear (lb/sq ft)		1.57	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	1.84	Cum Volume (acre-ft)	0.00	1.55	
C & E Loss (ft)	0.14	Cum SA (acres)	0.00	0.94	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2738.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.71	Wt. n-Val.		0.013	
W.S. Elev (ft)	2736.54	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2737.06	Flow Area (sq ft)		19.04	
E.G. Slope (ft/ft)	0.008488	Area (sq ft)		19.04	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.42	Top Width (ft)		18.42	
Vel Total (ft/s)	10.51	Avg. Vel. (ft/s)		10.51	
Max Chl Dpth (ft)	1.14	Hydr. Depth (ft)		1.03	
Conv. Total (cfs)	2170.8	Conv. (cfs)		2170.8	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		19.11	
Min Ch El (ft)	2735.40	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	1.74	Cum Volume (acre-ft)		0.46	
C & E Loss (ft)	0.10	Cum SA (acres)		0.80	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2746.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.32	Wt. n-Val.		0.013	
W.S. Elev (ft)	2739.10	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2741.30	Flow Area (sq ft)		75.98	
E.G. Slope (ft/ft)	0.009690	Area (sq ft)		75.98	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	26.09	Top Width (ft)		26.09	
Vel Total (ft/s)	21.72	Avg. Vel. (ft/s)		21.72	
Max Chl Dpth (ft)	3.70	Hydr. Depth (ft)		2.91	
Conv. Total (cfs)	16762.0	Conv. (cfs)		16762.0	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		28.33	
Min Ch El (ft)	2735.40	Shear (lb/sq ft)		1.62	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	1.81	Cum Volume (acre-ft)	0.00	1.64	
C & E Loss (ft)	0.12	Cum SA (acres)	0.00	0.95	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2743.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.53	Wt. n-Val.		0.013	
W.S. Elev (ft)	2738.44	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2740.14	Flow Area (sq ft)		59.35	
E.G. Slope (ft/ft)	0.009045	Area (sq ft)		59.35	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	24.11	Top Width (ft)		24.11	
Vel Total (ft/s)	18.87	Avg. Vel. (ft/s)		18.87	
Max Chl Dpth (ft)	3.04	Hydr. Depth (ft)		2.46	
Conv. Total (cfs)	11776.5	Conv. (cfs)		11776.5	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		25.94	
Min Ch El (ft)	2735.40	Shear (lb/sq ft)		1.29	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	1.65	Cum Volume (acre-ft)		1.47	
C & E Loss (ft)	0.03	Cum SA (acres)		0.93	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2741.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.13	Wt. n-Val.		0.013	
W.S. Elev (ft)	2737.67	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2738.94	Flow Area (sq ft)		41.69	
E.G. Slope (ft/ft)	0.009302	Area (sq ft)		41.69	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	21.80	Top Width (ft)		21.80	
Vel Total (ft/s)	16.31	Avg. Vel. (ft/s)		16.31	
Max Chl Dpth (ft)	2.27	Hydr. Depth (ft)		1.91	
Conv. Total (cfs)	7050.6	Conv. (cfs)		7050.6	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		23.17	
Min Ch El (ft)	2735.40	Shear (lb/sq ft)		1.04	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	1.78	Cum Volume (acre-ft)		1.06	
C & E Loss (ft)	0.11	Cum SA (acres)		0.88	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1712

INPUT
Description: Section 17+12
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
207	2745	209	2743.5	216.5	2738.5	226.5	2738.5	234	2743.2
254	2743.2	266	2733.4	281	2733.4	293	2743.2	316.86	2745

```
Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     207     .03     209     .03     234    .016     254    .013     293    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           254     293               4       4       4             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     207     254    2746       T
     293  316.86    2746       T
Left Levee      Station=     254      Elevation=    2746
Right Levee     Station=     293      Elevation=    2746

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2752.23    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              13.37    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2738.87    Reach Len. (ft)             4.00       4.00       4.00
  Crit W.S. (ft)           2742.62    Flow Area (sq ft)                    118.61
  E.G. Slope (ft/ft)      0.011624    Area (sq ft)                         118.61
  Q Total (cfs)            3480.00    Flow (cfs)                          3480.00
  Top Width (ft)             28.39    Top Width (ft)                        28.39
  Vel Total (ft/s)           29.34    Avg. Vel. (ft/s)                      29.34
  Max Chl Dpth (ft)           5.47    Hydr. Depth (ft)                       4.18
  Conv. Total (cfs)        32278.0    Conv. (cfs)                         32278.0
  Length Wtd. (ft)            4.00    Wetted Per. (ft)                      32.29
  Min Ch El (ft)           2733.40    Shear (lb/sq ft)                       2.67
  Alpha                       1.00    Stream Power (lb/ft s)    316.86     254.00     293.00
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)        0.01       2.53
  C & E Loss (ft)             0.18    Cum SA (acres)              0.02       1.07


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2749.98    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              11.88    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2738.10    Reach Len. (ft)             4.00       4.00       4.00
  Crit W.S. (ft)           2741.42    Flow Area (sq ft)                     97.61
  E.G. Slope (ft/ft)      0.012075    Area (sq ft)                          97.61
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             26.52    Top Width (ft)                        26.52
  Vel Total (ft/s)           27.66    Avg. Vel. (ft/s)                      27.66
  Max Chl Dpth (ft)           4.70    Hydr. Depth (ft)                       3.68
  Conv. Total (cfs)        24570.7    Conv. (cfs)                         24570.7
  Length Wtd. (ft)            4.00    Wetted Per. (ft)                      29.87
  Min Ch El (ft)           2733.40    Shear (lb/sq ft)                       2.46
  Alpha                       1.00    Stream Power (lb/ft s)    316.86     254.00     293.00
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)        0.00       2.16
  C & E Loss (ft)             0.18    Cum SA (acres)              0.02       1.01


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2745.57    Element                   Left OB    Channel   Right OB
```

Vel Head (ft)	8.88	Wt. n-Val.		0.013	
W.S. Elev (ft)	2736.70	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2739.17	Flow Area (sq ft)		62.73	
E.G. Slope (ft/ft)	0.013125	Area (sq ft)		62.73	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	23.07	Top Width (ft)		23.07	
Vel Total (ft/s)	23.91	Avg. Vel. (ft/s)		23.91	
Max Chl Dpth (ft)	3.30	Hydr. Depth (ft)		2.72	
Conv. Total (cfs)	13093.3	Conv. (cfs)		13093.3	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		25.42	
Min Ch El (ft)	2733.40	Shear (lb/sq ft)		2.02	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.00	1.54	
C & E Loss (ft)	0.19	Cum SA (acres)	0.00	0.94	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2737.76	Element			
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2737.68	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2735.08	Flow Area (sq ft)		86.55	
E.G. Slope (ft/ft)	0.000093	Area (sq ft)		86.55	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.47	Top Width (ft)		25.47	
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)		2.31	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		3.40	
Conv. Total (cfs)	20735.1	Conv. (cfs)		20735.1	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		28.52	
Min Ch El (ft)	2733.40	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.45	
C & E Loss (ft)	0.00	Cum SA (acres)		0.79	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2746.14	Element			
Vel Head (ft)	9.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2736.91	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2739.49	Flow Area (sq ft)		67.66	
E.G. Slope (ft/ft)	0.012774	Area (sq ft)		67.66	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	23.59	Top Width (ft)		23.59	
Vel Total (ft/s)	24.39	Avg. Vel. (ft/s)		24.39	
Max Chl Dpth (ft)	3.51	Hydr. Depth (ft)		2.87	
Conv. Total (cfs)	14598.9	Conv. (cfs)		14598.9	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		26.09	
Min Ch El (ft)	2733.40	Shear (lb/sq ft)		2.07	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.00	1.63	
C & E Loss (ft)	0.19	Cum SA (acres)	0.00	0.95	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2741.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.013	
W.S. Elev (ft)	2741.42	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2738.27	Flow Area (sq ft)		199.01	
E.G. Slope (ft/ft)	0.000289	Area (sq ft)		199.01	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	34.64	Top Width (ft)		34.64	
Vel Total (ft/s)	5.63	Avg. Vel. (ft/s)		5.63	
Max Chl Dpth (ft)	8.02	Hydr. Depth (ft)		5.75	
Conv. Total (cfs)	65905.1	Conv. (cfs)		65905.1	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		40.35	
Min Ch El (ft)	2733.40	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.45	
C & E Loss (ft)	0.00	Cum SA (acres)		0.93	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2740.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.013	
W.S. Elev (ft)	2740.01	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2737.02	Flow Area (sq ft)		152.70	
E.G. Slope (ft/ft)	0.000220	Area (sq ft)		152.70	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	31.19	Top Width (ft)		31.19	
Vel Total (ft/s)	4.45	Avg. Vel. (ft/s)		4.45	
Max Chl Dpth (ft)	6.61	Hydr. Depth (ft)		4.90	
Conv. Total (cfs)	45815.3	Conv. (cfs)		45815.3	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		35.90	
Min Ch El (ft)	2733.40	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.04	
C & E Loss (ft)	0.00	Cum SA (acres)		0.88	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

LATERAL STRUCTURE

RIVER: Desert Knolls Wa
REACH: Main RS: 1710

INPUT
Description: Reach 1 Diversion Chute #1
Lateral structure position = Left overbank
Distance from Upstream XS =
Deck/Roadway Width = 20
Weir Coefficient = 2
Weir Flow Reference = Water Surface
Weir Embankment Coordinates num = 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
0	2743.2	4	2743.2	12.8	2745	212	2742.5

```
Weir crest shape                            = Broad Crested


Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1      Circular       2
FHWA Chart # 1 - Concrete Pipe Culvert
FHWA Scale # 1 - Square edge entrance with headwall
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                       240     .013     .013        0                  .5                 1
Upstream   Elevation =  2733.4
           Centerline Station =  2
Downstream Elevation =  2732.2
           Centerline Station =  2

LATERAL STRUCTURE OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  E.G. US. (ft)                2752.23    Weir Sta US (ft)
  W.S. US. (ft)                2738.87    Weir Sta DS (ft)
  E.G. DS (ft)                 2749.32    Min El Weir Flow (ft)        2742.50
  W.S. DS (ft)                 2739.92    Wr Top Wdth (ft)
  Q US (cfs)                   3480.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          25.96    Weir Avg Depth (ft)
  Q DS (cfs)                   3480.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  0.75    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             25.96
  Q Culv (cfs)                   25.96    # Barrels                           1
  Q Lat RC (cfs)                          Culv Length (ft)              240.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2733.40
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2732.20
  Breach Flow Area (sq ft)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

LATERAL STRUCTURE OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  E.G. US. (ft)                2749.98    Weir Sta US (ft)
  W.S. US. (ft)                2738.10    Weir Sta DS (ft)
  E.G. DS (ft)                 2747.15    Min El Weir Flow (ft)        2742.50
  W.S. DS (ft)                 2739.24    Wr Top Wdth (ft)
  Q US (cfs)                   2700.00    Weir Max Depth (ft)
  Q Leaving Total (cfs)          23.91    Weir Avg Depth (ft)
  Q DS (cfs)                   2700.00    Weir Flow Area (sq ft)
  Perc Q Leaving                  0.89    Weir Coef (ft^1/2)             2.000
  Q Weir (cfs)                    0.00    Weir Submerg
  Q Gates (cfs)                           Q Culv Group (cfs)             23.91
  Q Culv (cfs)                   23.91    # Barrels                           1
  Q Lat RC (cfs)                          Culv Length (ft)              240.00
                                          Culv Depth Blocked (ft)
  Q Breach (cfs)                          Culv Inv El Up (ft)          2733.40
  Breach Avg Velocity (ft/s)              Culv Inv El Dn (ft)          2732.20
  Breach Flow Area (sq ft)
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

LATERAL STRUCTURE OUTPUT Profile #50-yr FIS Culv Group: Culvert #1

E.G. US. (ft)	2745.57	Weir Sta US (ft)	
W.S. US. (ft)	2736.70	Weir Sta DS (ft)	
E.G. DS (ft)	2743.06	Min El Weir Flow (ft)	2742.50
W.S. DS (ft)	2737.95	Wr Top Wdth (ft)	
Q US (cfs)	1500.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	19.79	Weir Avg Depth (ft)	
Q DS (cfs)	1500.00	Weir Flow Area (sq ft)	
Perc Q Leaving	1.32	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	19.79
Q Culv (cfs)	19.79	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	240.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2733.40
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2732.20
Breach Flow Area (sq ft)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

LATERAL STRUCTURE OUTPUT Profile #10-yr FIS Culv Group: Culvert #1

E.G. US. (ft)	2737.76	Weir Sta US (ft)	
W.S. US. (ft)	2737.68	Weir Sta DS (ft)	
E.G. DS (ft)	2736.80	Min El Weir Flow (ft)	2742.50
W.S. DS (ft)	2735.16	Wr Top Wdth (ft)	
Q US (cfs)	200.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	22.66	Weir Avg Depth (ft)	
Q DS (cfs)	200.00	Weir Flow Area (sq ft)	
Perc Q Leaving	11.33	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	22.66
Q Culv (cfs)	22.66	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	240.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2733.40
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2732.20
Breach Flow Area (sq ft)			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

LATERAL STRUCTURE OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

E.G. US. (ft)	2746.14	Weir Sta US (ft)	
W.S. US. (ft)	2736.91	Weir Sta DS (ft)	
E.G. DS (ft)	2743.62	Min El Weir Flow (ft)	2742.50
W.S. DS (ft)	2738.14	Wr Top Wdth (ft)	
Q US (cfs)	1650.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	20.41	Weir Avg Depth (ft)	
Q DS (cfs)	1650.00	Weir Flow Area (sq ft)	
Perc Q Leaving	1.24	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	20.41
Q Culv (cfs)	20.41	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	240.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2733.40
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2732.20
Breach Flow Area (sq ft)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

LATERAL STRUCTURE OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

E.G. US. (ft)	2741.91	Weir Sta US (ft)	
W.S. US. (ft)	2741.42	Weir Sta DS (ft)	
E.G. DS (ft)	2741.08	Min El Weir Flow (ft)	2742.50
W.S. DS (ft)	2737.70	Wr Top Wdth (ft)	
Q US (cfs)	1120.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	31.99	Weir Avg Depth (ft)	
Q DS (cfs)	1120.00	Weir Flow Area (sq ft)	
Perc Q Leaving	2.86	Weir Coef (ft^1/2)	2.000
Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	31.99
Q Culv (cfs)	31.99	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	240.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2733.40
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2732.20
Breach Flow Area (sq ft)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

LATERAL STRUCTURE OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #1

E.G. US. (ft)	2740.32	Weir Sta US (ft)	
W.S. US. (ft)	2740.01	Weir Sta DS (ft)	
E.G. DS (ft)	2739.47	Min El Weir Flow (ft)	2742.50
W.S. DS (ft)	2736.67	Wr Top Wdth (ft)	
Q US (cfs)	680.00	Weir Max Depth (ft)	
Q Leaving Total (cfs)	28.79	Weir Avg Depth (ft)	
Q DS (cfs)	680.00	Weir Flow Area (sq ft)	
Perc Q Leaving	4.23	Weir Coef (ft^1/2)	2.000

Q Weir (cfs)	0.00	Weir Submerg	
Q Gates (cfs)		Q Culv Group (cfs)	28.79
Q Culv (cfs)	28.79	# Barrels	1
Q Lat RC (cfs)		Culv Length (ft)	240.00
		Culv Depth Blocked (ft)	
Q Breach (cfs)		Culv Inv El Up (ft)	2733.40
Breach Avg Velocity (ft/s)		Culv Inv El Dn (ft)	2732.20
Breach Flow Area (sq ft)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1708

INPUT
Description: Section 17+08
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
207	2745	209	2743.5	216.5	2738.5	226.5	2738.5	234	2743.2
254	2743.2	266	2733.4	281	2733.4	293	2743.2	316.86	2745

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
207	.03	209	.03	234	.016	254	.013	293	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
254	293	8.8	8.8	8.8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
207	254	2746	T
293	316.86	2746	T

Left Levee Station= 254 Elevation= 2746
Right Levee Station= 293 Elevation= 2746

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2752.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	13.30	Wt. n-Val.		0.013	
W.S. Elev (ft)	2738.88	Reach Len. (ft)	8.80	8.80	8.80
Crit W.S. (ft)	2742.62	Flow Area (sq ft)		118.93	
E.G. Slope (ft/ft)	0.011537	Area (sq ft)		118.93	
Q Total (cfs)	3480.00	Flow (cfs)		3480.00	
Top Width (ft)	28.42	Top Width (ft)		28.42	
Vel Total (ft/s)	29.26	Avg. Vel. (ft/s)		29.26	
Max Chl Dpth (ft)	5.48	Hydr. Depth (ft)		4.19	
Conv. Total (cfs)	32399.1	Conv. (cfs)		32399.1	
Length Wtd. (ft)	8.80	Wetted Per. (ft)		32.32	
Min Ch El (ft)	2733.40	Shear (lb/sq ft)		2.65	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.01	2.52	
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	1.07	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2749.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.81	Wt. n-Val.		0.013	
W.S. Elev (ft)	2738.11	Reach Len. (ft)	8.80	8.80	8.80
Crit W.S. (ft)	2741.42	Flow Area (sq ft)		97.92	
E.G. Slope (ft/ft)	0.011970	Area (sq ft)		97.92	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	26.54	Top Width (ft)		26.54	
Vel Total (ft/s)	27.57	Avg. Vel. (ft/s)		27.57	
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)		3.69	
Conv. Total (cfs)	24678.6	Conv. (cfs)		24678.6	
Length Wtd. (ft)	8.80	Wetted Per. (ft)		29.90	
Min Ch El (ft)	2733.40	Shear (lb/sq ft)		2.45	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.00	2.15	
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	1.01	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2745.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.80	Wt. n-Val.		0.013	
W.S. Elev (ft)	2736.71	Reach Len. (ft)	8.80	8.80	8.80
Crit W.S. (ft)	2739.17	Flow Area (sq ft)		63.01	
E.G. Slope (ft/ft)	0.012956	Area (sq ft)		63.01	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	23.10	Top Width (ft)		23.10	
Vel Total (ft/s)	23.81	Avg. Vel. (ft/s)		23.81	
Max Chl Dpth (ft)	3.31	Hydr. Depth (ft)		2.73	
Conv. Total (cfs)	13178.1	Conv. (cfs)		13178.1	
Length Wtd. (ft)	8.80	Wetted Per. (ft)		25.46	
Min Ch El (ft)	2733.40	Shear (lb/sq ft)		2.00	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.00	1.53	
C & E Loss (ft)	0.02	Cum SA (acres)	0.00	0.94	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2737.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2737.68	Reach Len. (ft)	8.80	8.80	8.80
Crit W.S. (ft)	2735.08	Flow Area (sq ft)		86.54	
E.G. Slope (ft/ft)	0.000093	Area (sq ft)		86.54	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.47	Top Width (ft)		25.47	
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)		2.31	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		3.40	
Conv. Total (cfs)	20730.8	Conv. (cfs)		20730.8	
Length Wtd. (ft)	8.80	Wetted Per. (ft)		28.52	
Min Ch El (ft)	2733.40	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.45	
C & E Loss (ft)	0.07	Cum SA (acres)		0.79	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2746.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.16	Wt. n-Val.		0.013	
W.S. Elev (ft)	2736.92	Reach Len. (ft)	8.80	8.80	8.80
Crit W.S. (ft)	2739.49	Flow Area (sq ft)		67.95	
E.G. Slope (ft/ft)	0.012619	Area (sq ft)		67.95	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	23.62	Top Width (ft)		23.62	
Vel Total (ft/s)	24.28	Avg. Vel. (ft/s)		24.28	
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)		2.88	
Conv. Total (cfs)	14688.2	Conv. (cfs)		14688.2	
Length Wtd. (ft)	8.80	Wetted Per. (ft)		26.13	
Min Ch El (ft)	2733.40	Shear (lb/sq ft)		2.05	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.00	1.62	
C & E Loss (ft)	0.02	Cum SA (acres)	0.00	0.95	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2741.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.013	
W.S. Elev (ft)	2741.42	Reach Len. (ft)	8.80	8.80	8.80
Crit W.S. (ft)	2738.27	Flow Area (sq ft)		198.95	
E.G. Slope (ft/ft)	0.000289	Area (sq ft)		198.95	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	34.63	Top Width (ft)		34.63	
Vel Total (ft/s)	5.63	Avg. Vel. (ft/s)		5.63	
Max Chl Dpth (ft)	8.02	Hydr. Depth (ft)		5.74	
Conv. Total (cfs)	65878.3	Conv. (cfs)		65878.3	
Length Wtd. (ft)	8.80	Wetted Per. (ft)		40.35	
Min Ch El (ft)	2733.40	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		1.43	
C & E Loss (ft)	0.13	Cum SA (acres)		0.92	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2740.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.013	
W.S. Elev (ft)	2740.01	Reach Len. (ft)	8.80	8.80	8.80
Crit W.S. (ft)	2737.02	Flow Area (sq ft)		152.66	
E.G. Slope (ft/ft)	0.000220	Area (sq ft)		152.66	

Q Total (cfs)	680.00	Flow (cfs)		680.00		
Top Width (ft)	31.19	Top Width (ft)		31.19		
Vel Total (ft/s)	4.45	Avg. Vel. (ft/s)		4.45		
Max Chl Dpth (ft)	6.61	Hydr. Depth (ft)		4.89		
Conv. Total (cfs)	45799.6	Conv. (cfs)		45799.6		
Length Wtd. (ft)	8.80	Wetted Per. (ft)		35.90		
Min Ch El (ft)	2733.40	Shear (lb/sq ft)		0.06		
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	293.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.03		
C & E Loss (ft)	0.11	Cum SA (acres)		0.87		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1699.2

INPUT
Description: Section 16+99.2
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100.1	2745	120.77	2745	207	2745	209	2743.5	216.5	2738.5
226.5	2738.5	234	2745	254	2745	269.5	2735.3	284.5	2735.3
299	2745	316.86	2745						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100.1	.035	209	.03	234	.016	254	.013	299	.016
316.86	.035								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
254	299	199.21	199.21	199.21	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
100.1	254	2745	F

Left Levee Station= 254 Elevation= 2745

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2751.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.11	Wt. n-Val.		0.013	
W.S. Elev (ft)	2741.02	Reach Len. (ft)	199.21	199.21	199.21
Crit W.S. (ft)	2744.12	Flow Area (sq ft)		136.36	
E.G. Slope (ft/ft)	0.008463	Area (sq ft)		136.36	
Q Total (cfs)	3480.00	Flow (cfs)		3480.00	
Top Width (ft)	32.69	Top Width (ft)		32.69	
Vel Total (ft/s)	25.52	Avg. Vel. (ft/s)		25.52	
Max Chl Dpth (ft)	5.72	Hydr. Depth (ft)		4.17	
Conv. Total (cfs)	37827.8	Conv. (cfs)		37827.8	
Length Wtd. (ft)	199.21	Wetted Per. (ft)		36.07	
Min Ch El (ft)	2735.30	Shear (lb/sq ft)		2.00	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.01	2.50	
C & E Loss (ft)	0.95	Cum SA (acres)	0.02	1.06	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2748.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.47	Wt. n-Val.		0.013	
W.S. Elev (ft)	2740.36	Reach Len. (ft)	199.21	199.21	199.21
Crit W.S. (ft)	2743.00	Flow Area (sq ft)		115.59	
E.G. Slope (ft/ft)	0.008059	Area (sq ft)		115.59	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	30.66	Top Width (ft)		30.66	
Vel Total (ft/s)	23.36	Avg. Vel. (ft/s)		23.36	
Max Chl Dpth (ft)	5.06	Hydr. Depth (ft)		3.77	
Conv. Total (cfs)	30076.9	Conv. (cfs)		30076.9	
Length Wtd. (ft)	199.21	Wetted Per. (ft)		33.65	
Min Ch El (ft)	2735.30	Shear (lb/sq ft)		1.73	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.00	2.13	
C & E Loss (ft)	1.00	Cum SA (acres)	0.02	1.00	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The cross section had to be extended vertically during the critical depth calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2744.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2739.23	Reach Len. (ft)	199.21	199.21	199.21
Crit W.S. (ft)	2740.88	Flow Area (sq ft)		82.91	
E.G. Slope (ft/ft)	0.006314	Area (sq ft)		82.91	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	27.16	Top Width (ft)		27.16	
Vel Total (ft/s)	18.09	Avg. Vel. (ft/s)		18.09	
Max Chl Dpth (ft)	3.93	Hydr. Depth (ft)		3.05	
Conv. Total (cfs)	18877.5	Conv. (cfs)		18877.5	
Length Wtd. (ft)	199.21	Wetted Per. (ft)		29.49	
Min Ch El (ft)	2735.30	Shear (lb/sq ft)		1.11	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.00	1.52	
C & E Loss (ft)	1.11	Cum SA (acres)	0.00	0.93	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2737.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.		0.013	
W.S. Elev (ft)	2736.95	Reach Len. (ft)	199.21	199.21	199.21
Crit W.S. (ft)	2736.95	Flow Area (sq ft)		28.86	
E.G. Slope (ft/ft)	0.002414	Area (sq ft)		28.86	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	20.09	Top Width (ft)		20.09	
Vel Total (ft/s)	6.93	Avg. Vel. (ft/s)		6.93	
Max Chl Dpth (ft)	1.65	Hydr. Depth (ft)		1.44	
Conv. Total (cfs)	4070.9	Conv. (cfs)		4070.9	
Length Wtd. (ft)	199.21	Wetted Per. (ft)		21.06	
Min Ch El (ft)	2735.30	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	0.00
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)		0.43	
C & E Loss (ft)	0.00	Cum SA (acres)		0.79	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2744.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.51	Wt. n-Val.		0.013	
W.S. Elev (ft)	2739.40	Reach Len. (ft)	199.21	199.21	199.21
Crit W.S. (ft)	2741.18	Flow Area (sq ft)		87.60	
E.G. Slope (ft/ft)	0.006540	Area (sq ft)		87.60	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	27.69	Top Width (ft)		27.69	
Vel Total (ft/s)	18.84	Avg. Vel. (ft/s)		18.84	
Max Chl Dpth (ft)	4.10	Hydr. Depth (ft)		3.16	
Conv. Total (cfs)	20402.5	Conv. (cfs)		20402.5	
Length Wtd. (ft)	199.21	Wetted Per. (ft)		30.12	
Min Ch El (ft)	2735.30	Shear (lb/sq ft)		1.19	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.00	1.60	
C & E Loss (ft)	1.09	Cum SA (acres)	0.00	0.94	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2741.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.75	Wt. n-Val.		0.013	
W.S. Elev (ft)	2740.03	Reach Len. (ft)	199.21	199.21	199.21
Crit W.S. (ft)	2740.03	Flow Area (sq ft)		105.44	
E.G. Slope (ft/ft)	0.001792	Area (sq ft)		105.44	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	29.62	Top Width (ft)		29.62	
Vel Total (ft/s)	10.62	Avg. Vel. (ft/s)		10.62	
Max Chl Dpth (ft)	4.73	Hydr. Depth (ft)		3.56	
Conv. Total (cfs)	26460.6	Conv. (cfs)		26460.6	
Length Wtd. (ft)	199.21	Wetted Per. (ft)		32.41	
Min Ch El (ft)	2735.30	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	0.00
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)		1.40	
C & E Loss (ft)	0.00	Cum SA (acres)		0.92	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2740.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.39	Wt. n-Val.		0.013	
W.S. Elev (ft)	2738.82	Reach Len. (ft)	199.21	199.21	199.21
Crit W.S. (ft)	2738.82	Flow Area (sq ft)		71.99	
E.G. Slope (ft/ft)	0.001936	Area (sq ft)		71.99	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	25.89	Top Width (ft)		25.89	
Vel Total (ft/s)	9.45	Avg. Vel. (ft/s)		9.45	
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)		2.78	
Conv. Total (cfs)	15454.8	Conv. (cfs)		15454.8	
Length Wtd. (ft)	199.21	Wetted Per. (ft)		27.97	
Min Ch El (ft)	2735.30	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	316.86	254.00	0.00
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)		1.00	
C & E Loss (ft)	0.00	Cum SA (acres)		0.87	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 1500

INPUT
Description: Section 15+00
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   254.4    2743     274    2743   287.5    2734   302.5    2734     316    2743
  332.31    2742  345.45    2745  376.68    2750

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
   254.4    .016     274    .013     316    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           274     316              300     300     300             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
   254.4     274    2743       F
     316  376.68    2743       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2749.32    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               9.40    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2739.92    Reach Len. (ft)            300.00     300.00     300.00
  Crit W.S. (ft)           2743.20    Flow Area (sq ft)                     141.44
  E.G. Slope (ft/ft)      0.007572    Area (sq ft)                          141.44
  Q Total (cfs)            3480.00    Flow (cfs)                           3480.00
  Top Width (ft)             32.77    Top Width (ft)                         32.77
  Vel Total (ft/s)           24.60    Avg. Vel. (ft/s)                       24.60
  Max Chl Dpth (ft)           5.92    Hydr. Depth (ft)                        4.32
  Conv. Total (cfs)        39992.4    Conv. (cfs)                          39992.4
  Length Wtd. (ft)          300.00    Wetted Per. (ft)                       36.35
  Min Ch El (ft)           2734.00    Shear (lb/sq ft)                        1.84
  Alpha                       1.00    Stream Power (lb/ft s)     376.68       0.00       0.00
  Frctn Loss (ft)             1.59    Cum Volume (acre-ft)         0.01       1.86
  C & E Loss (ft)             0.21    Cum SA (acres)               0.02       0.91


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2747.15    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               7.91    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2739.24    Reach Len. (ft)            300.00     300.00     300.00
  Crit W.S. (ft)           2741.74    Flow Area (sq ft)                     119.62
  E.G. Slope (ft/ft)      0.007251    Area (sq ft)                          119.62
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             30.70    Top Width (ft)                         30.70
  Vel Total (ft/s)           22.57    Avg. Vel. (ft/s)                       22.57
  Max Chl Dpth (ft)           5.23    Hydr. Depth (ft)                        3.90
  Conv. Total (cfs)        31707.1    Conv. (cfs)                          31707.1
  Length Wtd. (ft)          300.00    Wetted Per. (ft)                       33.87
  Min Ch El (ft)           2734.00    Shear (lb/sq ft)                        1.60
  Alpha                       1.00    Stream Power (lb/ft s)     376.68       0.00       0.00
  Frctn Loss (ft)             1.52    Cum Volume (acre-ft)         0.00       1.59
  C & E Loss (ft)             0.17    Cum SA (acres)               0.02       0.86
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2743.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.11	Wt. n-Val.		0.013	
W.S. Elev (ft)	2737.95	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2739.60	Flow Area (sq ft)		82.70	
E.G. Slope (ft/ft)	0.006297	Area (sq ft)		82.70	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	26.86	Top Width (ft)		26.86	
Vel Total (ft/s)	18.14	Avg. Vel. (ft/s)		18.14	
Max Chl Dpth (ft)	3.95	Hydr. Depth (ft)		3.08	
Conv. Total (cfs)	18903.0	Conv. (cfs)		18903.0	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		29.25	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		1.11	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	1.26	Cum Volume (acre-ft)	0.00	1.14	
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	0.81	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2736.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.64	Wt. n-Val.		0.013	
W.S. Elev (ft)	2735.16	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2735.67	Flow Area (sq ft)		19.47	
E.G. Slope (ft/ft)	0.007928	Area (sq ft)		19.47	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	18.49	Top Width (ft)		18.49	
Vel Total (ft/s)	10.27	Avg. Vel. (ft/s)		10.27	
Max Chl Dpth (ft)	1.16	Hydr. Depth (ft)		1.05	
Conv. Total (cfs)	2246.2	Conv. (cfs)		2246.2	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		19.19	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)		0.32	
C & E Loss (ft)	0.09	Cum SA (acres)		0.70	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2743.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.48	Wt. n-Val.		0.013	
W.S. Elev (ft)	2738.14	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2739.90	Flow Area (sq ft)		87.86	
E.G. Slope (ft/ft)	0.006424	Area (sq ft)		87.86	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	27.43	Top Width (ft)		27.43	
Vel Total (ft/s)	18.78	Avg. Vel. (ft/s)		18.78	
Max Chl Dpth (ft)	4.14	Hydr. Depth (ft)		3.20	
Conv. Total (cfs)	20587.2	Conv. (cfs)		20587.2	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		29.93	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		1.18	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	1.29	Cum Volume (acre-ft)	0.00	1.20	
C & E Loss (ft)	0.01	Cum SA (acres)	0.00	0.82	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2741.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.38	Wt. n-Val.		0.013	
W.S. Elev (ft)	2737.70	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2738.75	Flow Area (sq ft)		75.90	
E.G. Slope (ft/ft)	0.004477	Area (sq ft)		75.90	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	26.08	Top Width (ft)		26.08	
Vel Total (ft/s)	14.76	Avg. Vel. (ft/s)		14.76	
Max Chl Dpth (ft)	3.69	Hydr. Depth (ft)		2.91	
Conv. Total (cfs)	16738.1	Conv. (cfs)		16738.1	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		28.32	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)		0.98	
C & E Loss (ft)	0.16	Cum SA (acres)		0.79	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2739.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.80	Wt. n-Val.		0.013	
W.S. Elev (ft)	2736.67	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2737.54	Flow Area (sq ft)		50.64	
E.G. Slope (ft/ft)	0.005273	Area (sq ft)		50.64	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	23.00	Top Width (ft)		23.00	
Vel Total (ft/s)	13.43	Avg. Vel. (ft/s)		13.43	
Max Chl Dpth (ft)	2.67	Hydr. Depth (ft)		2.20	
Conv. Total (cfs)	9364.1	Conv. (cfs)		9364.1	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		24.61	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		0.68	

Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)		0.72	
C & E Loss (ft)	0.14	Cum SA (acres)		0.75	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1200.*

INPUT
Description:
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2736	104	2735	106	2735	122	2735	124	2735
159	2735	168	2731	178	2736	188	2736	227	2732
238	2730	280	2730	294	2730	309	2736	317	2736
324	2737	339	2739						

Manning's n Values num= 6

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	159	.03	178	.016	188	.013	309	.035
339	.035								

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
188	309	242.5	242.5	242.5	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	188	2736	F
309	339	2736	F

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2744.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.96	Wt. n-Val.		0.013	
W.S. Elev (ft)	2731.90	Reach Len. (ft)	242.50	242.50	242.50
Crit W.S. (ft)	2734.43	Flow Area (sq ft)		120.47	
E.G. Slope (ft/ft)	0.031974	Area (sq ft)	1.70	120.47	
Q Total (cfs)	3480.00	Flow (cfs)		3480.00	
Top Width (ft)	74.96	Top Width (ft)	3.80	71.16	
Vel Total (ft/s)	28.89	Avg. Vel. (ft/s)		28.89	
Max Chl Dpth (ft)	1.89	Hydr. Depth (ft)		1.69	
Conv. Total (cfs)	19461.8	Conv. (cfs)		19461.8	
Length Wtd. (ft)	242.50	Wetted Per. (ft)		71.69	
Min Ch El (ft)	2730.00	Shear (lb/sq ft)		3.35	
Alpha	1.00	Stream Power (lb/ft s)	339.00	0.00	0.00
Frctn Loss (ft)	4.11	Cum Volume (acre-ft)	0.00	0.96	
C & E Loss (ft)	0.36	Cum SA (acres)	0.01	0.55	

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2742.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	11.15	Wt. n-Val.		0.013	
W.S. Elev (ft)	2731.61	Reach Len. (ft)	242.50	242.50	242.50
Crit W.S. (ft)	2733.81	Flow Area (sq ft)		100.75	
E.G. Slope (ft/ft)	0.033412	Area (sq ft)	0.80	100.75	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	71.51	Top Width (ft)	2.61	68.91	
Vel Total (ft/s)	26.80	Avg. Vel. (ft/s)		26.80	
Max Chl Dpth (ft)	1.61	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	14771.0	Conv. (cfs)		14771.0	
Length Wtd. (ft)	242.50	Wetted Per. (ft)		69.36	
Min Ch El (ft)	2730.00	Shear (lb/sq ft)		3.03	
Alpha	1.00	Stream Power (lb/ft s)	339.00	0.00	0.00
Frctn Loss (ft)	4.05	Cum Volume (acre-ft)	0.00	0.84	
C & E Loss (ft)	0.32	Cum SA (acres)	0.01	0.52	

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2738.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.87	Wt. n-Val.		0.013	
W.S. Elev (ft)	2731.10	Reach Len. (ft)	242.50	242.50	242.50
Crit W.S. (ft)	2732.66	Flow Area (sq ft)		66.64	
E.G. Slope (ft/ft)	0.037625	Area (sq ft)	0.02	66.64	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	65.26	Top Width (ft)	0.44	64.82	
Vel Total (ft/s)	22.51	Avg. Vel. (ft/s)		22.51	
Max Chl Dpth (ft)	1.10	Hydr. Depth (ft)		1.03	
Conv. Total (cfs)	7733.1	Conv. (cfs)		7733.1	
Length Wtd. (ft)	242.50	Wetted Per. (ft)		65.14	
Min Ch El (ft)	2730.00	Shear (lb/sq ft)		2.40	
Alpha	1.00	Stream Power (lb/ft s)	339.00	0.00	0.00
Frctn Loss (ft)	3.81	Cum Volume (acre-ft)	0.00	0.63	
C & E Loss (ft)	0.28	Cum SA (acres)	0.00	0.49	

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2732.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.83	Wt. n-Val.		0.013	
W.S. Elev (ft)	2730.32	Reach Len. (ft)	242.50	242.50	242.50
Crit W.S. (ft)	2730.73	Flow Area (sq ft)		18.42	
E.G. Slope (ft/ft)	0.042286	Area (sq ft)		18.42	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	58.57	Top Width (ft)		58.57	
Vel Total (ft/s)	10.86	Avg. Vel. (ft/s)		10.86	
Max Chl Dpth (ft)	0.32	Hydr. Depth (ft)		0.31	
Conv. Total (cfs)	972.6	Conv. (cfs)		972.6	
Length Wtd. (ft)	242.50	Wetted Per. (ft)		58.66	
Min Ch El (ft)	2730.00	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)	339.00	0.00	0.00
Frctn Loss (ft)	4.63	Cum Volume (acre-ft)		0.19	
C & E Loss (ft)	0.02	Cum SA (acres)		0.43	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2739.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.32	Wt. n-Val.		0.013	
W.S. Elev (ft)	2731.17	Reach Len. (ft)	242.50	242.50	242.50
Crit W.S. (ft)	2732.81	Flow Area (sq ft)		71.28	
E.G. Slope (ft/ft)	0.036813	Area (sq ft)	0.06	71.28	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	66.14	Top Width (ft)	0.74	65.39	
Vel Total (ft/s)	23.15	Avg. Vel. (ft/s)		23.15	
Max Chl Dpth (ft)	1.17	Hydr. Depth (ft)		1.09	
Conv. Total (cfs)	8599.7	Conv. (cfs)		8599.7	
Length Wtd. (ft)	242.50	Wetted Per. (ft)		65.73	
Min Ch El (ft)	2730.00	Shear (lb/sq ft)		2.49	
Alpha	1.00	Stream Power (lb/ft s)	339.00	0.00	0.00
Frctn Loss (ft)	3.84	Cum Volume (acre-ft)	0.00	0.66	
C & E Loss (ft)	0.28	Cum SA (acres)	0.00	0.50	

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2737.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.79	Wt. n-Val.		0.013	
W.S. Elev (ft)	2730.90	Reach Len. (ft)	242.50	242.50	242.50
Crit W.S. (ft)	2732.21	Flow Area (sq ft)		53.57	
E.G. Slope (ft/ft)	0.041918	Area (sq ft)		53.57	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	63.19	Top Width (ft)		63.19	
Vel Total (ft/s)	20.91	Avg. Vel. (ft/s)		20.91	
Max Chl Dpth (ft)	0.90	Hydr. Depth (ft)		0.85	
Conv. Total (cfs)	5470.4	Conv. (cfs)		5470.4	
Length Wtd. (ft)	242.50	Wetted Per. (ft)		63.45	
Min Ch El (ft)	2730.00	Shear (lb/sq ft)		2.21	
Alpha	1.00	Stream Power (lb/ft s)	339.00	0.00	0.00
Frctn Loss (ft)	3.05	Cum Volume (acre-ft)		0.54	
C & E Loss (ft)	0.34	Cum SA (acres)		0.48	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2735.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2730.65	Reach Len. (ft)	242.50	242.50	242.50
Crit W.S. (ft)	2731.60	Flow Area (sq ft)		37.76	
E.G. Slope (ft/ft)	0.047420	Area (sq ft)		37.76	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	61.16	Top Width (ft)		61.16	
Vel Total (ft/s)	18.01	Avg. Vel. (ft/s)		18.01	
Max Chl Dpth (ft)	0.64	Hydr. Depth (ft)		0.62	
Conv. Total (cfs)	3122.7	Conv. (cfs)		3122.7	
Length Wtd. (ft)	242.50	Wetted Per. (ft)		61.34	
Min Ch El (ft)	2730.00	Shear (lb/sq ft)		1.82	
Alpha	1.00	Stream Power (lb/ft s)	339.00	0.00	0.00
Frctn Loss (ft)	3.56	Cum Volume (acre-ft)		0.42	
C & E Loss (ft)	0.22	Cum SA (acres)		0.46	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 957.5

INPUT

```
Description: Section 9+57.5 - D/S Boundary
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2731  118.37    2730  179.97    2729  197.72    2727  264.51    2727
  287.05    2727  303.36    2730  308.76    2731

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  118.37     .03  303.36    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        118.37  303.36                0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2732.86    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               3.72    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2729.14    Reach Len. (ft)
  Crit W.S. (ft)           2730.27    Flow Area (sq ft)                    224.84
  E.G. Slope (ft/ft)      0.045999    Area (sq ft)                         224.84
  Q Total (cfs)            3480.00    Flow (cfs)                          3480.00
  Top Width (ft)            127.54    Top Width (ft)                       127.54
  Vel Total (ft/s)           15.48    Avg. Vel. (ft/s)                      15.48
  Max Chl Dpth (ft)           2.14    Hydr. Depth (ft)                       1.76
  Conv. Total (cfs)        16225.7    Conv. (cfs)                         16225.7
  Length Wtd. (ft)                    Wetted Per. (ft)                     127.85
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                       5.05
  Alpha                       1.00    Stream Power (lb/ft s)    308.76       0.00       0.00
  Frctn Loss (ft)             9.22    Cum Volume (acre-ft)
  C & E Loss (ft)             2.77    Cum SA (acres)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2731.78    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               2.84    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2728.93    Reach Len. (ft)
  Crit W.S. (ft)           2729.92    Flow Area (sq ft)                    199.51
  E.G. Slope (ft/ft)      0.036766    Area (sq ft)                         199.51
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)            117.01    Top Width (ft)                       117.01
  Vel Total (ft/s)           13.53    Avg. Vel. (ft/s)                      13.53
  Max Chl Dpth (ft)           1.93    Hydr. Depth (ft)                       1.71
  Conv. Total (cfs)        14081.2    Conv. (cfs)                         14081.2
  Length Wtd. (ft)                    Wetted Per. (ft)                     117.29
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                       3.90
  Alpha                       1.00    Stream Power (lb/ft s)    308.76       0.00       0.00
  Frctn Loss (ft)             8.49    Cum Volume (acre-ft)
  C & E Loss (ft)             2.49    Cum SA (acres)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr FIS
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E.G. Elev (ft)	2729.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.40	Wt. n-Val.		0.030	
W.S. Elev (ft)	2728.57	Reach Len. (ft)			
Crit W.S. (ft)	2728.94	Flow Area (sq ft)		158.03	
E.G. Slope (ft/ft)	0.023219	Area (sq ft)		158.03	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	111.82	Top Width (ft)		111.82	
Vel Total (ft/s)	9.49	Avg. Vel. (ft/s)		9.49	
Max Chl Dpth (ft)	1.57	Hydr. Depth (ft)		1.41	
Conv. Total (cfs)	9844.0	Conv. (cfs)		9844.0	
Length Wtd. (ft)		Wetted Per. (ft)		112.05	
Min Ch El (ft)	2727.00	Shear (lb/sq ft)		2.04	
Alpha	1.00	Stream Power (lb/ft s)	308.76	0.00	0.00
Frctn Loss (ft)	7.06	Cum Volume (acre-ft)			
C & E Loss (ft)	1.94	Cum SA (acres)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2727.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.030	
W.S. Elev (ft)	2727.55	Reach Len. (ft)			
Crit W.S. (ft)	2727.53	Flow Area (sq ft)		50.80	
E.G. Slope (ft/ft)	0.015007	Area (sq ft)		50.80	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	97.13	Top Width (ft)		97.13	
Vel Total (ft/s)	3.94	Avg. Vel. (ft/s)		3.94	
Max Chl Dpth (ft)	0.54	Hydr. Depth (ft)		0.52	
Conv. Total (cfs)	1632.6	Conv. (cfs)		1632.6	
Length Wtd. (ft)		Wetted Per. (ft)		97.21	
Min Ch El (ft)	2727.00	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	308.76	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2730.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.57	Wt. n-Val.		0.030	
W.S. Elev (ft)	2728.63	Reach Len. (ft)			
Crit W.S. (ft)	2729.09	Flow Area (sq ft)		164.25	
E.G. Slope (ft/ft)	0.024939	Area (sq ft)		164.25	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	112.61	Top Width (ft)		112.61	
Vel Total (ft/s)	10.05	Avg. Vel. (ft/s)		10.05	
Max Chl Dpth (ft)	1.63	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	10448.3	Conv. (cfs)		10448.3	
Length Wtd. (ft)		Wetted Per. (ft)		112.85	
Min Ch El (ft)	2727.00	Shear (lb/sq ft)		2.27	
Alpha	1.00	Stream Power (lb/ft s)	308.76	0.00	0.00
Frctn Loss (ft)	7.28	Cum Volume (acre-ft)			
C & E Loss (ft)	2.03	Cum SA (acres)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2729.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.030	
W.S. Elev (ft)	2728.41	Reach Len. (ft)			
Crit W.S. (ft)	2728.61	Flow Area (sq ft)		140.04	
E.G. Slope (ft/ft)	0.018828	Area (sq ft)		140.04	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	109.49	Top Width (ft)		109.49	
Vel Total (ft/s)	8.00	Avg. Vel. (ft/s)		8.00	
Max Chl Dpth (ft)	1.41	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	8162.4	Conv. (cfs)		8162.4	
Length Wtd. (ft)		Wetted Per. (ft)		109.70	
Min Ch El (ft)	2727.00	Shear (lb/sq ft)		1.50	
Alpha	1.00	Stream Power (lb/ft s)	308.76	0.00	0.00
Frctn Loss (ft)	6.55	Cum Volume (acre-ft)			
C & E Loss (ft)	1.74	Cum SA (acres)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2728.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.		0.030	
W.S. Elev (ft)	2728.15	Reach Len. (ft)			
Crit W.S. (ft)	2728.17	Flow Area (sq ft)		112.65	
E.G. Slope (ft/ft)	0.013700	Area (sq ft)		112.65	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	105.85	Top Width (ft)		105.85	
Vel Total (ft/s)	6.04	Avg. Vel. (ft/s)		6.04	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)		1.06	
Conv. Total (cfs)	5809.7	Conv. (cfs)		5809.7	
Length Wtd. (ft)		Wetted Per. (ft)		106.02	
Min Ch El (ft)	2727.00	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)	308.76	0.00	0.00
Frctn Loss (ft)	5.62	Cum Volume (acre-ft)			
C & E Loss (ft)	1.34	Cum SA (acres)			

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 11179.5

```
INPUT
Description:
Station Elevation Data    num=      23
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2858.2   135.8  2857.3  143.02 2857.12  165.01 2856.28  172.11 2855.97
  183.37 2855.65     197 2852.72     203  2848.4     216  2848.4     222 2852.72
     242 2852.72     254 2844.72     269 2844.72     281 2852.72  358.44  2852.6
  369.19 2852.73  374.32  2853.4  390.51 2853.72   415.4  2853.9  437.18 2853.66
  446.31 2853.72  456.75 2853.94  476.72  2854.8

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     197     .03     222    .016     242    .013     281    .035
  476.72    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           197     222            848.5   848.5   848.5             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     222  476.72 2852.72       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2849.36    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.10    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2849.26    Reach Len. (ft)            848.50     848.50     848.50
  Crit W.S. (ft)           2848.96    Flow Area (sq ft)                      12.17
  E.G. Slope (ft/ft)      0.003718    Area (sq ft)                           12.17      98.94
  Q Total (cfs)              30.70    Flow (cfs)                             30.70
  Top Width (ft)             43.99    Top Width (ft)                         15.38      28.61
  Vel Total (ft/s)            2.52    Avg. Vel. (ft/s)                        2.52
  Max Chl Dpth (ft)           4.54    Hydr. Depth (ft)                        0.79
  Conv. Total (cfs)          503.5    Conv. (cfs)                            503.5
  Length Wtd. (ft)          848.50    Wetted Per. (ft)                       15.93
  Min Ch El (ft)           2848.40    Shear (lb/sq ft)                        0.18
  Alpha                       1.00    Stream Power (lb/ft s)     476.72       0.00       0.00
  Frctn Loss (ft)             4.52    Cum Volume (acre-ft)                    2.28      32.93
  C & E Loss (ft)             0.01    Cum SA (acres)                          3.79       7.42


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2849.28    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.09    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2849.19    Reach Len. (ft)            848.50     848.50     848.50
  Crit W.S. (ft)           2848.90    Flow Area (sq ft)                      11.12
  E.G. Slope (ft/ft)      0.003727    Area (sq ft)                           11.12      96.98
  Q Total (cfs)              26.70    Flow (cfs)                             26.70
  Top Width (ft)             43.60    Top Width (ft)                         15.19      28.41
  Vel Total (ft/s)            2.40    Avg. Vel. (ft/s)                        2.40
  Max Chl Dpth (ft)           4.47    Hydr. Depth (ft)                        0.73
  Conv. Total (cfs)          437.3    Conv. (cfs)                            437.3
  Length Wtd. (ft)          848.50    Wetted Per. (ft)                       15.70
  Min Ch El (ft)           2848.40    Shear (lb/sq ft)                        0.16
```

Alpha	1.00	Stream Power (lb/ft s)	476.72	0.00	0.00
Frctn Loss (ft)	4.52	Cum Volume (acre-ft)		2.07	32.48
C & E Loss (ft)	0.01	Cum SA (acres)		3.71	7.35

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2849.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	2848.98	Reach Len. (ft)	848.50	848.50	848.50
Crit W.S. (ft)	2848.75	Flow Area (sq ft)		8.01	
E.G. Slope (ft/ft)	0.003607	Area (sq ft)		8.01	91.13
Q Total (cfs)	15.70	Flow (cfs)		15.70	
Top Width (ft)	42.39	Top Width (ft)		14.61	27.78
Vel Total (ft/s)	1.96	Avg. Vel. (ft/s)		1.96	
Max Chl Dpth (ft)	4.26	Hydr. Depth (ft)		0.55	
Conv. Total (cfs)	261.4	Conv. (cfs)		261.4	
Length Wtd. (ft)	848.50	Wetted Per. (ft)		14.99	
Min Ch El (ft)	2848.40	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	476.72	0.00	0.00
Frctn Loss (ft)	4.48	Cum Volume (acre-ft)		1.38	31.09
C & E Loss (ft)	0.00	Cum SA (acres)		3.44	7.12

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2848.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2848.60	Reach Len. (ft)	848.50	848.50	848.50
Crit W.S. (ft)	2848.50	Flow Area (sq ft)		2.67	
E.G. Slope (ft/ft)	0.002918	Area (sq ft)		2.67	80.80
Q Total (cfs)	2.40	Flow (cfs)		2.40	
Top Width (ft)	40.20	Top Width (ft)		13.56	26.64
Vel Total (ft/s)	0.90	Avg. Vel. (ft/s)		0.90	
Max Chl Dpth (ft)	3.88	Hydr. Depth (ft)		0.20	
Conv. Total (cfs)	44.4	Conv. (cfs)		44.4	
Length Wtd. (ft)	848.50	Wetted Per. (ft)		13.69	
Min Ch El (ft)	2848.40	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	476.72	0.00	0.00
Frctn Loss (ft)	4.46	Cum Volume (acre-ft)		0.35	28.19
C & E Loss (ft)	0.00	Cum SA (acres)		2.95	6.79

Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2849.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2848.96	Reach Len. (ft)	848.50	848.50	848.50
Crit W.S. (ft)	2848.73	Flow Area (sq ft)		7.68	
E.G. Slope (ft/ft)	0.003469	Area (sq ft)		7.68	90.50
Q Total (cfs)	14.40	Flow (cfs)		14.40	
Top Width (ft)	42.26	Top Width (ft)		14.55	27.71
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)		1.87	
Max Chl Dpth (ft)	4.24	Hydr. Depth (ft)		0.53	
Conv. Total (cfs)	244.5	Conv. (cfs)		244.5	
Length Wtd. (ft)	848.50	Wetted Per. (ft)		14.91	
Min Ch El (ft)	2848.40	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	476.72	0.00	0.00
Frctn Loss (ft)	4.49	Cum Volume (acre-ft)		1.32	30.94
C & E Loss (ft)	0.00	Cum SA (acres)		3.42	7.10

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2848.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2848.85	Reach Len. (ft)	848.50	848.50	848.50
Crit W.S. (ft)	2848.65	Flow Area (sq ft)		6.07	
E.G. Slope (ft/ft)	0.003335	Area (sq ft)		6.07	87.41
Q Total (cfs)	9.70	Flow (cfs)		9.70	
Top Width (ft)	41.61	Top Width (ft)		14.24	27.38
Vel Total (ft/s)	1.60	Avg. Vel. (ft/s)		1.60	
Max Chl Dpth (ft)	4.13	Hydr. Depth (ft)		0.43	
Conv. Total (cfs)	168.0	Conv. (cfs)		168.0	
Length Wtd. (ft)	848.50	Wetted Per. (ft)		14.53	
Min Ch El (ft)	2848.40	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	476.72	0.00	0.00
Frctn Loss (ft)	4.48	Cum Volume (acre-ft)		1.03	30.19
C & E Loss (ft)	0.00	Cum SA (acres)		3.29	7.02

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2848.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	2848.75	Reach Len. (ft)	848.50	848.50	848.50
Crit W.S. (ft)	2848.59	Flow Area (sq ft)		4.65	
E.G. Slope (ft/ft)	0.002994	Area (sq ft)		4.65	84.68
Q Total (cfs)	6.00	Flow (cfs)		6.00	
Top Width (ft)	41.03	Top Width (ft)		13.96	27.08
Vel Total (ft/s)	1.29	Avg. Vel. (ft/s)		1.29	
Max Chl Dpth (ft)	4.03	Hydr. Depth (ft)		0.33	
Conv. Total (cfs)	109.6	Conv. (cfs)		109.6	
Length Wtd. (ft)	848.50	Wetted Per. (ft)		14.18	
Min Ch El (ft)	2848.40	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	476.72	0.00	0.00
Frctn Loss (ft)	4.49	Cum Volume (acre-ft)		0.72	29.31
C & E Loss (ft)	0.00	Cum SA (acres)		3.14	6.92

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 10613.9

INPUT
Description: Section 106+13.9
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2855	143.02	2854	165.01	2853	183.37	2852	197	2847
203	2844	216	2844	222	2847	242	2847	254	2839
269	2839	281	2847	362.58	2847	367.33	2848	443.58	2849
462.06	2850								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	197	.03	222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
197	222	1077.8	1077.8	1077.8	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
222	462.06	2847	F

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2844.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2844.67	Reach Len. (ft)	1077.80	1077.80	1077.80
Crit W.S. (ft)	2844.54	Flow Area (sq ft)		9.60	
E.G. Slope (ft/ft)	0.008246	Area (sq ft)		9.60	133.25
Q Total (cfs)	30.70	Flow (cfs)		30.70	

Top Width (ft)	47.68	Top Width (ft)		15.68	32.01
Vel Total (ft/s)	3.20	Avg. Vel. (ft/s)		3.20	
Max Chl Dpth (ft)	5.67	Hydr. Depth (ft)		0.61	
Conv. Total (cfs)	338.1	Conv. (cfs)		338.1	
Length Wtd. (ft)	1077.80	Wetted Per. (ft)		15.99	
Min Ch El (ft)	2844.00	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	462.06	0.00	0.00
Frctn Loss (ft)	8.28	Cum Volume (acre-ft)		2.06	30.67
C & E Loss (ft)	0.00	Cum SA (acres)		3.49	6.83

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2844.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.030	
W.S. Elev (ft)	2844.62	Reach Len. (ft)	1077.80	1077.80	1077.80
Crit W.S. (ft)	2844.50	Flow Area (sq ft)		8.78	
E.G. Slope (ft/ft)	0.008229	Area (sq ft)		8.78	131.57
Q Total (cfs)	26.70	Flow (cfs)		26.70	
Top Width (ft)	47.32	Top Width (ft)		15.47	31.85
Vel Total (ft/s)	3.04	Avg. Vel. (ft/s)		3.04	
Max Chl Dpth (ft)	5.62	Hydr. Depth (ft)		0.57	
Conv. Total (cfs)	294.3	Conv. (cfs)		294.3	
Length Wtd. (ft)	1077.80	Wetted Per. (ft)		15.76	
Min Ch El (ft)	2844.00	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)	462.06	0.00	0.00
Frctn Loss (ft)	8.28	Cum Volume (acre-ft)		1.87	30.25
C & E Loss (ft)	0.00	Cum SA (acres)		3.41	6.76

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2844.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2844.45	Reach Len. (ft)	1077.80	1077.80	1077.80
Crit W.S. (ft)	2844.36	Flow Area (sq ft)		6.20	
E.G. Slope (ft/ft)	0.008470	Area (sq ft)		6.20	126.20
Q Total (cfs)	15.70	Flow (cfs)		15.70	
Top Width (ft)	46.13	Top Width (ft)		14.79	31.34
Vel Total (ft/s)	2.53	Avg. Vel. (ft/s)		2.53	
Max Chl Dpth (ft)	5.45	Hydr. Depth (ft)		0.42	
Conv. Total (cfs)	170.6	Conv. (cfs)		170.6	
Length Wtd. (ft)	1077.80	Wetted Per. (ft)		15.00	
Min Ch El (ft)	2844.00	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	462.06	0.00	0.00
Frctn Loss (ft)	8.28	Cum Volume (acre-ft)		1.24	28.98
C & E Loss (ft)	0.00	Cum SA (acres)		3.16	6.54

Warning: Divided flow computed for this cross-section.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2844.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	2844.13	Reach Len. (ft)	1077.80	1077.80	1077.80
Crit W.S. (ft)	2844.10	Flow Area (sq ft)		1.74	
E.G. Slope (ft/ft)	0.012118	Area (sq ft)		1.74	116.45
Q Total (cfs)	2.40	Flow (cfs)		2.40	
Top Width (ft)	43.92	Top Width (ft)		13.52	30.39
Vel Total (ft/s)	1.38	Avg. Vel. (ft/s)		1.38	
Max Chl Dpth (ft)	5.13	Hydr. Depth (ft)		0.13	
Conv. Total (cfs)	21.8	Conv. (cfs)		21.8	
Length Wtd. (ft)	1077.80	Wetted Per. (ft)		13.59	
Min Ch El (ft)	2844.00	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	462.06	0.00	0.00
Frctn Loss (ft)	8.26	Cum Volume (acre-ft)		0.31	26.27
C & E Loss (ft)	0.00	Cum SA (acres)		2.68	6.23

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2844.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2844.42	Reach Len. (ft)	1077.80	1077.80	1077.80
Crit W.S. (ft)	2844.33	Flow Area (sq ft)		5.76	
E.G. Slope (ft/ft)	0.009026	Area (sq ft)		5.76	125.25
Q Total (cfs)	14.40	Flow (cfs)		14.40	
Top Width (ft)	45.91	Top Width (ft)		14.67	31.25
Vel Total (ft/s)	2.50	Avg. Vel. (ft/s)		2.50	
Max Chl Dpth (ft)	5.42	Hydr. Depth (ft)		0.39	
Conv. Total (cfs)	151.6	Conv. (cfs)		151.6	
Length Wtd. (ft)	1077.80	Wetted Per. (ft)		14.86	
Min Ch El (ft)	2844.00	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	462.06	0.00	0.00
Frctn Loss (ft)	8.28	Cum Volume (acre-ft)		1.19	28.84
C & E Loss (ft)	0.01	Cum SA (acres)		3.14	6.53

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2844.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.030	

W.S. Elev (ft)	2844.32	Reach Len. (ft)	1077.80	1077.80	1077.80
Crit W.S. (ft)	2844.25	Flow Area (sq ft)		4.41	
E.G. Slope (ft/ft)	0.009585	Area (sq ft)		4.41	122.35
Q Total (cfs)	9.70	Flow (cfs)		9.70	
Top Width (ft)	45.26	Top Width (ft)		14.29	30.97
Vel Total (ft/s)	2.20	Avg. Vel. (ft/s)		2.20	
Max Chl Dpth (ft)	5.32	Hydr. Depth (ft)		0.31	
Conv. Total (cfs)	99.1	Conv. (cfs)		99.1	
Length Wtd. (ft)	1077.80	Wetted Per. (ft)		14.45	
Min Ch El (ft)	2844.00	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	462.06	0.00	0.00
Frctn Loss (ft)	8.28	Cum Volume (acre-ft)		0.92	28.15
C & E Loss (ft)	0.01	Cum SA (acres)		3.01	6.45

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2844.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	2844.23	Reach Len. (ft)	1077.80	1077.80	1077.80
Crit W.S. (ft)	2844.17	Flow Area (sq ft)		3.08	
E.G. Slope (ft/ft)	0.011733	Area (sq ft)		3.08	119.43
Q Total (cfs)	6.00	Flow (cfs)		6.00	
Top Width (ft)	44.60	Top Width (ft)		13.91	30.69
Vel Total (ft/s)	1.95	Avg. Vel. (ft/s)		1.95	
Max Chl Dpth (ft)	5.23	Hydr. Depth (ft)		0.22	
Conv. Total (cfs)	55.4	Conv. (cfs)		55.4	
Length Wtd. (ft)	1077.80	Wetted Per. (ft)		14.02	
Min Ch El (ft)	2844.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	462.06	0.00	0.00
Frctn Loss (ft)	8.26	Cum Volume (acre-ft)		0.65	27.32
C & E Loss (ft)	0.01	Cum SA (acres)		2.87	6.36

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 9536.1

INPUT
Description: Section 95+36 (u/s face of Pohez Rd.)
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2841	123.58	2840	152.2	2839	184.35	2838	197	2838.7
203	2835.7	216	2835.7	222	2838.7	242	2838.7	254	2830.7
269	2830.7	281	2838.7	346.25	2837	404.83	2838		

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Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     197     .03     222    .016     242    .013     281    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           197     222            500.3   500.3   500.3             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     222  404.83  2838.7       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2836.54    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.15    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2836.40    Reach Len. (ft)           500.30     500.30     500.30
  Crit W.S. (ft)           2836.24    Flow Area (sq ft)                     10.03
  E.G. Slope (ft/ft)      0.007180    Area (sq ft)                          10.03     134.14
  Q Total (cfs)              30.70    Flow (cfs)                            30.70
  Top Width (ft)             47.88    Top Width (ft)                        15.79      32.09
  Vel Total (ft/s)            3.06    Avg. Vel. (ft/s)                       3.06
  Max Chl Dpth (ft)           5.70    Hydr. Depth (ft)                       0.64
  Conv. Total (cfs)          362.3    Conv. (cfs)                           362.3
  Length Wtd. (ft)          500.30    Wetted Per. (ft)                      16.12
  Min Ch El (ft)           2835.70    Shear (lb/sq ft)                       0.28
  Alpha                       1.00    Stream Power (lb/ft s)    404.83       0.00       0.00
  Frctn Loss (ft)             5.32    Cum Volume (acre-ft)                   1.82      27.36
  C & E Loss (ft)             0.03    Cum SA (acres)                         3.10       6.04


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2836.47    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.13    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2836.34    Reach Len. (ft)           500.30     500.30     500.30
  Crit W.S. (ft)           2836.20    Flow Area (sq ft)                      9.17
  E.G. Slope (ft/ft)      0.007186    Area (sq ft)                           9.17     132.37
  Q Total (cfs)              26.70    Flow (cfs)                            26.70
  Top Width (ft)             47.49    Top Width (ft)                        15.57      31.93
  Vel Total (ft/s)            2.91    Avg. Vel. (ft/s)                       2.91
  Max Chl Dpth (ft)           5.64    Hydr. Depth (ft)                       0.59
  Conv. Total (cfs)          315.0    Conv. (cfs)                           315.0
  Length Wtd. (ft)          500.30    Wetted Per. (ft)                      15.87
  Min Ch El (ft)           2835.70    Shear (lb/sq ft)                       0.26
  Alpha                       1.00    Stream Power (lb/ft s)    404.83       0.00       0.00
  Frctn Loss (ft)             5.32    Cum Volume (acre-ft)                   1.65      26.99
  C & E Loss (ft)             0.03    Cum SA (acres)                         3.03       5.97


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2836.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.030	
W.S. Elev (ft)	2836.17	Reach Len. (ft)	500.30	500.30	500.30
Crit W.S. (ft)	2836.06	Flow Area (sq ft)		6.59	
E.G. Slope (ft/ft)	0.007005	Area (sq ft)		6.59	127.01
Q Total (cfs)	15.70	Flow (cfs)		15.70	
Top Width (ft)	46.31	Top Width (ft)		14.89	31.42
Vel Total (ft/s)	2.38	Avg. Vel. (ft/s)		2.38	
Max Chl Dpth (ft)	5.47	Hydr. Depth (ft)		0.44	
Conv. Total (cfs)	187.6	Conv. (cfs)		187.6	
Length Wtd. (ft)	500.30	Wetted Per. (ft)		15.11	
Min Ch El (ft)	2835.70	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	404.83	0.00	0.00
Frctn Loss (ft)	5.33	Cum Volume (acre-ft)		1.08	25.84
C & E Loss (ft)	0.02	Cum SA (acres)		2.79	5.76

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2835.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2835.87	Reach Len. (ft)	500.30	500.30	500.30
Crit W.S. (ft)	2835.80	Flow Area (sq ft)		2.24	
E.G. Slope (ft/ft)	0.005285	Area (sq ft)		2.24	117.57
Q Total (cfs)	2.40	Flow (cfs)		2.40	
Top Width (ft)	44.17	Top Width (ft)		13.67	30.50
Vel Total (ft/s)	1.07	Avg. Vel. (ft/s)		1.07	
Max Chl Dpth (ft)	5.17	Hydr. Depth (ft)		0.16	
Conv. Total (cfs)	33.0	Conv. (cfs)		33.0	
Length Wtd. (ft)	500.30	Wetted Per. (ft)		13.75	
Min Ch El (ft)	2835.70	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	404.83	0.00	0.00
Frctn Loss (ft)	5.32	Cum Volume (acre-ft)		0.26	23.38
C & E Loss (ft)	0.01	Cum SA (acres)		2.35	5.48

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2836.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.030	

W.S. Elev (ft)	2836.16	Reach Len. (ft)	500.30	500.30	500.30
Crit W.S. (ft)	2836.03	Flow Area (sq ft)		6.35	
E.G. Slope (ft/ft)	0.006612	Area (sq ft)		6.35	126.51
Q Total (cfs)	14.40	Flow (cfs)		14.40	
Top Width (ft)	46.20	Top Width (ft)		14.83	31.37
Vel Total (ft/s)	2.27	Avg. Vel. (ft/s)		2.27	
Max Chl Dpth (ft)	5.46	Hydr. Depth (ft)		0.43	
Conv. Total (cfs)	177.1	Conv. (cfs)		177.1	
Length Wtd. (ft)	500.30	Wetted Per. (ft)		15.04	
Min Ch El (ft)	2835.70	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	404.83	0.00	0.00
Frctn Loss (ft)	5.32	Cum Volume (acre-ft)		1.04	25.73
C & E Loss (ft)	0.02	Cum SA (acres)		2.77	5.75

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2836.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	2836.07	Reach Len. (ft)	500.30	500.30	500.30
Crit W.S. (ft)	2835.95	Flow Area (sq ft)		5.03	
E.G. Slope (ft/ft)	0.006288	Area (sq ft)		5.03	123.70
Q Total (cfs)	9.70	Flow (cfs)		9.70	
Top Width (ft)	45.57	Top Width (ft)		14.47	31.10
Vel Total (ft/s)	1.93	Avg. Vel. (ft/s)		1.93	
Max Chl Dpth (ft)	5.37	Hydr. Depth (ft)		0.35	
Conv. Total (cfs)	122.3	Conv. (cfs)		122.3	
Length Wtd. (ft)	500.30	Wetted Per. (ft)		14.64	
Min Ch El (ft)	2835.70	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	404.83	0.00	0.00
Frctn Loss (ft)	5.33	Cum Volume (acre-ft)		0.81	25.11
C & E Loss (ft)	0.02	Cum SA (acres)		2.66	5.68

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2836.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2835.99	Reach Len. (ft)	500.30	500.30	500.30
Crit W.S. (ft)	2835.87	Flow Area (sq ft)		3.91	
E.G. Slope (ft/ft)	0.005398	Area (sq ft)		3.91	121.27
Q Total (cfs)	6.00	Flow (cfs)		6.00	
Top Width (ft)	45.02	Top Width (ft)		14.15	30.86
Vel Total (ft/s)	1.53	Avg. Vel. (ft/s)		1.53	
Max Chl Dpth (ft)	5.29	Hydr. Depth (ft)		0.28	

Conv. Total (cfs)	81.7	Conv. (cfs)		81.7	
Length Wtd. (ft)	500.30	Wetted Per. (ft)		14.29	
Min Ch El (ft)	2835.70	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	404.83	0.00	0.00
Frctn Loss (ft)	5.33	Cum Volume (acre-ft)		0.56	24.34
C & E Loss (ft)	0.02	Cum SA (acres)		2.53	5.59

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 9035.8

INPUT
Description: Section 90+35.8 (u/s face of Mondamon Rd.)
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2835	126.93	2834	152.67	2833	197	2833.4	203	2830.4
216	2830.4	222	2833.4	242	2833.4	254	2825.4	269	2825.4
281	2833.4	345.88	2831.6	454.95	2832				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	197	.03	222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
197	222	30.7	30.7	30.7	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
222	454.95	2833.4	F

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2831.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.94	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2830.94	Flow Area (sq ft)		7.56	
E.G. Slope (ft/ft)	0.017365	Area (sq ft)		7.56	129.05
Q Total (cfs)	30.70	Flow (cfs)		30.70	
Top Width (ft)	46.76	Top Width (ft)		15.15	31.61
Vel Total (ft/s)	4.06	Avg. Vel. (ft/s)		4.06	
Max Chl Dpth (ft)	5.54	Hydr. Depth (ft)		0.50	
Conv. Total (cfs)	233.0	Conv. (cfs)		233.0	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		15.40	
Min Ch El (ft)	2830.40	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)	454.95	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		1.72	25.85
C & E Loss (ft)	0.11	Cum SA (acres)		2.92	5.67

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2831.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.90	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2830.90	Flow Area (sq ft)		6.92	
E.G. Slope (ft/ft)	0.017349	Area (sq ft)		6.92	127.71
Q Total (cfs)	26.70	Flow (cfs)		26.70	
Top Width (ft)	46.46	Top Width (ft)		14.98	31.48
Vel Total (ft/s)	3.86	Avg. Vel. (ft/s)		3.86	
Max Chl Dpth (ft)	5.49	Hydr. Depth (ft)		0.46	
Conv. Total (cfs)	202.7	Conv. (cfs)		202.7	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		15.21	
Min Ch El (ft)	2830.40	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	454.95	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		1.56	25.49
C & E Loss (ft)	0.10	Cum SA (acres)		2.85	5.61

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2830.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.76	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2830.76	Flow Area (sq ft)		4.89	
E.G. Slope (ft/ft)	0.018081	Area (sq ft)		4.89	123.38
Q Total (cfs)	15.70	Flow (cfs)		15.70	
Top Width (ft)	45.50	Top Width (ft)		14.43	31.07
Vel Total (ft/s)	3.21	Avg. Vel. (ft/s)		3.21	
Max Chl Dpth (ft)	5.36	Hydr. Depth (ft)		0.34	
Conv. Total (cfs)	116.8	Conv. (cfs)		116.8	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		14.59	
Min Ch El (ft)	2830.40	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)	454.95	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		1.01	24.41
C & E Loss (ft)	0.07	Cum SA (acres)		2.62	5.40

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2830.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.50	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2830.50	Flow Area (sq ft)		1.30	
E.G. Slope (ft/ft)	0.031417	Area (sq ft)		1.30	115.47
Q Total (cfs)	2.40	Flow (cfs)		2.40	
Top Width (ft)	43.69	Top Width (ft)		13.39	30.30
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)		1.85	
Max Chl Dpth (ft)	5.10	Hydr. Depth (ft)		0.10	
Conv. Total (cfs)	13.5	Conv. (cfs)		13.5	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		13.44	
Min Ch El (ft)	2830.40	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	454.95	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		0.24	22.04
C & E Loss (ft)	0.03	Cum SA (acres)		2.19	5.13

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2830.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.73	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2830.73	Flow Area (sq ft)		4.50	
E.G. Slope (ft/ft)	0.019839	Area (sq ft)		4.50	122.54
Q Total (cfs)	14.40	Flow (cfs)		14.40	
Top Width (ft)	45.31	Top Width (ft)		14.32	30.99
Vel Total (ft/s)	3.20	Avg. Vel. (ft/s)		3.20	
Max Chl Dpth (ft)	5.33	Hydr. Depth (ft)		0.31	
Conv. Total (cfs)	102.2	Conv. (cfs)		102.2	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		14.47	

Min Ch El (ft)	2830.40	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)	454.95	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		0.98	24.30
C & E Loss (ft)	0.07	Cum SA (acres)		2.61	5.39

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2830.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.65	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2830.65	Flow Area (sq ft)		3.42	
E.G. Slope (ft/ft)	0.021825	Area (sq ft)		3.42	120.18
Q Total (cfs)	9.70	Flow (cfs)		9.70	
Top Width (ft)	44.77	Top Width (ft)		14.01	30.76
Vel Total (ft/s)	2.84	Avg. Vel. (ft/s)		2.84	
Max Chl Dpth (ft)	5.25	Hydr. Depth (ft)		0.24	
Conv. Total (cfs)	65.7	Conv. (cfs)		65.7	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		14.13	
Min Ch El (ft)	2830.40	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	454.95	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		0.76	23.71
C & E Loss (ft)	0.06	Cum SA (acres)		2.49	5.33

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2830.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.57	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2830.57	Flow Area (sq ft)		2.30	
E.G. Slope (ft/ft)	0.030152	Area (sq ft)		2.30	117.72
Q Total (cfs)	6.00	Flow (cfs)		6.00	
Top Width (ft)	44.21	Top Width (ft)		13.69	30.52
Vel Total (ft/s)	2.61	Avg. Vel. (ft/s)		2.61	

Max Chl Dpth (ft)	5.17	Hydr. Depth (ft)		0.17	
Conv. Total (cfs)	34.6	Conv. (cfs)		34.6	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		13.77	
Min Ch El (ft)	2830.40	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	454.95	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		0.52	22.97
C & E Loss (ft)	0.05	Cum SA (acres)		2.37	5.24

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 9005

INPUT
Description: Section 90+05 (d/s face of Mondamon Rd.)
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2835	123.1	2834	152.88	2833	185.37	2832	197	2832
203	2829	216	2829	222	2832	242	2832	254	2824
269	2824	281	2832	315.1	2831	417.14	2831.2		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	197	.03	222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
197	222	330.1	330.1	330.1	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
222	417.14	2832	F

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2830.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.42	Reach Len. (ft)	330.10	330.10	330.10
Crit W.S. (ft)	2829.54	Flow Area (sq ft)		22.41	
E.G. Slope (ft/ft)	0.000628	Area (sq ft)		22.41	157.97
Q Total (cfs)	30.70	Flow (cfs)		30.70	
Top Width (ft)	52.91	Top Width (ft)		18.66	34.25
Vel Total (ft/s)	1.37	Avg. Vel. (ft/s)		1.37	
Max Chl Dpth (ft)	6.42	Hydr. Depth (ft)		1.20	
Conv. Total (cfs)	1224.9	Conv. (cfs)		1224.9	
Length Wtd. (ft)	330.10	Wetted Per. (ft)		19.33	
Min Ch El (ft)	2829.00	Shear (lb/sq ft)		0.05	

Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)		1.71	25.75
C & E Loss (ft)	0.07	Cum SA (acres)		2.91	5.65

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2830.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.32	Reach Len. (ft)	330.10	330.10	330.10
Crit W.S. (ft)	2829.50	Flow Area (sq ft)		20.71	
E.G. Slope (ft/ft)	0.000600	Area (sq ft)		20.71	154.84
Q Total (cfs)	26.70	Flow (cfs)		26.70	
Top Width (ft)	52.27	Top Width (ft)		18.29	33.97
Vel Total (ft/s)	1.29	Avg. Vel. (ft/s)		1.29	
Max Chl Dpth (ft)	6.32	Hydr. Depth (ft)		1.13	
Conv. Total (cfs)	1089.8	Conv. (cfs)		1089.8	
Length Wtd. (ft)	330.10	Wetted Per. (ft)		18.92	
Min Ch El (ft)	2829.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)		1.55	25.39
C & E Loss (ft)	0.06	Cum SA (acres)		2.84	5.58

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2830.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.03	Reach Len. (ft)	330.10	330.10	330.10
Crit W.S. (ft)	2829.36	Flow Area (sq ft)		15.46	
E.G. Slope (ft/ft)	0.000499	Area (sq ft)		15.46	144.90
Q Total (cfs)	15.70	Flow (cfs)		15.70	
Top Width (ft)	50.19	Top Width (ft)		17.11	33.08
Vel Total (ft/s)	1.02	Avg. Vel. (ft/s)		1.02	
Max Chl Dpth (ft)	6.03	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	702.7	Conv. (cfs)		702.7	
Length Wtd. (ft)	330.10	Wetted Per. (ft)		17.59	
Min Ch El (ft)	2829.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)		1.01	24.31
C & E Loss (ft)	0.04	Cum SA (acres)		2.61	5.38

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2829.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.030	
W.S. Elev (ft)	2829.42	Reach Len. (ft)	330.10	330.10	330.10
Crit W.S. (ft)	2829.10	Flow Area (sq ft)		5.85	
E.G. Slope (ft/ft)	0.000239	Area (sq ft)		5.85	125.44
Q Total (cfs)	2.40	Flow (cfs)		2.40	
Top Width (ft)	45.96	Top Width (ft)		14.69	31.27
Vel Total (ft/s)	0.41	Avg. Vel. (ft/s)		0.41	
Max Chl Dpth (ft)	5.42	Hydr. Depth (ft)		0.40	
Conv. Total (cfs)	155.3	Conv. (cfs)		155.3	
Length Wtd. (ft)	330.10	Wetted Per. (ft)		14.89	
Min Ch El (ft)	2829.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)		0.24	21.95
C & E Loss (ft)	0.01	Cum SA (acres)		2.18	5.11

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2830.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2829.99	Reach Len. (ft)	330.10	330.10	330.10
Crit W.S. (ft)	2829.33	Flow Area (sq ft)		14.76	
E.G. Slope (ft/ft)	0.000484	Area (sq ft)		14.76	143.53
Q Total (cfs)	14.40	Flow (cfs)		14.40	
Top Width (ft)	49.90	Top Width (ft)		16.94	32.96
Vel Total (ft/s)	0.98	Avg. Vel. (ft/s)		0.98	
Max Chl Dpth (ft)	5.99	Hydr. Depth (ft)		0.87	
Conv. Total (cfs)	654.6	Conv. (cfs)		654.6	
Length Wtd. (ft)	330.10	Wetted Per. (ft)		17.41	
Min Ch El (ft)	2829.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)		0.97	24.20
C & E Loss (ft)	0.04	Cum SA (acres)		2.59	5.37

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2829.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2829.82	Reach Len. (ft)	330.10	330.10	330.10
Crit W.S. (ft)	2829.25	Flow Area (sq ft)		12.01	
E.G. Slope (ft/ft)	0.000411	Area (sq ft)		12.01	138.13
Q Total (cfs)	9.70	Flow (cfs)		9.70	
Top Width (ft)	48.74	Top Width (ft)		16.28	32.46
Vel Total (ft/s)	0.81	Avg. Vel. (ft/s)		0.81	
Max Chl Dpth (ft)	5.82	Hydr. Depth (ft)		0.74	
Conv. Total (cfs)	478.3	Conv. (cfs)		478.3	
Length Wtd. (ft)	330.10	Wetted Per. (ft)		16.67	
Min Ch El (ft)	2829.00	Shear (lb/sq ft)		0.02	

Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)		0.75	23.62
C & E Loss (ft)	0.03	Cum SA (acres)		2.48	5.30

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2829.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2829.66	Reach Len. (ft)	330.10	330.10	330.10
Crit W.S. (ft)	2829.17	Flow Area (sq ft)		9.45	
E.G. Slope (ft/ft)	0.000330	Area (sq ft)		9.45	132.96
Q Total (cfs)	6.00	Flow (cfs)		6.00	
Top Width (ft)	47.62	Top Width (ft)		15.64	31.98
Vel Total (ft/s)	0.63	Avg. Vel. (ft/s)		0.63	
Max Chl Dpth (ft)	5.66	Hydr. Depth (ft)		0.60	
Conv. Total (cfs)	330.4	Conv. (cfs)		330.4	
Length Wtd. (ft)	330.10	Wetted Per. (ft)		15.95	
Min Ch El (ft)	2829.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)		0.52	22.88
C & E Loss (ft)	0.03	Cum SA (acres)		2.35	5.22

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 8674.9

INPUT
Description: Section 86+74.9 (d/s face of Mondamon Rd.)
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2835	123.1	2834	152.88	2833	185.37	2832	197	2832
203	2829	216	2829	222	2832	242	2832	254	2824
269	2824	281	2832	315.1	2831	417.14	2831.2		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	197	.03	222	.016	242	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
197	222	167.5	167.5	167.5	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
242	417.14	2832	F

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2829.79	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.26	Wt. n-Val.		0.030	
W.S. Elev (ft)	2829.54	Reach Len. (ft)	167.50	167.50	167.50
Crit W.S. (ft)	2829.54	Flow Area (sq ft)		7.56	
E.G. Slope (ft/ft)	0.017365	Area (sq ft)		7.56	129.05
Q Total (cfs)	30.70	Flow (cfs)		30.70	
Top Width (ft)	46.76	Top Width (ft)		15.15	31.61
Vel Total (ft/s)	4.06	Avg. Vel. (ft/s)		4.06	
Max Chl Dpth (ft)	5.54	Hydr. Depth (ft)		0.50	
Conv. Total (cfs)	233.0	Conv. (cfs)		233.0	
Length Wtd. (ft)	167.50	Wetted Per. (ft)		15.40	
Min Ch El (ft)	2829.00	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	2.70	Cum Volume (acre-ft)		1.60	24.66
C & E Loss (ft)	0.01	Cum SA (acres)		2.78	5.40

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2829.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.030	
W.S. Elev (ft)	2829.50	Reach Len. (ft)	167.50	167.50	167.50
Crit W.S. (ft)	2829.50	Flow Area (sq ft)		6.92	
E.G. Slope (ft/ft)	0.017349	Area (sq ft)		6.92	127.71
Q Total (cfs)	26.70	Flow (cfs)		26.70	
Top Width (ft)	46.46	Top Width (ft)		14.98	31.48
Vel Total (ft/s)	3.86	Avg. Vel. (ft/s)		3.86	
Max Chl Dpth (ft)	5.49	Hydr. Depth (ft)		0.46	
Conv. Total (cfs)	202.7	Conv. (cfs)		202.7	
Length Wtd. (ft)	167.50	Wetted Per. (ft)		15.21	
Min Ch El (ft)	2829.00	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	2.69	Cum Volume (acre-ft)		1.44	24.32
C & E Loss (ft)	0.01	Cum SA (acres)		2.71	5.34

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2829.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2829.36	Reach Len. (ft)	167.50	167.50	167.50
Crit W.S. (ft)	2829.36	Flow Area (sq ft)		4.89	
E.G. Slope (ft/ft)	0.018081	Area (sq ft)		4.89	123.38
Q Total (cfs)	15.70	Flow (cfs)		15.70	
Top Width (ft)	45.50	Top Width (ft)		14.43	31.07
Vel Total (ft/s)	3.21	Avg. Vel. (ft/s)		3.21	
Max Chl Dpth (ft)	5.36	Hydr. Depth (ft)		0.34	
Conv. Total (cfs)	116.8	Conv. (cfs)		116.8	
Length Wtd. (ft)	167.50	Wetted Per. (ft)		14.59	
Min Ch El (ft)	2829.00	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	2.14	Cum Volume (acre-ft)		0.93	23.29
C & E Loss (ft)	0.03	Cum SA (acres)		2.49	5.14

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2829.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2829.10	Reach Len. (ft)	167.50	167.50	167.50
Crit W.S. (ft)	2829.10	Flow Area (sq ft)		1.37	
E.G. Slope (ft/ft)	0.026101	Area (sq ft)		1.37	115.64
Q Total (cfs)	2.40	Flow (cfs)		2.40	
Top Width (ft)	43.73	Top Width (ft)		13.42	30.31
Vel Total (ft/s)	1.75	Avg. Vel. (ft/s)		1.75	
Max Chl Dpth (ft)	5.10	Hydr. Depth (ft)		0.10	
Conv. Total (cfs)	14.9	Conv. (cfs)		14.9	
Length Wtd. (ft)	167.50	Wetted Per. (ft)		13.47	
Min Ch El (ft)	2829.00	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	4.81	Cum Volume (acre-ft)		0.21	21.04
C & E Loss (ft)	0.00	Cum SA (acres)		2.08	4.87

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2829.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2829.33	Reach Len. (ft)	167.50	167.50	167.50

Crit W.S. (ft)	2829.33	Flow Area (sq ft)		4.50	
E.G. Slope (ft/ft)	0.019839	Area (sq ft)		4.50	122.54
Q Total (cfs)	14.40	Flow (cfs)		14.40	
Top Width (ft)	45.31	Top Width (ft)		14.32	30.99
Vel Total (ft/s)	3.20	Avg. Vel. (ft/s)		3.20	
Max Chl Dpth (ft)	5.33	Hydr. Depth (ft)		0.31	
Conv. Total (cfs)	102.2	Conv. (cfs)		102.2	
Length Wtd. (ft)	167.50	Wetted Per. (ft)		14.47	
Min Ch El (ft)	2829.00	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	2.21	Cum Volume (acre-ft)		0.90	23.20
C & E Loss (ft)	0.03	Cum SA (acres)		2.48	5.13

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2829.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.030	
W.S. Elev (ft)	2829.25	Reach Len. (ft)	167.50	167.50	167.50
Crit W.S. (ft)	2829.25	Flow Area (sq ft)		3.42	
E.G. Slope (ft/ft)	0.021825	Area (sq ft)		3.42	120.18
Q Total (cfs)	9.70	Flow (cfs)		9.70	
Top Width (ft)	44.77	Top Width (ft)		14.01	30.76
Vel Total (ft/s)	2.84	Avg. Vel. (ft/s)		2.84	
Max Chl Dpth (ft)	5.25	Hydr. Depth (ft)		0.24	
Conv. Total (cfs)	65.7	Conv. (cfs)		65.7	
Length Wtd. (ft)	167.50	Wetted Per. (ft)		14.13	
Min Ch El (ft)	2829.00	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	2.17	Cum Volume (acre-ft)		0.70	22.64
C & E Loss (ft)	0.03	Cum SA (acres)		2.37	5.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

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         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2829.28    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.11    Wt. n-Val.                           0.030
  W.S. Elev (ft)           2829.17    Reach Len. (ft)           167.50     167.50     167.50
  Crit W.S. (ft)           2829.17    Flow Area (sq ft)                      2.30
  E.G. Slope (ft/ft)      0.030152    Area (sq ft)                           2.30     117.72
  Q Total (cfs)               6.00    Flow (cfs)                             6.00
  Top Width (ft)             44.21    Top Width (ft)                        13.69      30.52
  Vel Total (ft/s)            2.61    Avg. Vel. (ft/s)                       2.61
  Max Chl Dpth (ft)           5.17    Hydr. Depth (ft)                       0.17
  Conv. Total (cfs)           34.6    Conv. (cfs)                            34.6
  Length Wtd. (ft)          167.50    Wetted Per. (ft)                      13.77
  Min Ch El (ft)           2829.00    Shear (lb/sq ft)                       0.31
  Alpha                       1.00    Stream Power (lb/ft s)    417.14       0.00       0.00
  Frctn Loss (ft)             4.63    Cum Volume (acre-ft)                   0.48      21.93
  C & E Loss (ft)             0.01    Cum SA (acres)                         2.24       4.98


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Low Flow Channel   RS: 8507.43

INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2831  109.97 2830.34  122.81 2829.61   123.1 2829.59  139.34 2828.87
  150.37 2828.25  152.88 2828.14  167.82 2827.52  185.37  2827.2     197  2827.2
     203  2824.2     216  2824.2     222  2827.2     242  2827.2     254  2819.2
     269  2819.2     281  2827.2  314.82 2826.01  326.76 2825.81  381.96 2826.28
  416.02 2826.72

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     197     .03     222    .016     242    .013     281    .035
  416.02    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           197     222           248.78  248.78  248.78             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     222  416.02  2827.2       F
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CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2825.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.030	
W.S. Elev (ft)	2824.59	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2824.74	Flow Area (sq ft)		5.39	
E.G. Slope (ft/ft)	0.050493	Area (sq ft)		5.39	124.47
Q Total (cfs)	30.70	Flow (cfs)		30.70	
Top Width (ft)	45.74	Top Width (ft)		14.57	31.17
Vel Total (ft/s)	5.69	Avg. Vel. (ft/s)		5.69	
Max Chl Dpth (ft)	5.39	Hydr. Depth (ft)		0.37	
Conv. Total (cfs)	136.6	Conv. (cfs)		136.6	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		14.75	
Min Ch El (ft)	2824.20	Shear (lb/sq ft)		1.15	
Alpha	1.00	Stream Power (lb/ft s)	416.02	0.00	0.00
Frctn Loss (ft)	4.62	Cum Volume (acre-ft)		1.57	24.17
C & E Loss (ft)	0.07	Cum SA (acres)		2.72	5.28

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2825.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.		0.030	
W.S. Elev (ft)	2824.56	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2824.70	Flow Area (sq ft)		4.92	
E.G. Slope (ft/ft)	0.051106	Area (sq ft)		4.92	123.46
Q Total (cfs)	26.70	Flow (cfs)		26.70	
Top Width (ft)	45.51	Top Width (ft)		14.44	31.08
Vel Total (ft/s)	5.42	Avg. Vel. (ft/s)		5.42	
Max Chl Dpth (ft)	5.36	Hydr. Depth (ft)		0.34	
Conv. Total (cfs)	118.1	Conv. (cfs)		118.1	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		14.60	
Min Ch El (ft)	2824.20	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)	416.02	0.00	0.00
Frctn Loss (ft)	4.64	Cum Volume (acre-ft)		1.42	23.84
C & E Loss (ft)	0.07	Cum SA (acres)		2.66	5.22

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2824.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.030	
W.S. Elev (ft)	2824.63	Reach Len. (ft)	248.78	248.78	248.78

Crit W.S. (ft)	2824.56	Flow Area (sq ft)		5.98	
E.G. Slope (ft/ft)	0.009495	Area (sq ft)		5.98	125.73
Q Total (cfs)	15.70	Flow (cfs)		15.70	
Top Width (ft)	46.02	Top Width (ft)		14.73	31.29
Vel Total (ft/s)	2.62	Avg. Vel. (ft/s)		2.62	
Max Chl Dpth (ft)	5.43	Hydr. Depth (ft)		0.41	
Conv. Total (cfs)	161.1	Conv. (cfs)		161.1	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		14.93	
Min Ch El (ft)	2824.20	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)	416.02	0.00	0.00
Frctn Loss (ft)	2.41	Cum Volume (acre-ft)		0.91	22.82
C & E Loss (ft)	0.00	Cum SA (acres)		2.43	5.02

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2824.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2824.30	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2824.30	Flow Area (sq ft)		1.30	
E.G. Slope (ft/ft)	0.031679	Area (sq ft)		1.30	115.46
Q Total (cfs)	2.40	Flow (cfs)		2.40	
Top Width (ft)	43.69	Top Width (ft)		13.39	30.29
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)		1.85	
Max Chl Dpth (ft)	5.10	Hydr. Depth (ft)		0.10	
Conv. Total (cfs)	13.5	Conv. (cfs)		13.5	
Length Wtd. (ft)		Wetted Per. (ft)		13.44	
Min Ch El (ft)	2824.20	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	416.02	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		0.21	20.59
C & E Loss (ft)		Cum SA (acres)		2.02	4.76

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2824.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.030	
W.S. Elev (ft)	2824.46	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2824.53	Flow Area (sq ft)		3.52	
E.G. Slope (ft/ft)	0.043711	Area (sq ft)		3.52	120.41
Q Total (cfs)	14.40	Flow (cfs)		14.40	
Top Width (ft)	44.82	Top Width (ft)		14.04	30.78
Vel Total (ft/s)	4.09	Avg. Vel. (ft/s)		4.09	
Max Chl Dpth (ft)	5.26	Hydr. Depth (ft)		0.25	
Conv. Total (cfs)	68.9	Conv. (cfs)		68.9	

Length Wtd. (ft)	248.78	Wetted Per. (ft)		14.16	
Min Ch El (ft)	2824.20	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)	416.02	0.00	0.00
Frctn Loss (ft)	4.74	Cum Volume (acre-ft)		0.89	22.73
C & E Loss (ft)	0.03	Cum SA (acres)		2.42	5.01

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2824.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	2824.53	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2824.45	Flow Area (sq ft)		4.56	
E.G. Slope (ft/ft)	0.008589	Area (sq ft)		4.56	122.69
Q Total (cfs)	9.70	Flow (cfs)		9.70	
Top Width (ft)	45.34	Top Width (ft)		14.34	31.00
Vel Total (ft/s)	2.12	Avg. Vel. (ft/s)		2.12	
Max Chl Dpth (ft)	5.33	Hydr. Depth (ft)		0.32	
Conv. Total (cfs)	104.7	Conv. (cfs)		104.7	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		14.49	
Min Ch El (ft)	2824.20	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	416.02	0.00	0.00
Frctn Loss (ft)	2.41	Cum Volume (acre-ft)		0.68	22.17
C & E Loss (ft)	0.00	Cum SA (acres)		2.31	4.95

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2824.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.030	
W.S. Elev (ft)	2824.37	Reach Len. (ft)	248.78	248.78	248.78
Crit W.S. (ft)	2824.37	Flow Area (sq ft)		2.30	
E.G. Slope (ft/ft)	0.030010	Area (sq ft)		2.30	117.72
Q Total (cfs)	6.00	Flow (cfs)		6.00	
Top Width (ft)	44.21	Top Width (ft)		13.69	30.52
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)		2.60	
Max Chl Dpth (ft)	5.17	Hydr. Depth (ft)		0.17	
Conv. Total (cfs)	34.6	Conv. (cfs)		34.6	
Length Wtd. (ft)	248.78	Wetted Per. (ft)		13.77	
Min Ch El (ft)	2824.20	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	416.02	0.00	0.00
Frctn Loss (ft)	5.04	Cum Volume (acre-ft)		0.47	21.48
C & E Loss (ft)	0.00	Cum SA (acres)		2.19	4.87

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

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         for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Low Flow Channel   RS: 8258.66

INPUT
Description:
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2829  109.97 2828.23  122.81 2827.41   123.1 2827.39  139.34 2826.58
  150.37 2825.83  152.88 2825.71  167.82 2825.02  185.37  2824.8     197  2824.8
     203  2821.8     216  2821.8     222  2824.8     242  2824.8     254  2816.8
     269  2816.8     281  2824.8  314.68 2823.51  326.57 2823.21  381.54 2823.85
  415.47 2824.48

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     197     .03     222    .016     242    .013     281    .035
  415.47    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           197     222            248.7   248.7   248.7             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     222  415.47  2824.8       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2822.66    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.13    Wt. n-Val.                           0.030
  W.S. Elev (ft)           2822.53    Reach Len. (ft)           248.70     248.70     248.70
  Crit W.S. (ft)           2822.34    Flow Area (sq ft)                     10.49
  E.G. Slope (ft/ft)      0.006250    Area (sq ft)                          10.49     135.07
  Q Total (cfs)              30.70    Flow (cfs)                            30.70
  Top Width (ft)             48.08    Top Width (ft)                        15.90      32.18
  Vel Total (ft/s)            2.93    Avg. Vel. (ft/s)                       2.93
  Max Chl Dpth (ft)           5.73    Hydr. Depth (ft)                       0.66
  Conv. Total (cfs)          388.3    Conv. (cfs)                           388.3
  Length Wtd. (ft)          248.70    Wetted Per. (ft)                      16.25
  Min Ch El (ft)           2821.80    Shear (lb/sq ft)                       0.25
  Alpha                       1.00    Stream Power (lb/ft s)    415.47       0.00       0.00
  Frctn Loss (ft)             2.43    Cum Volume (acre-ft)                   1.53      23.43
  C & E Loss (ft)             0.04    Cum SA (acres)                         2.63       5.10


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.
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CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2822.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.030	
W.S. Elev (ft)	2822.47	Reach Len. (ft)	248.70	248.70	248.70
Crit W.S. (ft)	2822.30	Flow Area (sq ft)		9.59	
E.G. Slope (ft/ft)	0.006245	Area (sq ft)		9.59	133.24
Q Total (cfs)	26.70	Flow (cfs)		26.70	
Top Width (ft)	47.68	Top Width (ft)		15.68	32.01
Vel Total (ft/s)	2.78	Avg. Vel. (ft/s)		2.78	
Max Chl Dpth (ft)	5.67	Hydr. Depth (ft)		0.61	
Conv. Total (cfs)	337.9	Conv. (cfs)		337.9	
Length Wtd. (ft)	248.70	Wetted Per. (ft)		15.99	
Min Ch El (ft)	2821.80	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	415.47	0.00	0.00
Frctn Loss (ft)	2.43	Cum Volume (acre-ft)		1.38	23.11
C & E Loss (ft)	0.03	Cum SA (acres)		2.57	5.04

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2822.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.030	
W.S. Elev (ft)	2822.23	Reach Len. (ft)	248.70	248.70	248.70
Crit W.S. (ft)	2822.16	Flow Area (sq ft)		5.91	
E.G. Slope (ft/ft)	0.009866	Area (sq ft)		5.91	125.58
Q Total (cfs)	15.70	Flow (cfs)		15.70	
Top Width (ft)	45.99	Top Width (ft)		14.71	31.28
Vel Total (ft/s)	2.66	Avg. Vel. (ft/s)		2.66	
Max Chl Dpth (ft)	5.43	Hydr. Depth (ft)		0.40	
Conv. Total (cfs)	158.1	Conv. (cfs)		158.1	
Length Wtd. (ft)	248.70	Wetted Per. (ft)		14.91	
Min Ch El (ft)	2821.80	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)	415.47	0.00	0.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)		0.88	22.10
C & E Loss (ft)	0.00	Cum SA (acres)		2.35	4.84

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2821.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2821.97	Reach Len. (ft)	248.70	248.70	248.70
Crit W.S. (ft)	2821.90	Flow Area (sq ft)		2.32	
E.G. Slope (ft/ft)	0.004690	Area (sq ft)		2.32	117.76
Q Total (cfs)	2.40	Flow (cfs)		2.40	

Top Width (ft)	44.22	Top Width (ft)		13.70	30.52
Vel Total (ft/s)	1.03	Avg. Vel. (ft/s)		1.03	
Max Chl Dpth (ft)	5.17	Hydr. Depth (ft)		0.17	
Conv. Total (cfs)	35.0	Conv. (cfs)		35.0	
Length Wtd. (ft)	248.70	Wetted Per. (ft)		13.78	
Min Ch El (ft)	2821.80	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	415.47	0.00	0.00
Frctn Loss (ft)	2.43	Cum Volume (acre-ft)		0.20	19.93
C & E Loss (ft)	0.01	Cum SA (acres)		1.95	4.58

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2822.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2822.21	Reach Len. (ft)	248.70	248.70	248.70
Crit W.S. (ft)	2822.13	Flow Area (sq ft)		5.59	
E.G. Slope (ft/ft)	0.009917	Area (sq ft)		5.59	124.89
Q Total (cfs)	14.40	Flow (cfs)		14.40	
Top Width (ft)	45.83	Top Width (ft)		14.62	31.21
Vel Total (ft/s)	2.58	Avg. Vel. (ft/s)		2.58	
Max Chl Dpth (ft)	5.40	Hydr. Depth (ft)		0.38	
Conv. Total (cfs)	144.6	Conv. (cfs)		144.6	
Length Wtd. (ft)	248.70	Wetted Per. (ft)		14.81	
Min Ch El (ft)	2821.80	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	415.47	0.00	0.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)		0.86	22.03
C & E Loss (ft)	0.00	Cum SA (acres)		2.34	4.83

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2822.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.030	
W.S. Elev (ft)	2822.11	Reach Len. (ft)	248.70	248.70	248.70
Crit W.S. (ft)	2822.05	Flow Area (sq ft)		4.23	
E.G. Slope (ft/ft)	0.010995	Area (sq ft)		4.23	121.95
Q Total (cfs)	9.70	Flow (cfs)		9.70	
Top Width (ft)	45.17	Top Width (ft)		14.24	30.93
Vel Total (ft/s)	2.30	Avg. Vel. (ft/s)		2.30	
Max Chl Dpth (ft)	5.31	Hydr. Depth (ft)		0.30	
Conv. Total (cfs)	92.5	Conv. (cfs)		92.5	
Length Wtd. (ft)	248.70	Wetted Per. (ft)		14.39	
Min Ch El (ft)	2821.80	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	415.47	0.00	0.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)		0.65	21.47
C & E Loss (ft)	0.01	Cum SA (acres)		2.23	4.77

```
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)          2822.13    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              0.03    Wt. n-Val.                            0.030
  W.S. Elev (ft)          2822.10    Reach Len. (ft)           248.70     248.70     248.70
  Crit W.S. (ft)          2821.97    Flow Area (sq ft)                      4.06
  E.G. Slope (ft/ft)     0.004787    Area (sq ft)                           4.06     121.59
  Q Total (cfs)              6.00    Flow (cfs)                             6.00
  Top Width (ft)            45.09    Top Width (ft)                        14.19      30.90
  Vel Total (ft/s)           1.48    Avg. Vel. (ft/s)                       1.48
  Max Chl Dpth (ft)          5.30    Hydr. Depth (ft)                       0.29
  Conv. Total (cfs)          86.7    Conv. (cfs)                            86.7
  Length Wtd. (ft)         248.70    Wetted Per. (ft)                      14.34
  Min Ch El (ft)          2821.80    Shear (lb/sq ft)                       0.08
  Alpha                      1.00    Stream Power (lb/ft s)    415.47       0.00       0.00
  Frctn Loss (ft)            2.43    Cum Volume (acre-ft)                   0.45      20.79
  C & E Loss (ft)            0.02    Cum SA (acres)                         2.11       4.69


Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Low Flow Channel   RS: 8009.9

INPUT
Description: 80+09.9
Station Elevation Data    num=      21
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2827  109.97 2826.11  122.81  2825.2   123.1 2825.19  139.34 2824.29
  150.37 2823.42  152.88 2823.28  167.82 2822.51  185.37  2822.4     197  2822.4
     203  2819.4     216  2819.4     222  2822.4     242  2822.4     254  2814.4
     269  2814.4     281  2822.4  314.54 2821.02  326.38  2820.6  381.13 2821.43
  414.91 2822.24

Manning's n Values        num=       6
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     197     .03     222    .016     242    .013     281    .035
  414.91    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           197     222           1274.9  1274.9  1274.9             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     222  414.91  2822.4       F
```

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2820.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.030	
W.S. Elev (ft)	2819.94	Reach Len. (ft)	1274.90	1274.90	1274.90
Crit W.S. (ft)	2819.94	Flow Area (sq ft)		7.56	
E.G. Slope (ft/ft)	0.017365	Area (sq ft)		7.56	129.05
Q Total (cfs)	30.70	Flow (cfs)		30.70	
Top Width (ft)	46.76	Top Width (ft)		15.15	31.61
Vel Total (ft/s)	4.06	Avg. Vel. (ft/s)		4.06	
Max Chl Dpth (ft)	5.54	Hydr. Depth (ft)		0.50	
Conv. Total (cfs)	233.0	Conv. (cfs)		233.0	
Length Wtd. (ft)	1274.90	Wetted Per. (ft)		15.40	
Min Ch El (ft)	2819.40	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)	414.91	0.00	0.00
Frctn Loss (ft)	13.51	Cum Volume (acre-ft)		1.47	22.68
C & E Loss (ft)	0.05	Cum SA (acres)		2.55	4.92

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2820.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.030	
W.S. Elev (ft)	2819.90	Reach Len. (ft)	1274.90	1274.90	1274.90
Crit W.S. (ft)	2819.90	Flow Area (sq ft)		6.92	
E.G. Slope (ft/ft)	0.017349	Area (sq ft)		6.92	127.71
Q Total (cfs)	26.70	Flow (cfs)		26.70	
Top Width (ft)	46.46	Top Width (ft)		14.98	31.48
Vel Total (ft/s)	3.86	Avg. Vel. (ft/s)		3.86	
Max Chl Dpth (ft)	5.49	Hydr. Depth (ft)		0.46	
Conv. Total (cfs)	202.7	Conv. (cfs)		202.7	
Length Wtd. (ft)	1274.90	Wetted Per. (ft)		15.21	
Min Ch El (ft)	2819.40	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	414.91	0.00	0.00
Frctn Loss (ft)	13.59	Cum Volume (acre-ft)		1.33	22.36
C & E Loss (ft)	0.05	Cum SA (acres)		2.48	4.85

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2819.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.030	
W.S. Elev (ft)	2819.83	Reach Len. (ft)	1274.90	1274.90	1274.90
Crit W.S. (ft)	2819.76	Flow Area (sq ft)		6.01	
E.G. Slope (ft/ft)	0.009388	Area (sq ft)		6.01	125.77
Q Total (cfs)	15.70	Flow (cfs)		15.70	
Top Width (ft)	46.03	Top Width (ft)		14.73	31.30
Vel Total (ft/s)	2.61	Avg. Vel. (ft/s)		2.61	
Max Chl Dpth (ft)	5.43	Hydr. Depth (ft)		0.41	
Conv. Total (cfs)	162.0	Conv. (cfs)		162.0	
Length Wtd. (ft)	1274.90	Wetted Per. (ft)		14.94	
Min Ch El (ft)	2819.40	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)	414.91	0.00	0.00
Frctn Loss (ft)	16.42	Cum Volume (acre-ft)		0.84	21.38
C & E Loss (ft)	0.02	Cum SA (acres)		2.27	4.66

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2819.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2819.50	Reach Len. (ft)	1274.90	1274.90	1274.90
Crit W.S. (ft)	2819.50	Flow Area (sq ft)		1.30	
E.G. Slope (ft/ft)	0.031417	Area (sq ft)		1.30	115.47
Q Total (cfs)	2.40	Flow (cfs)		2.40	
Top Width (ft)	43.69	Top Width (ft)		13.39	30.30
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)		1.85	
Max Chl Dpth (ft)	5.10	Hydr. Depth (ft)		0.10	
Conv. Total (cfs)	13.5	Conv. (cfs)		13.5	
Length Wtd. (ft)		Wetted Per. (ft)		13.44	
Min Ch El (ft)	2819.40	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	414.91	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		0.19	19.26
C & E Loss (ft)		Cum SA (acres)		1.87	4.41

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2819.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2819.81	Reach Len. (ft)	1274.90	1274.90	1274.90
Crit W.S. (ft)	2819.73	Flow Area (sq ft)		5.69	
E.G. Slope (ft/ft)	0.009355	Area (sq ft)		5.69	125.11
Q Total (cfs)	14.40	Flow (cfs)		14.40	
Top Width (ft)	45.88	Top Width (ft)		14.65	31.24
Vel Total (ft/s)	2.53	Avg. Vel. (ft/s)		2.53	
Max Chl Dpth (ft)	5.41	Hydr. Depth (ft)		0.39	
Conv. Total (cfs)	148.9	Conv. (cfs)		148.9	
Length Wtd. (ft)	1274.90	Wetted Per. (ft)		14.84	
Min Ch El (ft)	2819.40	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	414.91	0.00	0.00
Frctn Loss (ft)	16.41	Cum Volume (acre-ft)		0.83	21.31
C & E Loss (ft)	0.02	Cum SA (acres)		2.26	4.65

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2819.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	2819.74	Reach Len. (ft)	1274.90	1274.90	1274.90
Crit W.S. (ft)	2819.65	Flow Area (sq ft)		4.59	
E.G. Slope (ft/ft)	0.008463	Area (sq ft)		4.59	122.73
Q Total (cfs)	9.70	Flow (cfs)		9.70	
Top Width (ft)	45.35	Top Width (ft)		14.34	31.01
Vel Total (ft/s)	2.12	Avg. Vel. (ft/s)		2.12	
Max Chl Dpth (ft)	5.34	Hydr. Depth (ft)		0.32	
Conv. Total (cfs)	105.4	Conv. (cfs)		105.4	
Length Wtd. (ft)	1274.90	Wetted Per. (ft)		14.50	
Min Ch El (ft)	2819.40	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	414.91	0.00	0.00
Frctn Loss (ft)	16.42	Cum Volume (acre-ft)		0.63	20.77
C & E Loss (ft)	0.02	Cum SA (acres)		2.15	4.59

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2819.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.030	
W.S. Elev (ft)	2819.57	Reach Len. (ft)	1274.90	1274.90	1274.90
Crit W.S. (ft)	2819.57	Flow Area (sq ft)		2.30	

E.G. Slope (ft/ft)	0.030152	Area (sq ft)		2.30	117.72
Q Total (cfs)	6.00	Flow (cfs)		6.00	
Top Width (ft)	44.21	Top Width (ft)		13.69	30.52
Vel Total (ft/s)	2.61	Avg. Vel. (ft/s)		2.61	
Max Chl Dpth (ft)	5.17	Hydr. Depth (ft)		0.17	
Conv. Total (cfs)	34.6	Conv. (cfs)		34.6	
Length Wtd. (ft)		Wetted Per. (ft)		13.77	
Min Ch El (ft)	2819.40	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	414.91	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		0.43	20.11
C & E Loss (ft)		Cum SA (acres)		2.03	4.51

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 6735

INPUT
Description: 67+35
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
197	2806	203	2803	216	2803	222	2806	242	2806

Manning's n Values num= 2

Sta	n Val	Sta	n Val
197	.03	222	.016

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
197	222	3325	3325	3325	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
222	242	2808	F

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2803.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.030	
W.S. Elev (ft)	2803.70	Reach Len. (ft)	3325.00	3325.00	3325.00
Crit W.S. (ft)	2803.55	Flow Area (sq ft)		10.12	
E.G. Slope (ft/ft)	0.007171	Area (sq ft)		10.12	
Q Total (cfs)	31.10	Flow (cfs)		31.10	
Top Width (ft)	15.81	Top Width (ft)		15.81	
Vel Total (ft/s)	3.07	Avg. Vel. (ft/s)		3.07	
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)		0.64	
Conv. Total (cfs)	367.3	Conv. (cfs)		367.3	
Length Wtd. (ft)	3325.00	Wetted Per. (ft)		16.14	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)	242.00	0.00	0.00
Frctn Loss (ft)	34.51	Cum Volume (acre-ft)		1.22	20.79
C & E Loss (ft)	0.04	Cum SA (acres)		2.09	4.45

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2803.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.030	
W.S. Elev (ft)	2803.64	Reach Len. (ft)	3325.00	3325.00	3325.00
Crit W.S. (ft)	2803.50	Flow Area (sq ft)		9.16	
E.G. Slope (ft/ft)	0.007205	Area (sq ft)		9.16	
Q Total (cfs)	26.70	Flow (cfs)		26.70	
Top Width (ft)	15.57	Top Width (ft)		15.57	
Vel Total (ft/s)	2.91	Avg. Vel. (ft/s)		2.91	
Max Chl Dpth (ft)	0.64	Hydr. Depth (ft)		0.59	
Conv. Total (cfs)	314.6	Conv. (cfs)		314.6	
Length Wtd. (ft)	3325.00	Wetted Per. (ft)		15.87	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)	242.00	0.00	0.00
Frctn Loss (ft)	34.52	Cum Volume (acre-ft)		1.10	20.49
C & E Loss (ft)	0.04	Cum SA (acres)		2.04	4.39

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2803.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2803.34	Reach Len. (ft)	3325.00	3325.00	3325.00
Crit W.S. (ft)	2803.34	Flow Area (sq ft)		4.62	
E.G. Slope (ft/ft)	0.019229	Area (sq ft)		4.62	
Q Total (cfs)	14.80	Flow (cfs)		14.80	
Top Width (ft)	14.35	Top Width (ft)		14.35	
Vel Total (ft/s)	3.20	Avg. Vel. (ft/s)		3.20	
Max Chl Dpth (ft)	0.34	Hydr. Depth (ft)		0.32	
Conv. Total (cfs)	106.7	Conv. (cfs)		106.7	
Length Wtd. (ft)		Wetted Per. (ft)		14.51	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)	242.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		0.69	19.54
C & E Loss (ft)		Cum SA (acres)		1.84	4.20

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2803.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2803.09	Reach Len. (ft)	3325.00	3325.00	3325.00
Crit W.S. (ft)	2803.09	Flow Area (sq ft)		1.23	
E.G. Slope (ft/ft)	0.026086	Area (sq ft)		1.23	
Q Total (cfs)	2.00	Flow (cfs)		2.00	
Top Width (ft)	13.37	Top Width (ft)		13.37	
Vel Total (ft/s)	1.63	Avg. Vel. (ft/s)		1.63	
Max Chl Dpth (ft)	0.09	Hydr. Depth (ft)		0.09	
Conv. Total (cfs)	12.4	Conv. (cfs)		12.4	
Length Wtd. (ft)		Wetted Per. (ft)		13.42	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	242.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		0.15	17.57
C & E Loss (ft)		Cum SA (acres)		1.48	3.97

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2803.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2803.34	Reach Len. (ft)	3325.00	3325.00	3325.00
Crit W.S. (ft)	2803.34	Flow Area (sq ft)		4.62	
E.G. Slope (ft/ft)	0.018712	Area (sq ft)		4.62	
Q Total (cfs)	14.60	Flow (cfs)		14.60	
Top Width (ft)	14.35	Top Width (ft)		14.35	
Vel Total (ft/s)	3.16	Avg. Vel. (ft/s)		3.16	
Max Chl Dpth (ft)	0.34	Hydr. Depth (ft)		0.32	
Conv. Total (cfs)	106.7	Conv. (cfs)		106.7	
Length Wtd. (ft)		Wetted Per. (ft)		14.51	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)	242.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		0.68	19.48
C & E Loss (ft)		Cum SA (acres)		1.83	4.20

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2803.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.030	
W.S. Elev (ft)	2803.26	Reach Len. (ft)	3325.00	3325.00	3325.00
Crit W.S. (ft)	2803.26	Flow Area (sq ft)		3.44	
E.G. Slope (ft/ft)	0.021780	Area (sq ft)		3.44	
Q Total (cfs)	9.80	Flow (cfs)		9.80	
Top Width (ft)	14.02	Top Width (ft)		14.02	

Vel Total (ft/s)	2.85	Avg. Vel. (ft/s)		2.85	
Max Chl Dpth (ft)	0.25	Hydr. Depth (ft)		0.25	
Conv. Total (cfs)	66.4	Conv. (cfs)		66.4	
Length Wtd. (ft)		Wetted Per. (ft)		14.14	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	242.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		0.51	18.98
C & E Loss (ft)		Cum SA (acres)		1.74	4.14

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2803.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.030	
W.S. Elev (ft)	2803.18	Reach Len. (ft)	3325.00	3325.00	3325.00
Crit W.S. (ft)	2803.18	Flow Area (sq ft)		2.44	
E.G. Slope (ft/ft)	0.024852	Area (sq ft)		2.44	
Q Total (cfs)	6.00	Flow (cfs)		6.00	
Top Width (ft)	13.73	Top Width (ft)		13.73	
Vel Total (ft/s)	2.46	Avg. Vel. (ft/s)		2.46	
Max Chl Dpth (ft)	0.18	Hydr. Depth (ft)		0.18	
Conv. Total (cfs)	38.1	Conv. (cfs)		38.1	
Length Wtd. (ft)		Wetted Per. (ft)		13.82	
Min Ch El (ft)	2803.00	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)	242.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		0.36	18.39
C & E Loss (ft)		Cum SA (acres)		1.63	4.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 3410

INPUT
Description: Section 34+10
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2771.05	110.17	2769.89	182	2770	194	2768	195	2768
207	2770	221	2770	239	2758	254	2758	266	2766
284.96	2764.7	286.78	2765.07	289.17	2765.62	295.27	2767.33	295.61	2767.37
305.93	2768.55	307.95	2768.79	317.85	2769.26	319.77	2769.74	321.07	2770.13
327.53	2772.63								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

```
     100    .035     182     .03     207    .016     221    .013     266    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           182     207               10      10      10             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     207  327.53    2770       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2769.31    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.28    Wt. n-Val.                           0.030
  W.S. Elev (ft)           2769.03    Reach Len. (ft)            10.00     10.00      10.00
  Crit W.S. (ft)           2769.03    Flow Area (sq ft)                     7.36
  E.G. Slope (ft/ft)      0.016339    Area (sq ft)                          7.36     455.47
  Q Total (cfs)              31.10    Flow (cfs)                           31.10
  Top Width (ft)            103.82    Top Width (ft)                       13.33      90.49
  Vel Total (ft/s)            4.23    Avg. Vel. (ft/s)                      4.23
  Max Chl Dpth (ft)          11.03    Hydr. Depth (ft)                      0.55
  Conv. Total (cfs)          243.3    Conv. (cfs)                          243.3
  Length Wtd. (ft)           10.00    Wetted Per. (ft)                     13.50
  Min Ch El (ft)           2768.00    Shear (lb/sq ft)                      0.56
  Alpha                       1.00    Stream Power (lb/ft s)    327.53      0.00       0.00
  Frctn Loss (ft)             0.16    Cum Volume (acre-ft)                  0.55       3.41
  C & E Loss (ft)             0.02    Cum SA (acres)                        0.98       1.00


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2769.22    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.26    Wt. n-Val.                           0.030
  W.S. Elev (ft)           2768.97    Reach Len. (ft)            10.00     10.00      10.00
  Crit W.S. (ft)           2768.97    Flow Area (sq ft)                     6.58
  E.G. Slope (ft/ft)      0.016234    Area (sq ft)                          6.58     450.08
  Q Total (cfs)              26.70    Flow (cfs)                           26.70
  Top Width (ft)            101.74    Top Width (ft)                       12.61      89.13
  Vel Total (ft/s)            4.06    Avg. Vel. (ft/s)                      4.06
  Max Chl Dpth (ft)          10.97    Hydr. Depth (ft)                      0.52
  Conv. Total (cfs)          209.6    Conv. (cfs)                          209.6
  Length Wtd. (ft)           10.00    Wetted Per. (ft)                     12.77
  Min Ch El (ft)           2768.00    Shear (lb/sq ft)                      0.52
  Alpha                       1.00    Stream Power (lb/ft s)    327.53      0.00       0.00
  Frctn Loss (ft)             0.16    Cum Volume (acre-ft)                  0.50       3.32
  C & E Loss (ft)             0.02    Cum SA (acres)                        0.96       0.99


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2768.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.030	
W.S. Elev (ft)	2768.75	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2768.75	Flow Area (sq ft)		4.12	
E.G. Slope (ft/ft)	0.017482	Area (sq ft)		4.12	431.15
Q Total (cfs)	14.80	Flow (cfs)		14.80	
Top Width (ft)	94.72	Top Width (ft)		9.99	84.73
Vel Total (ft/s)	3.60	Avg. Vel. (ft/s)		3.60	
Max Chl Dpth (ft)	10.75	Hydr. Depth (ft)		0.41	
Conv. Total (cfs)	111.9	Conv. (cfs)		111.9	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		10.11	
Min Ch El (ft)	2768.00	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		0.35	3.08
C & E Loss (ft)	0.02	Cum SA (acres)		0.91	0.97

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2768.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.030	
W.S. Elev (ft)	2768.30	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2768.30	Flow Area (sq ft)		0.85	
E.G. Slope (ft/ft)	0.021890	Area (sq ft)		0.85	394.29
Q Total (cfs)	2.00	Flow (cfs)		2.00	
Top Width (ft)	84.84	Top Width (ft)		4.63	80.22
Vel Total (ft/s)	2.35	Avg. Vel. (ft/s)		2.35	
Max Chl Dpth (ft)	10.30	Hydr. Depth (ft)		0.18	
Conv. Total (cfs)	13.5	Conv. (cfs)		13.5	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		4.68	
Min Ch El (ft)	2768.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	0.00
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)		0.07	2.52
C & E Loss (ft)	0.01	Cum SA (acres)		0.79	0.91

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2768.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.030	
W.S. Elev (ft)	2768.73	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2768.73	Flow Area (sq ft)		3.97	
E.G. Slope (ft/ft)	0.018785	Area (sq ft)		3.97	429.87
Q Total (cfs)	14.60	Flow (cfs)		14.60	
Top Width (ft)	94.38	Top Width (ft)		9.81	84.58
Vel Total (ft/s)	3.68	Avg. Vel. (ft/s)		3.68	
Max Chl Dpth (ft)	10.73	Hydr. Depth (ft)		0.40	
Conv. Total (cfs)	106.5	Conv. (cfs)		106.5	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		9.93	
Min Ch El (ft)	2768.00	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		0.35	3.08
C & E Loss (ft)	0.01	Cum SA (acres)		0.91	0.97

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2768.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.030	
W.S. Elev (ft)	2768.63	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2768.63	Flow Area (sq ft)		2.98	
E.G. Slope (ft/ft)	0.018148	Area (sq ft)		2.98	420.84
Q Total (cfs)	9.80	Flow (cfs)		9.80	
Top Width (ft)	92.03	Top Width (ft)		8.52	83.51
Vel Total (ft/s)	3.29	Avg. Vel. (ft/s)		3.29	
Max Chl Dpth (ft)	10.63	Hydr. Depth (ft)		0.35	
Conv. Total (cfs)	72.7	Conv. (cfs)		72.7	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		8.62	
Min Ch El (ft)	2768.00	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	0.00
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)		0.27	2.91

C & E Loss (ft)	0.01	Cum SA (acres)	0.88	0.95

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2768.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.030	
W.S. Elev (ft)	2768.49	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2768.49	Flow Area (sq ft)		1.93	
E.G. Slope (ft/ft)	0.021923	Area (sq ft)		1.93	409.47
Q Total (cfs)	6.00	Flow (cfs)		6.00	
Top Width (ft)	89.00	Top Width (ft)		6.87	82.13
Vel Total (ft/s)	3.12	Avg. Vel. (ft/s)		3.12	
Max Chl Dpth (ft)	10.49	Hydr. Depth (ft)		0.28	
Conv. Total (cfs)	40.5	Conv. (cfs)		40.5	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		6.95	
Min Ch El (ft)	2768.00	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	0.00
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		0.19	2.76
C & E Loss (ft)	0.01	Cum SA (acres)		0.84	0.93

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 3400

INPUT
Description: Section 34+00
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2771.05	110.17	2769.89	138.05	2767.95	181.6	2765.83	182	2766
194	2757	195	2757	207	2766	227	2766	239	2758
254	2758	266	2766	284.96	2764.7	286.78	2765.07	289.17	2765.62

```
  295.27 2767.33  295.61 2767.37  305.93 2768.55  307.95 2768.79  317.85 2769.26
  319.77 2769.74  321.07 2770.13  327.53 2772.63

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     182     .03     207    .016     227    .013     266    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           182     207            133.6   133.6   133.6             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     207  327.53    2766       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2767.80    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              10.14    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2757.66    Reach Len. (ft)           133.60     133.60     133.60
  Crit W.S. (ft)           2758.72    Flow Area (sq ft)                      1.24
  E.G. Slope (ft/ft)      0.939075    Area (sq ft)                           1.24
  Q Total (cfs)              31.80    Flow (cfs)                            31.80
  Top Width (ft)              2.76    Top Width (ft)                         2.76
  Vel Total (ft/s)           25.55    Avg. Vel. (ft/s)                      25.55
  Max Chl Dpth (ft)           0.66    Hydr. Depth (ft)                       0.45
  Conv. Total (cfs)           32.8    Conv. (cfs)                            32.8
  Length Wtd. (ft)          133.60    Wetted Per. (ft)                       3.20
  Min Ch El (ft)           2757.00    Shear (lb/sq ft)                      22.77
  Alpha                       1.00    Stream Power (lb/ft s)    327.53       0.00       0.00
  Frctn Loss (ft)             0.52    Cum Volume (acre-ft)                   0.55       3.35
  C & E Loss (ft)             0.99    Cum SA (acres)                         0.98       0.99


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2767.71    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              10.12    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2757.60    Reach Len. (ft)           133.60     133.60     133.60
  Crit W.S. (ft)           2758.60    Flow Area (sq ft)                      1.07
  E.G. Slope (ft/ft)      1.044419    Area (sq ft)                           1.07
  Q Total (cfs)              27.30    Flow (cfs)                            27.30
  Top Width (ft)              2.59    Top Width (ft)                         2.59
  Vel Total (ft/s)           25.53    Avg. Vel. (ft/s)                      25.53
  Max Chl Dpth (ft)           0.60    Hydr. Depth (ft)                       0.41
  Conv. Total (cfs)           26.7    Conv. (cfs)                            26.7
  Length Wtd. (ft)          133.60    Wetted Per. (ft)                       2.99
  Min Ch El (ft)           2757.00    Shear (lb/sq ft)                      23.35
  Alpha                       1.00    Stream Power (lb/ft s)    327.53       0.00       0.00
  Frctn Loss (ft)             0.52    Cum Volume (acre-ft)                   0.49       3.27
  C & E Loss (ft)             0.99    Cum SA (acres)                         0.96       0.98


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2767.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	10.00	Wt. n-Val.		0.030	
W.S. Elev (ft)	2757.39	Reach Len. (ft)	133.60	133.60	133.60
Crit W.S. (ft)	2758.21	Flow Area (sq ft)		0.60	
E.G. Slope (ft/ft)	1.586917	Area (sq ft)		0.60	
Q Total (cfs)	15.20	Flow (cfs)		15.20	
Top Width (ft)	2.05	Top Width (ft)		2.05	
Vel Total (ft/s)	25.37	Avg. Vel. (ft/s)		25.37	
Max Chl Dpth (ft)	0.39	Hydr. Depth (ft)		0.29	
Conv. Total (cfs)	12.1	Conv. (cfs)		12.1	
Length Wtd. (ft)	133.60	Wetted Per. (ft)		2.31	
Min Ch El (ft)	2757.00	Shear (lb/sq ft)		25.69	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	0.00
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)		0.35	3.03
C & E Loss (ft)	0.98	Cum SA (acres)		0.91	0.96

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2761.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.38	Wt. n-Val.		0.030	
W.S. Elev (ft)	2757.10	Reach Len. (ft)	133.60	133.60	133.60
Crit W.S. (ft)	2757.41	Flow Area (sq ft)		0.12	
E.G. Slope (ft/ft)	2.925896	Area (sq ft)		0.12	
Q Total (cfs)	2.00	Flow (cfs)		2.00	
Top Width (ft)	1.28	Top Width (ft)		1.28	
Vel Total (ft/s)	16.80	Avg. Vel. (ft/s)		16.80	
Max Chl Dpth (ft)	0.10	Hydr. Depth (ft)		0.09	
Conv. Total (cfs)	1.2	Conv. (cfs)		1.2	
Length Wtd. (ft)	133.60	Wetted Per. (ft)		1.35	
Min Ch El (ft)	2757.00	Shear (lb/sq ft)		16.13	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	0.00
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)		0.07	2.48
C & E Loss (ft)	0.95	Cum SA (acres)		0.79	0.90

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water
surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2767.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.95	Wt. n-Val.		0.030	
W.S. Elev (ft)	2757.39	Reach Len. (ft)	133.60	133.60	133.60
Crit W.S. (ft)	2758.20	Flow Area (sq ft)		0.59	
E.G. Slope (ft/ft)	1.592792	Area (sq ft)		0.59	
Q Total (cfs)	15.00	Flow (cfs)		15.00	
Top Width (ft)	2.04	Top Width (ft)		2.04	
Vel Total (ft/s)	25.31	Avg. Vel. (ft/s)		25.31	
Max Chl Dpth (ft)	0.39	Hydr. Depth (ft)		0.29	
Conv. Total (cfs)	11.9	Conv. (cfs)		11.9	
Length Wtd. (ft)	133.60	Wetted Per. (ft)		2.30	
Min Ch El (ft)	2757.00	Shear (lb/sq ft)		25.62	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	0.00
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)		0.35	3.03
C & E Loss (ft)	0.97	Cum SA (acres)		0.91	0.96

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2767.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.92	Wt. n-Val.		0.030	
W.S. Elev (ft)	2757.29	Reach Len. (ft)	133.60	133.60	133.60
Crit W.S. (ft)	2757.98	Flow Area (sq ft)		0.40	
E.G. Slope (ft/ft)	2.189498	Area (sq ft)		0.40	
Q Total (cfs)	10.00	Flow (cfs)		10.00	
Top Width (ft)	1.76	Top Width (ft)		1.76	
Vel Total (ft/s)	25.27	Avg. Vel. (ft/s)		25.27	
Max Chl Dpth (ft)	0.29	Hydr. Depth (ft)		0.22	
Conv. Total (cfs)	6.8	Conv. (cfs)		6.8	
Length Wtd. (ft)	133.60	Wetted Per. (ft)		1.95	
Min Ch El (ft)	2757.00	Shear (lb/sq ft)		27.67	
Alpha	1.00	Stream Power (lb/ft s)	327.53	0.00	0.00
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)		0.27	2.87
C & E Loss (ft)	0.97	Cum SA (acres)		0.87	0.94

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

```
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2768.98    Element                    Left OB    Channel   Right OB
  Vel Head (ft)              11.80    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2757.18    Reach Len. (ft)            133.60     133.60     133.60
  Crit W.S. (ft)           2757.77    Flow Area (sq ft)                       0.22
  E.G. Slope (ft/ft)      4.251826    Area (sq ft)                            0.22
  Q Total (cfs)               6.20    Flow (cfs)                              6.20
  Top Width (ft)              1.48    Top Width (ft)                          1.48
  Vel Total (ft/s)           27.57    Avg. Vel. (ft/s)                       27.57
  Max Chl Dpth (ft)           0.18    Hydr. Depth (ft)                        0.15
  Conv. Total (cfs)            3.0    Conv. (cfs)                              3.0
  Length Wtd. (ft)          133.60    Wetted Per. (ft)                        1.60
  Min Ch El (ft)           2757.00    Shear (lb/sq ft)                       37.22
  Alpha                       1.00    Stream Power (lb/ft s)     327.53       0.00       0.00
  Frctn Loss (ft)             0.77    Cum Volume (acre-ft)                    0.19       2.71
  C & E Loss (ft)             0.96    Cum SA (acres)                          0.84       0.92


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program selected the water
         surface that had the least amount of error between computed and assumed values.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: During the supercritical standard step calculations, the final energy answer that was
computed is greater than the
         upstream energy.  This is not physically possible.  Please check your data.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Low Flow Channel   RS: 2900

INPUT
Description: Section 29+00
Station Elevation Data    num=      27
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2765  105.22    2764  133.32    2764  142.51    2764  183.84 2764.55
  225.16    2764  233.85    2763  242.53    2762  248.78    2761   267.5    2761
   321.3    2762  331.53    2763     360    2758     372    2751     374    2751
     385    2758     405    2758     417    2750     432    2750     444    2758
  445.74    2760  449.54    2762  451.37    2763  459.93    2763  466.32    2764
  469.85    2764  480.65    2765

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     360     .03     385    .016     405    .013     444    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           360     385              490     490     490             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     385  480.65    2759       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD
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E.G. Elev (ft)	2753.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2753.21	Reach Len. (ft)	490.00	490.00	490.00
Crit W.S. (ft)	2752.39	Flow Area (sq ft)		12.40	
E.G. Slope (ft/ft)	0.002145	Area (sq ft)		12.40	63.48
Q Total (cfs)	31.80	Flow (cfs)		31.80	
Top Width (ft)	33.86	Top Width (ft)		9.24	24.61
Vel Total (ft/s)	2.57	Avg. Vel. (ft/s)		2.57	
Max Chl Dpth (ft)	3.20	Hydr. Depth (ft)		1.34	
Conv. Total (cfs)	686.6	Conv. (cfs)		686.6	
Length Wtd. (ft)	490.00	Wetted Per. (ft)		10.48	
Min Ch El (ft)	2751.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	2.27	Cum Volume (acre-ft)		0.53	3.26
C & E Loss (ft)	0.02	Cum SA (acres)		0.96	0.95

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2753.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.030	
W.S. Elev (ft)	2753.09	Reach Len. (ft)	490.00	490.00	490.00
Crit W.S. (ft)	2752.27	Flow Area (sq ft)		11.31	
E.G. Slope (ft/ft)	0.002020	Area (sq ft)		11.31	60.55
Q Total (cfs)	27.30	Flow (cfs)		27.30	
Top Width (ft)	33.11	Top Width (ft)		8.85	24.25
Vel Total (ft/s)	2.41	Avg. Vel. (ft/s)		2.41	
Max Chl Dpth (ft)	3.08	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	607.4	Conv. (cfs)		607.4	
Length Wtd. (ft)	490.00	Wetted Per. (ft)		10.02	
Min Ch El (ft)	2751.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	2.21	Cum Volume (acre-ft)		0.48	3.17
C & E Loss (ft)	0.02	Cum SA (acres)		0.94	0.94

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2752.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	2752.65	Reach Len. (ft)	490.00	490.00	490.00
Crit W.S. (ft)	2751.94	Flow Area (sq ft)		7.73	

E.G. Slope (ft/ft)	0.001739	Area (sq ft)		7.73	50.16
Q Total (cfs)	15.20	Flow (cfs)		15.20	
Top Width (ft)	30.34	Top Width (ft)		7.40	22.93
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)		1.97	
Max Chl Dpth (ft)	2.64	Hydr. Depth (ft)		1.04	
Conv. Total (cfs)	364.5	Conv. (cfs)		364.5	
Length Wtd. (ft)	490.00	Wetted Per. (ft)		8.33	
Min Ch El (ft)	2751.00	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	1.99	Cum Volume (acre-ft)		0.34	2.96
C & E Loss (ft)	0.01	Cum SA (acres)		0.90	0.92

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2751.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2751.67	Reach Len. (ft)	490.00	490.00	490.00
Crit W.S. (ft)	2751.28	Flow Area (sq ft)		2.09	
E.G. Slope (ft/ft)	0.001072	Area (sq ft)		2.09	29.27
Q Total (cfs)	2.00	Flow (cfs)		2.00	
Top Width (ft)	24.22	Top Width (ft)		4.21	20.02
Vel Total (ft/s)	0.96	Avg. Vel. (ft/s)		0.96	
Max Chl Dpth (ft)	1.67	Hydr. Depth (ft)		0.50	
Conv. Total (cfs)	61.1	Conv. (cfs)		61.1	
Length Wtd. (ft)	490.00	Wetted Per. (ft)		4.58	
Min Ch El (ft)	2751.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	1.46	Cum Volume (acre-ft)		0.07	2.43
C & E Loss (ft)	0.01	Cum SA (acres)		0.78	0.87

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2752.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	2752.64	Reach Len. (ft)	490.00	490.00	490.00
Crit W.S. (ft)	2751.92	Flow Area (sq ft)		7.66	
E.G. Slope (ft/ft)	0.001738	Area (sq ft)		7.66	49.93
Q Total (cfs)	15.00	Flow (cfs)		15.00	
Top Width (ft)	30.27	Top Width (ft)		7.37	22.90
Vel Total (ft/s)	1.96	Avg. Vel. (ft/s)		1.96	
Max Chl Dpth (ft)	2.63	Hydr. Depth (ft)		1.04	
Conv. Total (cfs)	359.8	Conv. (cfs)		359.8	
Length Wtd. (ft)	490.00	Wetted Per. (ft)		8.29	

Min Ch El (ft)	2751.00	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	1.98	Cum Volume (acre-ft)		0.34	2.95
C & E Loss (ft)	0.01	Cum SA (acres)		0.89	0.92

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2752.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2752.38	Reach Len. (ft)	490.00	490.00	490.00
Crit W.S. (ft)	2751.75	Flow Area (sq ft)		5.92	
E.G. Slope (ft/ft)	0.001549	Area (sq ft)		5.92	44.29
Q Total (cfs)	10.00	Flow (cfs)		10.00	
Top Width (ft)	28.70	Top Width (ft)		6.55	22.15
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69	
Max Chl Dpth (ft)	2.38	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	254.1	Conv. (cfs)		254.1	
Length Wtd. (ft)	490.00	Wetted Per. (ft)		7.32	
Min Ch El (ft)	2751.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	1.86	Cum Volume (acre-ft)		0.26	2.80
C & E Loss (ft)	0.01	Cum SA (acres)		0.86	0.91

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2752.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	2752.13	Reach Len. (ft)	490.00	490.00	490.00
Crit W.S. (ft)	2751.57	Flow Area (sq ft)		4.33	
E.G. Slope (ft/ft)	0.001384	Area (sq ft)		4.33	38.66
Q Total (cfs)	6.20	Flow (cfs)		6.20	
Top Width (ft)	27.07	Top Width (ft)		5.70	21.38
Vel Total (ft/s)	1.43	Avg. Vel. (ft/s)		1.43	
Max Chl Dpth (ft)	2.13	Hydr. Depth (ft)		0.76	
Conv. Total (cfs)	166.6	Conv. (cfs)		166.6	
Length Wtd. (ft)	490.00	Wetted Per. (ft)		6.33	
Min Ch El (ft)	2751.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	1.71	Cum Volume (acre-ft)		0.19	2.65
C & E Loss (ft)	0.01	Cum SA (acres)		0.83	0.89

```
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Low Flow Channel   RS: 2410

INPUT
Description: Section 24+10
Station Elevation Data    num=      38
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2760  107.69    2759  116.25    2758  141.84    2757  163.76    2757
  187.19    2755  234.08    2755  289.28    2755  307.85    2754  319.63    2754
  327.06    2755  345.27    2755  383.03    2756   426.7    2756  438.09    2755
  465.01    2755  481.87 2754.66  512.42    2755  516.98    2756  520.63    2756
     523  2751.5     533    2750     538    2750     548  2751.5     568  2751.5
     580  2743.5     595  2743.5     607  2751.5  626.07    2753  628.58    2754
  631.17    2755  643.77    2755  685.62    2755  692.43    2756  698.86    2757
  707.55    2758  718.12    2759  729.11    2760

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     523     .03     548    .016     568    .013     607    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           523     548               10      10      10             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     548  729.11    2756       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2751.03    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.25    Wt. n-Val.                           0.030
  W.S. Elev (ft)           2750.77    Reach Len. (ft)            10.00     10.00      10.00
  Crit W.S. (ft)           2750.77    Flow Area (sq ft)                     7.87
  E.G. Slope (ft/ft)      0.016367    Area (sq ft)                          7.87     188.48
  Q Total (cfs)              31.80    Flow (cfs)                           31.80
  Top Width (ft)             52.14    Top Width (ft)                       15.32      36.82
  Vel Total (ft/s)            4.04    Avg. Vel. (ft/s)                      4.04
  Max Chl Dpth (ft)           7.27    Hydr. Depth (ft)                      0.51
  Conv. Total (cfs)          248.6    Conv. (cfs)                          248.6
  Length Wtd. (ft)           10.00    Wetted Per. (ft)                     15.44
  Min Ch El (ft)           2750.00    Shear (lb/sq ft)                      0.52
  Alpha                       1.00    Stream Power (lb/ft s)    729.11      0.00       0.00
  Frctn Loss (ft)             0.16    Cum Volume (acre-ft)                  0.41       1.84
  C & E Loss (ft)             0.01    Cum SA (acres)                        0.82       0.61


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
```

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2750.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.030	
W.S. Elev (ft)	2750.71	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2750.71	Flow Area (sq ft)		6.85	
E.G. Slope (ft/ft)	0.017596	Area (sq ft)		6.85	185.98
Q Total (cfs)	27.30	Flow (cfs)		27.30	
Top Width (ft)	51.03	Top Width (ft)		14.41	36.62
Vel Total (ft/s)	3.98	Avg. Vel. (ft/s)		3.98	
Max Chl Dpth (ft)	7.21	Hydr. Depth (ft)		0.48	
Conv. Total (cfs)	205.8	Conv. (cfs)		205.8	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		14.52	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		0.52	
Alpha	1.00	Stream Power (lb/ft s)	729.11	0.00	0.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)		0.37	1.79
C & E Loss (ft)	0.01	Cum SA (acres)		0.81	0.60

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2750.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.030	
W.S. Elev (ft)	2750.52	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2750.52	Flow Area (sq ft)		4.41	
E.G. Slope (ft/ft)	0.018382	Area (sq ft)		4.41	179.26
Q Total (cfs)	15.20	Flow (cfs)		15.20	
Top Width (ft)	48.01	Top Width (ft)		11.95	36.06
Vel Total (ft/s)	3.44	Avg. Vel. (ft/s)		3.44	
Max Chl Dpth (ft)	7.02	Hydr. Depth (ft)		0.37	
Conv. Total (cfs)	112.1	Conv. (cfs)		112.1	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		12.02	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)	729.11	0.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		0.27	1.67
C & E Loss (ft)	0.01	Cum SA (acres)		0.79	0.59

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2750.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	2750.16	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2750.16	Flow Area (sq ft)		0.94	
E.G. Slope (ft/ft)	0.026994	Area (sq ft)		0.94	166.30
Q Total (cfs)	2.00	Flow (cfs)		2.00	
Top Width (ft)	42.05	Top Width (ft)		7.08	34.97
Vel Total (ft/s)	2.12	Avg. Vel. (ft/s)		2.12	
Max Chl Dpth (ft)	6.66	Hydr. Depth (ft)		0.13	
Conv. Total (cfs)	12.2	Conv. (cfs)		12.2	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		7.11	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	729.11	0.00	0.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)		0.05	1.33
C & E Loss (ft)	0.01	Cum SA (acres)		0.72	0.56

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2750.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.030	
W.S. Elev (ft)	2750.52	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2750.52	Flow Area (sq ft)		4.41	
E.G. Slope (ft/ft)	0.017902	Area (sq ft)		4.41	179.26
Q Total (cfs)	15.00	Flow (cfs)		15.00	
Top Width (ft)	48.01	Top Width (ft)		11.95	36.06
Vel Total (ft/s)	3.40	Avg. Vel. (ft/s)		3.40	
Max Chl Dpth (ft)	7.02	Hydr. Depth (ft)		0.37	
Conv. Total (cfs)	112.1	Conv. (cfs)		112.1	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		12.02	

Min Ch El (ft)	2750.00	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)	729.11	0.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		0.27	1.66
C & E Loss (ft)	0.01	Cum SA (acres)		0.79	0.59

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2750.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.030	
W.S. Elev (ft)	2750.41	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2750.41	Flow Area (sq ft)		3.17	
E.G. Slope (ft/ft)	0.020101	Area (sq ft)		3.17	175.27
Q Total (cfs)	10.00	Flow (cfs)		10.00	
Top Width (ft)	46.20	Top Width (ft)		10.47	35.73
Vel Total (ft/s)	3.15	Avg. Vel. (ft/s)		3.15	
Max Chl Dpth (ft)	6.91	Hydr. Depth (ft)		0.30	
Conv. Total (cfs)	70.5	Conv. (cfs)		70.5	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		10.53	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)	729.11	0.00	0.00
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)		0.21	1.56
C & E Loss (ft)	0.01	Cum SA (acres)		0.77	0.58

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2750.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.030	
W.S. Elev (ft)	2750.32	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2750.32	Flow Area (sq ft)		2.24	
E.G. Slope (ft/ft)	0.020565	Area (sq ft)		2.24	171.92
Q Total (cfs)	6.20	Flow (cfs)		6.20	
Top Width (ft)	44.66	Top Width (ft)		9.21	35.45
Vel Total (ft/s)	2.76	Avg. Vel. (ft/s)		2.76	

Max Chl Dpth (ft)	6.82	Hydr. Depth (ft)		0.24		
Conv. Total (cfs)	43.2	Conv. (cfs)		43.2		
Length Wtd. (ft)	10.00	Wetted Per. (ft)		9.26		
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		0.31		
Alpha	1.00	Stream Power (lb/ft s)	729.11	0.00	0.00	
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)		0.15	1.47	
C & E Loss (ft)	0.00	Cum SA (acres)		0.75	0.57	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 2400

INPUT
Description: Section 24+00
Station Elevation Data num= 38

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2760	107.69	2759	116.25	2758	141.84	2757	163.76	2757
187.19	2755	234.08	2755	289.28	2755	307.85	2754	319.63	2754
327.06	2755	345.27	2755	383.03	2756	426.7	2756	438.09	2755
465.01	2755	481.87	2754.66	512.42	2755	516.98	2756	520.63	2756
523	2751.5	533	2745	538	2745	548	2751.5	568	2751.5
580	2743.5	595	2743.5	607	2751.5	626.07	2753	628.58	2754
631.17	2755	643.77	2755	685.62	2755	692.43	2756	698.86	2757
707.55	2758	718.12	2759	729.11	2760				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	523	.03	548	.016	568	.013	607	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
523	548	500	500	500	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
548	729.11	2756	F

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2750.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.76	Wt. n-Val.		0.030	
W.S. Elev (ft)	2745.33	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2745.98	Flow Area (sq ft)		1.82	
E.G. Slope (ft/ft)	0.643355	Area (sq ft)		1.82	32.47
Q Total (cfs)	31.80	Flow (cfs)		31.80	
Top Width (ft)	26.50	Top Width (ft)		6.01	20.49
Vel Total (ft/s)	17.51	Avg. Vel. (ft/s)		17.51	
Max Chl Dpth (ft)	1.83	Hydr. Depth (ft)		0.30	
Conv. Total (cfs)	39.6	Conv. (cfs)		39.6	

Length Wtd. (ft)	500.00	Wetted Per. (ft)		6.21	
Min Ch El (ft)	2745.00	Shear (lb/sq ft)		11.75	
Alpha	1.00	Stream Power (lb/ft s)	729.11	0.00	0.00
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)		0.41	1.81
C & E Loss (ft)	0.45	Cum SA (acres)		0.82	0.60

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2749.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.69	Wt. n-Val.		0.030	
W.S. Elev (ft)	2745.29	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2745.87	Flow Area (sq ft)		1.57	
E.G. Slope (ft/ft)	0.744510	Area (sq ft)		1.57	31.63
Q Total (cfs)	27.30	Flow (cfs)		27.30	
Top Width (ft)	26.25	Top Width (ft)		5.89	20.37
Vel Total (ft/s)	17.38	Avg. Vel. (ft/s)		17.38	
Max Chl Dpth (ft)	1.79	Hydr. Depth (ft)		0.27	
Conv. Total (cfs)	31.6	Conv. (cfs)		31.6	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		6.06	
Min Ch El (ft)	2745.00	Shear (lb/sq ft)		12.05	
Alpha	1.00	Stream Power (lb/ft s)	729.11	0.00	0.00
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)		0.37	1.76
C & E Loss (ft)	0.44	Cum SA (acres)		0.81	0.60

Warning: Divided flow computed for this cross-section.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2745.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.030	
W.S. Elev (ft)	2745.62	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2745.62	Flow Area (sq ft)		3.69	
E.G. Slope (ft/ft)	0.017137	Area (sq ft)		3.69	38.53
Q Total (cfs)	15.20	Flow (cfs)		15.20	
Top Width (ft)	28.26	Top Width (ft)		6.91	21.36
Vel Total (ft/s)	4.12	Avg. Vel. (ft/s)		4.12	
Max Chl Dpth (ft)	2.12	Hydr. Depth (ft)		0.53	
Conv. Total (cfs)	116.1	Conv. (cfs)		116.1	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		7.27	
Min Ch El (ft)	2745.00	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)	729.11	0.00	0.00
Frctn Loss (ft)	3.59	Cum Volume (acre-ft)		0.27	1.64
C & E Loss (ft)	0.05	Cum SA (acres)		0.78	0.59

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2745.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2745.21	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2745.17	Flow Area (sq ft)		1.12	
E.G. Slope (ft/ft)	0.011424	Area (sq ft)		1.12	30.06
Q Total (cfs)	2.00	Flow (cfs)		2.00	
Top Width (ft)	25.78	Top Width (ft)		5.65	20.13
Vel Total (ft/s)	1.78	Avg. Vel. (ft/s)		1.78	
Max Chl Dpth (ft)	1.71	Hydr. Depth (ft)		0.20	
Conv. Total (cfs)	18.7	Conv. (cfs)		18.7	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		5.77	
Min Ch El (ft)	2745.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	729.11	0.00	0.00
Frctn Loss (ft)	6.05	Cum Volume (acre-ft)		0.05	1.31
C & E Loss (ft)	0.00	Cum SA (acres)		0.72	0.55

Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2745.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.030	
W.S. Elev (ft)	2745.60	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2745.60	Flow Area (sq ft)		3.57	
E.G. Slope (ft/ft)	0.018302	Area (sq ft)		3.57	38.18
Q Total (cfs)	15.00	Flow (cfs)		15.00	
Top Width (ft)	28.16	Top Width (ft)		6.86	21.31
Vel Total (ft/s)	4.20	Avg. Vel. (ft/s)		4.20	
Max Chl Dpth (ft)	2.10	Hydr. Depth (ft)		0.52	
Conv. Total (cfs)	110.9	Conv. (cfs)		110.9	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		7.21	
Min Ch El (ft)	2745.00	Shear (lb/sq ft)		0.57	
Alpha	1.00	Stream Power (lb/ft s)	729.11	0.00	0.00
Frctn Loss (ft)	3.67	Cum Volume (acre-ft)		0.27	1.64
C & E Loss (ft)	0.06	Cum SA (acres)		0.78	0.59

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2745.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.030	
W.S. Elev (ft)	2745.48	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2745.48	Flow Area (sq ft)		2.73	
E.G. Slope (ft/ft)	0.018264	Area (sq ft)		2.73	35.50
Q Total (cfs)	10.00	Flow (cfs)		10.00	
Top Width (ft)	27.39	Top Width (ft)		6.47	20.93
Vel Total (ft/s)	3.66	Avg. Vel. (ft/s)		3.66	
Max Chl Dpth (ft)	1.98	Hydr. Depth (ft)		0.42	
Conv. Total (cfs)	74.0	Conv. (cfs)		74.0	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		6.75	
Min Ch El (ft)	2745.00	Shear (lb/sq ft)		0.46	
Alpha	1.00	Stream Power (lb/ft s)	729.11	0.00	0.00
Frctn Loss (ft)	3.99	Cum Volume (acre-ft)		0.21	1.54
C & E Loss (ft)	0.04	Cum SA (acres)		0.76	0.58

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2745.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2745.35	Reach Len. (ft)	500.00	500.00	500.00
Crit W.S. (ft)	2745.35	Flow Area (sq ft)		1.95	
E.G. Slope (ft/ft)	0.019570	Area (sq ft)		1.95	32.93
Q Total (cfs)	6.20	Flow (cfs)		6.20	
Top Width (ft)	26.64	Top Width (ft)		6.08	20.56
Vel Total (ft/s)	3.18	Avg. Vel. (ft/s)		3.18	
Max Chl Dpth (ft)	1.85	Hydr. Depth (ft)		0.32	
Conv. Total (cfs)	44.3	Conv. (cfs)		44.3	
Length Wtd. (ft)	500.00	Wetted Per. (ft)		6.29	
Min Ch El (ft)	2745.00	Shear (lb/sq ft)		0.38	

Alpha	1.00	Stream Power (lb/ft s)	729.11	0.00	0.00
Frctn Loss (ft)	4.79	Cum Volume (acre-ft)		0.15	1.45
C & E Loss (ft)	0.03	Cum SA (acres)		0.75	0.57

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 1900

INPUT
Description: Section 19+00
Station Elevation Data num= 23

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2750	125.77	2749	151.52	2748	185.75	2748	213.11	2747.25
245.77	2748	275.91	2748	337.17	2747	339.72	2746	351.01	2745
375.07	2746	401.99	2746	459	2745	468	2739	475	2739
484	2745	504	2745	516	2737	531	2737	543	2745
554.7	2748	565.62	2749	574.4	2750				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	459	.03	484	.016	504	.013	543	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
459	484	200.8	200.8	200.8	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
484	574.4	2747	F

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2740.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.030	
W.S. Elev (ft)	2740.26	Reach Len. (ft)	200.80	200.80	200.80
Crit W.S. (ft)	2739.81	Flow Area (sq ft)		11.20	
E.G. Slope (ft/ft)	0.003417	Area (sq ft)		11.20	64.85
Q Total (cfs)	31.80	Flow (cfs)		31.80	
Top Width (ft)	35.56	Top Width (ft)		10.78	24.78
Vel Total (ft/s)	2.84	Avg. Vel. (ft/s)		2.84	
Max Chl Dpth (ft)	3.26	Hydr. Depth (ft)		1.04	
Conv. Total (cfs)	544.0	Conv. (cfs)		544.0	
Length Wtd. (ft)	200.80	Wetted Per. (ft)		11.54	
Min Ch El (ft)	2739.00	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)		0.34	1.26

C & E Loss (ft)	0.02	Cum SA (acres)	0.72	0.34

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2740.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.030	
W.S. Elev (ft)	2740.15	Reach Len. (ft)	200.80	200.80	200.80
Crit W.S. (ft)	2739.74	Flow Area (sq ft)		10.04	
E.G. Slope (ft/ft)	0.003465	Area (sq ft)		10.04	62.15
Q Total (cfs)	27.30	Flow (cfs)		27.30	
Top Width (ft)	34.90	Top Width (ft)		10.45	24.45
Vel Total (ft/s)	2.72	Avg. Vel. (ft/s)		2.72	
Max Chl Dpth (ft)	3.15	Hydr. Depth (ft)		0.96	
Conv. Total (cfs)	463.8	Conv. (cfs)		463.8	
Length Wtd. (ft)	200.80	Wetted Per. (ft)		11.15	
Min Ch El (ft)	2739.00	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)		0.31	1.22
C & E Loss (ft)	0.02	Cum SA (acres)		0.72	0.34

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2739.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.79	Reach Len. (ft)	200.80	200.80	200.80
Crit W.S. (ft)	2739.50	Flow Area (sq ft)		6.48	
E.G. Slope (ft/ft)	0.003917	Area (sq ft)		6.48	53.57
Q Total (cfs)	15.20	Flow (cfs)		15.20	
Top Width (ft)	32.75	Top Width (ft)		9.38	23.38
Vel Total (ft/s)	2.34	Avg. Vel. (ft/s)		2.34	
Max Chl Dpth (ft)	2.79	Hydr. Depth (ft)		0.69	
Conv. Total (cfs)	242.9	Conv. (cfs)		242.9	
Length Wtd. (ft)	200.80	Wetted Per. (ft)		9.85	
Min Ch El (ft)	2739.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)		0.21	1.11
C & E Loss (ft)	0.02	Cum SA (acres)		0.69	0.33

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2739.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.17	Reach Len. (ft)	200.80	200.80	200.80
Crit W.S. (ft)	2739.14	Flow Area (sq ft)		1.21	
E.G. Slope (ft/ft)	0.012820	Area (sq ft)		1.21	39.55
Q Total (cfs)	2.00	Flow (cfs)		2.00	
Top Width (ft)	29.00	Top Width (ft)		7.50	21.50
Vel Total (ft/s)	1.65	Avg. Vel. (ft/s)		1.65	
Max Chl Dpth (ft)	2.17	Hydr. Depth (ft)		0.16	
Conv. Total (cfs)	17.7	Conv. (cfs)		17.7	
Length Wtd. (ft)	200.80	Wetted Per. (ft)		7.60	
Min Ch El (ft)	2739.00	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)		0.03	0.91
C & E Loss (ft)	0.01	Cum SA (acres)		0.64	0.31

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2739.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.79	Reach Len. (ft)	200.80	200.80	200.80
Crit W.S. (ft)	2739.50	Flow Area (sq ft)		6.42	
E.G. Slope (ft/ft)	0.003934	Area (sq ft)		6.42	53.40
Q Total (cfs)	15.00	Flow (cfs)		15.00	
Top Width (ft)	32.71	Top Width (ft)		9.35	23.35
Vel Total (ft/s)	2.34	Avg. Vel. (ft/s)		2.34	
Max Chl Dpth (ft)	2.78	Hydr. Depth (ft)		0.69	
Conv. Total (cfs)	239.1	Conv. (cfs)		239.1	
Length Wtd. (ft)	200.80	Wetted Per. (ft)		9.83	
Min Ch El (ft)	2739.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)		0.21	1.11
C & E Loss (ft)	0.02	Cum SA (acres)		0.69	0.33

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2739.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.60	Reach Len. (ft)	200.80	200.80	200.80
Crit W.S. (ft)	2739.39	Flow Area (sq ft)		4.71	
E.G. Slope (ft/ft)	0.004459	Area (sq ft)		4.71	49.06
Q Total (cfs)	10.00	Flow (cfs)		10.00	
Top Width (ft)	31.58	Top Width (ft)		8.79	22.79
Vel Total (ft/s)	2.12	Avg. Vel. (ft/s)		2.12	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		0.54	
Conv. Total (cfs)	149.8	Conv. (cfs)		149.8	
Length Wtd. (ft)	200.80	Wetted Per. (ft)		9.15	
Min Ch El (ft)	2739.00	Shear (lb/sq ft)		0.14	

Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)		0.16	1.05
C & E Loss (ft)	0.02	Cum SA (acres)		0.68	0.32

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2739.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.42	Reach Len. (ft)	200.80	200.80	200.80
Crit W.S. (ft)	2739.28	Flow Area (sq ft)		3.20	
E.G. Slope (ft/ft)	0.005662	Area (sq ft)		3.20	45.06
Q Total (cfs)	6.20	Flow (cfs)		6.20	
Top Width (ft)	30.51	Top Width (ft)		8.26	22.26
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)		1.94	
Max Chl Dpth (ft)	2.42	Hydr. Depth (ft)		0.39	
Conv. Total (cfs)	82.4	Conv. (cfs)		82.4	
Length Wtd. (ft)	200.80	Wetted Per. (ft)		8.51	
Min Ch El (ft)	2739.00	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)		0.12	1.00
C & E Loss (ft)	0.01	Cum SA (acres)		0.66	0.32

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 1699.2

INPUT
Description: Section 16+99.2
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100.1	2745	120.77	2745	207	2745	209	2743.5	216.5	2738.5
226.5	2738.5	234	2745	254	2745	269	2735.3	302	2735.3
315	2743.3	316.86	2745						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100.1	.035	209	.03	234	.016	254	.013	316.86	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
207	234	189.2	189.2	189.2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100.1	207	2745	F
254	316.86	2745	F

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2739.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.94	Reach Len. (ft)	189.20	189.20	189.20
Crit W.S. (ft)	2739.15	Flow Area (sq ft)		17.15	
E.G. Slope (ft/ft)	0.001151	Area (sq ft)		17.15	187.24
Q Total (cfs)	31.80	Flow (cfs)		31.80	
Top Width (ft)	61.53	Top Width (ft)		13.82	47.71
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)		1.85	
Max Chl Dpth (ft)	4.64	Hydr. Depth (ft)		1.24	
Conv. Total (cfs)	937.2	Conv. (cfs)		937.2	
Length Wtd. (ft)	189.20	Wetted Per. (ft)		14.79	
Min Ch El (ft)	2738.50	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	316.86	0.00	0.00
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)		0.27	0.68
C & E Loss (ft)	0.02	Cum SA (acres)		0.67	0.17

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the
largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may
wish to examine this cross section and enter a single n value for the entire channel.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2739.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.84	Reach Len. (ft)	189.20	189.20	189.20
Crit W.S. (ft)	2739.10	Flow Area (sq ft)		15.74	
E.G. Slope (ft/ft)	0.001095	Area (sq ft)		15.74	182.34
Q Total (cfs)	27.30	Flow (cfs)		27.30	
Top Width (ft)	60.93	Top Width (ft)		13.55	47.39
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)		1.73	
Max Chl Dpth (ft)	4.54	Hydr. Depth (ft)		1.16	
Conv. Total (cfs)	825.1	Conv. (cfs)		825.1	
Length Wtd. (ft)	189.20	Wetted Per. (ft)		14.45	
Min Ch El (ft)	2738.50	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	316.86	0.00	0.00
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)		0.25	0.66
C & E Loss (ft)	0.02	Cum SA (acres)		0.66	0.17

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the
largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may
wish to examine this cross section and enter a single n value for the entire channel.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2739.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.49	Reach Len. (ft)	189.20	189.20	189.20
Crit W.S. (ft)	2738.90	Flow Area (sq ft)		11.23	
E.G. Slope (ft/ft)	0.000937	Area (sq ft)		11.23	166.21
Q Total (cfs)	15.20	Flow (cfs)		15.20	
Top Width (ft)	58.93	Top Width (ft)		12.63	46.29
Vel Total (ft/s)	1.35	Avg. Vel. (ft/s)		1.35	
Max Chl Dpth (ft)	4.19	Hydr. Depth (ft)		0.89	
Conv. Total (cfs)	496.7	Conv. (cfs)		496.7	
Length Wtd. (ft)	189.20	Wetted Per. (ft)		13.30	
Min Ch El (ft)	2738.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	316.86	0.00	0.00
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)		0.17	0.61
C & E Loss (ft)	0.02	Cum SA (acres)		0.64	0.17

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the
largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may
wish to examine this cross section and enter a single n value for the entire channel.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2738.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2738.82	Reach Len. (ft)	189.20	189.20	189.20
Crit W.S. (ft)	2738.61	Flow Area (sq ft)		3.35	
E.G. Slope (ft/ft)	0.000715	Area (sq ft)		3.35	135.86
Q Total (cfs)	2.00	Flow (cfs)		2.00	
Top Width (ft)	55.02	Top Width (ft)		10.85	44.17
Vel Total (ft/s)	0.60	Avg. Vel. (ft/s)		0.60	
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)		0.31	
Conv. Total (cfs)	74.8	Conv. (cfs)		74.8	
Length Wtd. (ft)	189.20	Wetted Per. (ft)		11.07	
Min Ch El (ft)	2738.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	316.86	0.00	0.00
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)		0.02	0.51
C & E Loss (ft)	0.01	Cum SA (acres)		0.60	0.16

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the
largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may
wish to examine this cross section and enter a single n value for the entire channel.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2739.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.49	Reach Len. (ft)	189.20	189.20	189.20
Crit W.S. (ft)	2738.90	Flow Area (sq ft)		11.14	
E.G. Slope (ft/ft)	0.000934	Area (sq ft)		11.14	165.88
Q Total (cfs)	15.00	Flow (cfs)		15.00	
Top Width (ft)	58.89	Top Width (ft)		12.61	46.27
Vel Total (ft/s)	1.35	Avg. Vel. (ft/s)		1.35	
Max Chl Dpth (ft)	4.19	Hydr. Depth (ft)		0.88	
Conv. Total (cfs)	490.7	Conv. (cfs)		490.7	
Length Wtd. (ft)	189.20	Wetted Per. (ft)		13.28	
Min Ch El (ft)	2738.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	316.86	0.00	0.00
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)		0.17	0.61
C & E Loss (ft)	0.02	Cum SA (acres)		0.64	0.17

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the
largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may
wish to examine this cross section and enter a single n value for the entire channel.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2739.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.30	Reach Len. (ft)	189.20	189.20	189.20
Crit W.S. (ft)	2738.81	Flow Area (sq ft)		8.81	
E.G. Slope (ft/ft)	0.000851	Area (sq ft)		8.81	157.23
Q Total (cfs)	10.00	Flow (cfs)		10.00	
Top Width (ft)	57.79	Top Width (ft)		12.11	45.68
Vel Total (ft/s)	1.13	Avg. Vel. (ft/s)		1.13	
Max Chl Dpth (ft)	4.00	Hydr. Depth (ft)		0.73	
Conv. Total (cfs)	342.9	Conv. (cfs)		342.9	
Length Wtd. (ft)	189.20	Wetted Per. (ft)		12.65	
Min Ch El (ft)	2738.50	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	316.86	0.00	0.00
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)		0.13	0.58
C & E Loss (ft)	0.02	Cum SA (acres)		0.63	0.17

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the
largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may
wish to examine this cross section and enter a single n value for the entire channel.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2739.13	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.01	Wt. n-Val.			0.030	
W.S. Elev (ft)	2739.11	Reach Len. (ft)		189.20	189.20	189.20
Crit W.S. (ft)	2738.73	Flow Area (sq ft)			6.64	
E.G. Slope (ft/ft)	0.000785	Area (sq ft)			6.64	148.94
Q Total (cfs)	6.20	Flow (cfs)			6.20	
Top Width (ft)	56.73	Top Width (ft)			11.63	45.10
Vel Total (ft/s)	0.93	Avg. Vel. (ft/s)			0.93	
Max Chl Dpth (ft)	3.81	Hydr. Depth (ft)			0.57	
Conv. Total (cfs)	221.3	Conv. (cfs)			221.3	
Length Wtd. (ft)	189.20	Wetted Per. (ft)			12.05	
Min Ch El (ft)	2738.50	Shear (lb/sq ft)			0.03	
Alpha	1.00	Stream Power (lb/ft s)		316.86	0.00	0.00
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)			0.10	0.55
C & E Loss (ft)	0.01	Cum SA (acres)			0.62	0.16

Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: When the Manning's n value for the channel was composited, the computed n value was larger [smaller] than the
largest [smallest] user entered n value. The n value has been set to the largest [smallest] entered value. The user may
wish to examine this cross section and enter a single n value for the entire channel.
Note: Manning's n values were composited to a single value in the main channel.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 1510

INPUT
Description: Section 15+10
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2742	107.5	2741	111.85	2740	143.55	2740	147.09	2740
230.4	2740.5	242.4	2738	243.4	2738	255.4	2740.5	277.4	2740.5
287.4	2734	302.4	2734	312.4	2740.5	325.51	2741	332.31	2742
345.45	2745	376.68	2750						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	230.4	.03	255.4	.016	277.4	.013	312.4	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
230.4	255.4	10	10	10	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
255.4	376.68	2740.5	F

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2739.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.13	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2739.13	Flow Area (sq ft)		7.23	
E.G. Slope (ft/ft)	0.015567	Area (sq ft)		7.23	117.37
Q Total (cfs)	31.80	Flow (cfs)		31.80	
Top Width (ft)	42.61	Top Width (ft)		11.83	30.78
Vel Total (ft/s)	4.40	Avg. Vel. (ft/s)		4.40	
Max Chl Dpth (ft)	5.13	Hydr. Depth (ft)		0.61	

Conv. Total (cfs)	254.9	Conv. (cfs)		254.9	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		12.06	
Min Ch El (ft)	2738.00	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)		0.22	0.01
C & E Loss (ft)	0.02	Cum SA (acres)		0.61	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2739.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.05	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2739.05	Flow Area (sq ft)		6.36	
E.G. Slope (ft/ft)	0.016212	Area (sq ft)		6.36	115.02
Q Total (cfs)	27.30	Flow (cfs)		27.30	
Top Width (ft)	41.63	Top Width (ft)		11.09	30.54
Vel Total (ft/s)	4.30	Avg. Vel. (ft/s)		4.30	
Max Chl Dpth (ft)	5.05	Hydr. Depth (ft)		0.57	
Conv. Total (cfs)	214.4	Conv. (cfs)		214.4	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		11.31	
Min Ch El (ft)	2738.00	Shear (lb/sq ft)		0.57	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)		0.20	0.01
C & E Loss (ft)	0.02	Cum SA (acres)		0.61	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2739.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.030	
W.S. Elev (ft)	2738.81	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2738.81	Flow Area (sq ft)		4.00	
E.G. Slope (ft/ft)	0.017342	Area (sq ft)		4.00	107.88
Q Total (cfs)	15.20	Flow (cfs)		15.20	

Top Width (ft)	38.63	Top Width (ft)		8.82	29.81
Vel Total (ft/s)	3.80	Avg. Vel. (ft/s)		3.80	
Max Chl Dpth (ft)	4.81	Hydr. Depth (ft)		0.45	
Conv. Total (cfs)	115.4	Conv. (cfs)		115.4	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		8.99	
Min Ch El (ft)	2738.00	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		0.14	0.01
C & E Loss (ft)	0.01	Cum SA (acres)		0.59	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2738.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2738.31	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2738.31	Flow Area (sq ft)		0.78	
E.G. Slope (ft/ft)	0.024000	Area (sq ft)		0.78	93.31
Q Total (cfs)	2.00	Flow (cfs)		2.00	
Top Width (ft)	32.27	Top Width (ft)		4.00	28.27
Vel Total (ft/s)	2.56	Avg. Vel. (ft/s)		2.56	
Max Chl Dpth (ft)	4.31	Hydr. Depth (ft)		0.20	
Conv. Total (cfs)	12.9	Conv. (cfs)		12.9	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		4.07	
Min Ch El (ft)	2738.00	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)		0.01	0.01
C & E Loss (ft)	0.02	Cum SA (acres)		0.57	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2739.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.030	
W.S. Elev (ft)	2738.81	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2738.81	Flow Area (sq ft)		3.96	
E.G. Slope (ft/ft)	0.017383	Area (sq ft)		3.96	107.73
Q Total (cfs)	15.00	Flow (cfs)		15.00	
Top Width (ft)	38.57	Top Width (ft)		8.77	29.80
Vel Total (ft/s)	3.79	Avg. Vel. (ft/s)		3.79	
Max Chl Dpth (ft)	4.81	Hydr. Depth (ft)		0.45	
Conv. Total (cfs)	113.8	Conv. (cfs)		113.8	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		8.94	
Min Ch El (ft)	2738.00	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		0.14	0.01
C & E Loss (ft)	0.01	Cum SA (acres)		0.59	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2738.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.		0.030	
W.S. Elev (ft)	2738.68	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2738.68	Flow Area (sq ft)		2.86	
E.G. Slope (ft/ft)	0.018418	Area (sq ft)		2.86	103.74
Q Total (cfs)	10.00	Flow (cfs)		10.00	
Top Width (ft)	36.86	Top Width (ft)		7.48	29.38
Vel Total (ft/s)	3.50	Avg. Vel. (ft/s)		3.50	
Max Chl Dpth (ft)	4.67	Hydr. Depth (ft)		0.38	
Conv. Total (cfs)	73.7	Conv. (cfs)		73.7	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		7.61	
Min Ch El (ft)	2738.00	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		0.11	0.01
C & E Loss (ft)	0.01	Cum SA (acres)		0.59	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2738.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2738.54	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2738.54	Flow Area (sq ft)		1.95	
E.G. Slope (ft/ft)	0.019839	Area (sq ft)		1.95	99.84
Q Total (cfs)	6.20	Flow (cfs)		6.20	
Top Width (ft)	35.17	Top Width (ft)		6.19	28.97
Vel Total (ft/s)	3.19	Avg. Vel. (ft/s)		3.19	
Max Chl Dpth (ft)	4.54	Hydr. Depth (ft)		0.31	
Conv. Total (cfs)	44.0	Conv. (cfs)		44.0	
Length Wtd. (ft)	10.00	Wetted Per. (ft)		6.31	
Min Ch El (ft)	2738.00	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)		0.08	0.01
C & E Loss (ft)	0.01	Cum SA (acres)		0.58	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: Divided flow computed for this cross-section.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Low Flow Channel RS: 1500

INPUT
Description: Section 15+00
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2742	107.5	2741	111.85	2740	143.55	2740	147.09	2740
230.4	2740.5	242.4	2732.5	243.4	2732.5	255.4	2740.5	277.4	2740.5
287.4	2734	302.4	2734	312.4	2740.5	325.51	2741	332.31	2742
345.45	2745	376.68	2750						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	230.4	.03	255.4	.016	277.4	.013	312.4	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
230.4	255.4	542.2	542.2	542.2	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
255.4	376.68	2740.5	F

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2738.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.21	Wt. n-Val.		0.030	
W.S. Elev (ft)	2733.29	Reach Len. (ft)	542.20	542.20	542.20

Crit W.S. (ft)	2734.16	Flow Area (sq ft)		1.74	
E.G. Slope (ft/ft)	0.397194	Area (sq ft)		1.74	
Q Total (cfs)	31.80	Flow (cfs)		31.80	
Top Width (ft)	3.38	Top Width (ft)		3.38	
Vel Total (ft/s)	18.32	Avg. Vel. (ft/s)		18.32	
Max Chl Dpth (ft)	0.79	Hydr. Depth (ft)		0.51	
Conv. Total (cfs)	50.5	Conv. (cfs)		50.5	
Length Wtd. (ft)	542.20	Wetted Per. (ft)		3.86	
Min Ch El (ft)	2732.50	Shear (lb/sq ft)		11.15	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)		0.22	
C & E Loss (ft)	0.49	Cum SA (acres)		0.61	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2738.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.18	Wt. n-Val.		0.030	
W.S. Elev (ft)	2733.22	Reach Len. (ft)	542.20	542.20	542.20
Crit W.S. (ft)	2734.01	Flow Area (sq ft)		1.50	
E.G. Slope (ft/ft)	0.437424	Area (sq ft)		1.50	
Q Total (cfs)	27.30	Flow (cfs)		27.30	
Top Width (ft)	3.16	Top Width (ft)		3.16	
Vel Total (ft/s)	18.26	Avg. Vel. (ft/s)		18.26	
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)		0.47	
Conv. Total (cfs)	41.3	Conv. (cfs)		41.3	
Length Wtd. (ft)	542.20	Wetted Per. (ft)		3.59	
Min Ch El (ft)	2732.50	Shear (lb/sq ft)		11.36	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)		0.20	
C & E Loss (ft)	0.49	Cum SA (acres)		0.61	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2738.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2732.99	Reach Len. (ft)	542.20	542.20	542.20
Crit W.S. (ft)	2733.65	Flow Area (sq ft)		0.84	
E.G. Slope (ft/ft)	0.643299	Area (sq ft)		0.84	
Q Total (cfs)	15.20	Flow (cfs)		15.20	
Top Width (ft)	2.46	Top Width (ft)		2.46	
Vel Total (ft/s)	18.03	Avg. Vel. (ft/s)		18.03	
Max Chl Dpth (ft)	0.49	Hydr. Depth (ft)		0.34	
Conv. Total (cfs)	19.0	Conv. (cfs)		19.0	
Length Wtd. (ft)	542.20	Wetted Per. (ft)		2.76	
Min Ch El (ft)	2732.50	Shear (lb/sq ft)		12.28	

Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)		0.14	
C & E Loss (ft)	0.48	Cum SA (acres)		0.59	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2737.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.56	Wt. n-Val.		0.030	
W.S. Elev (ft)	2732.60	Reach Len. (ft)	542.20	542.20	542.20
Crit W.S. (ft)	2732.90	Flow Area (sq ft)		0.12	
E.G. Slope (ft/ft)	3.178187	Area (sq ft)		0.12	
Q Total (cfs)	2.00	Flow (cfs)		2.00	
Top Width (ft)	1.30	Top Width (ft)		1.30	
Vel Total (ft/s)	17.14	Avg. Vel. (ft/s)		17.14	
Max Chl Dpth (ft)	0.10	Hydr. Depth (ft)		0.09	
Conv. Total (cfs)	1.1	Conv. (cfs)		1.1	
Length Wtd. (ft)	542.20	Wetted Per. (ft)		1.37	
Min Ch El (ft)	2732.50	Shear (lb/sq ft)		16.96	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.81	Cum Volume (acre-ft)		0.01	
C & E Loss (ft)	0.45	Cum SA (acres)		0.57	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2738.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2732.98	Reach Len. (ft)	542.20	542.20	542.20
Crit W.S. (ft)	2733.66	Flow Area (sq ft)		0.83	
E.G. Slope (ft/ft)	0.650233	Area (sq ft)		0.83	
Q Total (cfs)	15.00	Flow (cfs)		15.00	
Top Width (ft)	2.45	Top Width (ft)		2.45	
Vel Total (ft/s)	18.04	Avg. Vel. (ft/s)		18.04	
Max Chl Dpth (ft)	0.48	Hydr. Depth (ft)		0.34	
Conv. Total (cfs)	18.6	Conv. (cfs)		18.6	
Length Wtd. (ft)	542.20	Wetted Per. (ft)		2.74	
Min Ch El (ft)	2732.50	Shear (lb/sq ft)		12.32	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)		0.14	
C & E Loss (ft)	0.48	Cum SA (acres)		0.59	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2737.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.97	Wt. n-Val.		0.030	
W.S. Elev (ft)	2732.86	Reach Len. (ft)	542.20	542.20	542.20
Crit W.S. (ft)	2733.45	Flow Area (sq ft)		0.56	
E.G. Slope (ft/ft)	0.862145	Area (sq ft)		0.56	
Q Total (cfs)	10.00	Flow (cfs)		10.00	
Top Width (ft)	2.09	Top Width (ft)		2.09	
Vel Total (ft/s)	17.88	Avg. Vel. (ft/s)		17.88	
Max Chl Dpth (ft)	0.36	Hydr. Depth (ft)		0.27	
Conv. Total (cfs)	10.8	Conv. (cfs)		10.8	
Length Wtd. (ft)	542.20	Wetted Per. (ft)		2.31	
Min Ch El (ft)	2732.50	Shear (lb/sq ft)		13.05	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)		0.11	
C & E Loss (ft)	0.48	Cum SA (acres)		0.59	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2737.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.86	Wt. n-Val.		0.030	
W.S. Elev (ft)	2732.75	Reach Len. (ft)	542.20	542.20	542.20
Crit W.S. (ft)	2733.24	Flow Area (sq ft)		0.35	
E.G. Slope (ft/ft)	1.226480	Area (sq ft)		0.35	
Q Total (cfs)	6.20	Flow (cfs)		6.20	
Top Width (ft)	1.76	Top Width (ft)		1.76	
Vel Total (ft/s)	17.68	Avg. Vel. (ft/s)		17.68	
Max Chl Dpth (ft)	0.25	Hydr. Depth (ft)		0.20	
Conv. Total (cfs)	5.6	Conv. (cfs)		5.6	
Length Wtd. (ft)	542.20	Wetted Per. (ft)		1.92	
Min Ch El (ft)	2732.50	Shear (lb/sq ft)		14.02	
Alpha	1.00	Stream Power (lb/ft s)	376.68	0.00	0.00
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)		0.08	
C & E Loss (ft)	0.47	Cum SA (acres)		0.58	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

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          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Low Flow Channel   RS: 957.5

INPUT
Description: Section 9+57.5 - D/S Boundary
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2731  118.37    2730  179.97    2729  197.72    2727  264.51    2727
  287.05    2727  303.36    2730  308.76    2731

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  179.97     .03  303.36    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        179.97  303.36                0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2727.38    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.01    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2727.36    Reach Len. (ft)
  Crit W.S. (ft)           2727.16    Flow Area (sq ft)                     33.26
  E.G. Slope (ft/ft)      0.001501    Area (sq ft)                          33.26
  Q Total (cfs)              31.80    Flow (cfs)                            31.80
  Top Width (ft)             94.51    Top Width (ft)                        94.51
  Vel Total (ft/s)            0.96    Avg. Vel. (ft/s)                       0.96
  Max Chl Dpth (ft)           0.36    Hydr. Depth (ft)                       0.35
  Conv. Total (cfs)          820.8    Conv. (cfs)                           820.8
  Length Wtd. (ft)                    Wetted Per. (ft)                      94.56
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                       0.03
  Alpha                       1.00    Stream Power (lb/ft s)    308.76       0.00       0.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)
  C & E Loss (ft)                     Cum SA (acres)


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2727.34    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.01    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2727.33    Reach Len. (ft)
  Crit W.S. (ft)           2727.14    Flow Area (sq ft)                     30.29
  E.G. Slope (ft/ft)      0.001501    Area (sq ft)                          30.29
  Q Total (cfs)              27.30    Flow (cfs)                            27.30
  Top Width (ft)             94.06    Top Width (ft)                        94.06
  Vel Total (ft/s)            0.90    Avg. Vel. (ft/s)                       0.90
  Max Chl Dpth (ft)           0.33    Hydr. Depth (ft)                       0.32
  Conv. Total (cfs)          704.6    Conv. (cfs)                           704.6
  Length Wtd. (ft)                    Wetted Per. (ft)                      94.11
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                       0.03
  Alpha                       1.00    Stream Power (lb/ft s)    308.76       0.00       0.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)
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  C & E Loss (ft)                     Cum SA (acres)


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2727.24    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.01    Wt. n-Val.                           0.030
  W.S. Elev (ft)           2727.23    Reach Len. (ft)
  Crit W.S. (ft)           2727.10    Flow Area (sq ft)                    21.19
  E.G. Slope (ft/ft)      0.001500    Area (sq ft)                         21.19
  Q Total (cfs)              15.20    Flow (cfs)                           15.20
  Top Width (ft)             92.66    Top Width (ft)                       92.66
  Vel Total (ft/s)            0.72    Avg. Vel. (ft/s)                      0.72
  Max Chl Dpth (ft)           0.23    Hydr. Depth (ft)                      0.23
  Conv. Total (cfs)          392.5    Conv. (cfs)                          392.5
  Length Wtd. (ft)                    Wetted Per. (ft)                     92.70
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                      0.02
  Alpha                       1.00    Stream Power (lb/ft s)    308.76      0.00       0.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)
  C & E Loss (ft)                     Cum SA (acres)


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #10-yr FIS

  E.G. Elev (ft)           2727.04    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.01    Wt. n-Val.                           0.030
  W.S. Elev (ft)           2727.03    Reach Len. (ft)
  Crit W.S. (ft)           2727.03    Flow Area (sq ft)                     2.27
  E.G. Slope (ft/ft)      0.042414    Area (sq ft)                          2.27
  Q Total (cfs)               2.00    Flow (cfs)                            2.00
  Top Width (ft)             89.69    Top Width (ft)                       89.69
  Vel Total (ft/s)            0.88    Avg. Vel. (ft/s)                      0.88
  Max Chl Dpth (ft)           0.03    Hydr. Depth (ft)                      0.03
  Conv. Total (cfs)            9.7    Conv. (cfs)                           9.7
  Length Wtd. (ft)                    Wetted Per. (ft)                     89.70
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                      0.07
  Alpha                       1.00    Stream Power (lb/ft s)    308.76      0.00       0.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)
  C & E Loss (ft)                     Cum SA (acres)


Warning: Slope-Area method could not converge on a starting water surface elevation within the
specified number of trials.  The
         program used critical depth as the starting water surface.

CROSS SECTION OUTPUT  Profile #10-yr SBCFCD

  E.G. Elev (ft)           2727.24    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.01    Wt. n-Val.                           0.030
  W.S. Elev (ft)           2727.23    Reach Len. (ft)
  Crit W.S. (ft)           2727.10    Flow Area (sq ft)                    21.01
  E.G. Slope (ft/ft)      0.001502    Area (sq ft)                         21.01
  Q Total (cfs)              15.00    Flow (cfs)                           15.00
  Top Width (ft)             92.64    Top Width (ft)                       92.64
  Vel Total (ft/s)            0.71    Avg. Vel. (ft/s)                      0.71
  Max Chl Dpth (ft)           0.23    Hydr. Depth (ft)                      0.23
  Conv. Total (cfs)          387.0    Conv. (cfs)                          387.0
  Length Wtd. (ft)                    Wetted Per. (ft)                     92.67
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                      0.02
  Alpha                       1.00    Stream Power (lb/ft s)    308.76      0.00       0.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)
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  C & E Loss (ft)                     Cum SA (acres)


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #5-yr SBCFCD

  E.G. Elev (ft)           2727.19    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.01    Wt. n-Val.                           0.030
  W.S. Elev (ft)           2727.18    Reach Len. (ft)
  Crit W.S. (ft)           2727.07    Flow Area (sq ft)                    16.44
  E.G. Slope (ft/ft)      0.001498    Area (sq ft)                         16.44
  Q Total (cfs)              10.00    Flow (cfs)                           10.00
  Top Width (ft)             91.93    Top Width (ft)                       91.93
  Vel Total (ft/s)            0.61    Avg. Vel. (ft/s)                      0.61
  Max Chl Dpth (ft)           0.18    Hydr. Depth (ft)                      0.18
  Conv. Total (cfs)          258.4    Conv. (cfs)                          258.4
  Length Wtd. (ft)                    Wetted Per. (ft)                     91.95
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                      0.02
  Alpha                       1.00    Stream Power (lb/ft s)    308.76      0.00       0.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)
  C & E Loss (ft)                     Cum SA (acres)


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2727.14    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.00    Wt. n-Val.                           0.030
  W.S. Elev (ft)           2727.14    Reach Len. (ft)
  Crit W.S. (ft)           2727.05    Flow Area (sq ft)                    12.30
  E.G. Slope (ft/ft)      0.001499    Area (sq ft)                         12.30
  Q Total (cfs)               6.20    Flow (cfs)                            6.20
  Top Width (ft)             91.28    Top Width (ft)                       91.28
  Vel Total (ft/s)            0.50    Avg. Vel. (ft/s)                      0.50
  Max Chl Dpth (ft)           0.14    Hydr. Depth (ft)                      0.13
  Conv. Total (cfs)          160.2    Conv. (cfs)                          160.2
  Length Wtd. (ft)                    Wetted Per. (ft)                     91.30
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                      0.01
  Alpha                       1.00    Stream Power (lb/ft s)    308.76      0.00       0.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)
  C & E Loss (ft)                     Cum SA (acres)


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.


SUMMARY OF MANNING'S N VALUES

River:Desert Knolls Wa

      Reach          River Sta.       n1        n2        n3        n4        n5        n6

 Main                 12028.1          .016      .013      .016      .035
 Main                 11745.2*         .035      .016      .013      .016      .035      .035
 Main                 11655            .016      .013      .016      .035
 Main                 11647            .016      .013      .016      .035
 Main                 11645        Lat Struct
 Main                 11643            .016      .013      .016      .035
 Main                 11635            .016      .013      .016      .035
 Main                 11462.4*         .035      .016      .013      .016      .035      .035
 Main                 11179.5*         .035      .016      .013      .016      .035      .035
 Main                 10896.7*         .035      .016      .013      .016      .035      .035
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Main	10720.4	.035	.013	.035			
Main	10694.4	Culvert					
Main	10659.4	.035	.013	.035			
Main	10613.9	.035	.016	.013	.035		
Main	10525	.016	.013	.035			
Main	10517	.016	.013	.035			
Main	10515	Lat Struct					
Main	10513	.016	.013	.035			
Main	10505	.016	.013	.035			
Main	10344.4*	.035	.016	.013	.016	.035	.035
Main	10075*	.035	.016	.013	.016	.035	.035
Main	9805.55*	.035	.016	.013	.016	.035	.035
Main	9575	.035	.016	.013	.035		
Main	9536.1	.035	.016	.013	.035		
Main	9525.6	Culvert					
Main	9515.1	.035	.016	.013	.035		
Main	9355.33*	.035	.016	.013	.016	.035	.035
Main	9195.56*	.035	.016	.013	.035	.035	
Main	9035.8	.035	.016	.013	.016	.035	
Main	9020.399	Culvert					
Main	9005	.035	.016	.013	.035		
Main	8885	.016	.013	.035			
Main	8877	.016	.013	.035			
Main	8875	Lat Struct					
Main	8873	.016	.013	.035			
Main	8865	.016	.013	.035			
Main	8756.22*	.035	.016	.013	.035	.035	
Main	8507.43*	.035	.016	.013	.035	.035	
Main	8258.66*	.035	.016	.013	.035	.035	
Main	8009.88*	.035	.016	.013	.016	.035	.035
Main	7800	.035	.016	.013	.035		
Main	7761.1	.035	.016	.013	.035		
Main	7749.9	Culvert					
Main	7738.6	.035	.016	.013	.035		
Main	7700	.035	.016	.013	.035		
Main	7500.*	.035	.016	.013	.016	.035	.035
Main	7305	.035	.016	.013	.035		
Main	7266.9	.035	.016	.013	.035	.016	
Main	7249.1	Culvert					
Main	7231.3	.035	.016	.013	.035	.016	
Main	7187.1	.035	.016	.013	.035		
Main	7125	.016	.013	.035			
Main	7117	.016	.013	.035			
Main	7115	Lat Struct					
Main	7113	.016	.013	.035			
Main	7105	.016	.013	.035			
Main	7013.55*	.035	.016	.013	.016	.035	.035
Main	6840	.035	.016	.013	.035		
Main	6801.6	.035	.016	.013	.035	.016	
Main	6785.6	Culvert					
Main	6769.6	.035	.016	.013	.035	.016	
Main	6707.1	.035	.016	.013	.035		
Main	6385	.035	.016	.013	.035		
Main	6345	.035	.016	.013	.035		
Main	6344.7	.035	.016	.013	.013		
Main	6328.7	Culvert					
Main	6312.6	.035	.016	.013	.013		
Main	6312.1	.035	.016	.013	.016	.035	
Main	6267.1	.035	.016	.013	.016	.035	
Main	6000	.035	.016	.013	.016	.035	
Main	5950	.035	.013	.016			
Main	5772.1	.035	.016	.013	.016	.035	
Main	5742	.035	.016	.013	.016	.035	
Main	5679.8	Culvert					
Main	5609.6	.035	.013	.035			

Main	5581.3	.035	.013	.035			
Main	5515.3	.013	.013	.013			
Main	5135	.013	.013	.013			
Main	4875	.013	.013	.013			
Main	4635	.013	.013	.013			
Main	4385	.013	.013	.013			
Main	4135	.013	.013	.013			
Main	3969.6	.035	.013	.035			
Main	3835	.013	.013	.013			
Main	3740	.016	.013	.035			
Main	3732	.016	.013	.035			
Main	3730	Lat Struct					
Main	3728	.016	.013	.035			
Main	3720	.016	.013	.035			
Main	3520.3	.03	.016	.013	.035		
Main	3422	.03	.016	.013	.035		
Main	3410	.035	.03	.016	.013	.035	
Main	3400.*	.035	.03	.016	.013	.035	
Main	3266.4	.03	.016	.013	.035		
Main	3220	.016	.013	.035			
Main	3212	.016	.013	.035			
Main	3210	Lat Struct					
Main	3208	.016	.013	.035			
Main	3200	.016	.013	.035			
Main	2942.6	.035	.03	.016	.013	.035	
Main	2910	.035	.03	.016	.013	.035	
Main	2900	.035	.03	.016	.013	.035	
Main	2770	.16	.013	.035			
Main	2762	.16	.013	.035			
Main	2760	Lat Struct					
Main	2758	.16	.013	.035			
Main	2750	.16	.013	.035			
Main	2730.8	.035	.03	.16	.013	.035	
Main	2513.9	.035	.03	.016	.013	.035	
Main	2410	.035	.03	.016	.013	.035	
Main	2400	.035	.03	.016	.013	.035	
Main	2320	.016	.013	.035			
Main	2312	.016	.013	.035			
Main	2310	Lat Struct					
Main	2308	.016	.013	.035			
Main	2300	.016	.013	.035			
Main	2260.4	.035	.03	.016	.013	.035	
Main	1986.6	.035	.03	.016	.013	.035	
Main	1910	.035	.03	.016	.013	.035	
Main	1900	.035	.03	.016	.013	.035	
Main	1720	.03	.016	.013	.035		
Main	1712	.03	.03	.016	.013	.035	
Main	1710	Lat Struct					
Main	1708	.03	.03	.016	.013	.035	
Main	1699.2	.035	.03	.016	.013	.016	.035
Main	1500	.016	.013	.035			
Main	1200.*	.035	.03	.016	.013	.035	.035
Main	957.5	.035	.03	.035			
Low Flow Channel	11179.5	.035	.03	.016	.013	.035	.035
Low Flow Channel	10613.9	.035	.03	.016	.013	.035	
Low Flow Channel	9536.1	.035	.03	.016	.013	.035	
Low Flow Channel	9035.8	.035	.03	.016	.013	.035	
Low Flow Channel	9005	.035	.03	.016	.013	.035	
Low Flow Channel	8674.9	.035	.03	.016	.013	.035	
Low Flow Channel	8507.43	.035	.03	.016	.013	.035	.035
Low Flow Channel	8258.66	.035	.03	.016	.013	.035	.035
Low Flow Channel	8009.9	.035	.03	.016	.013	.035	.035
Low Flow Channel	6735	.03	.016				
Low Flow Channel	3410	.035	.03	.016	.013	.035	
Low Flow Channel	3400	.035	.03	.016	.013	.035	

Low Flow Channel	2900	.035	.03	.016	.013	.035
Low Flow Channel	2410	.035	.03	.016	.013	.035
Low Flow Channel	2400	.035	.03	.016	.013	.035
Low Flow Channel	1900	.035	.03	.016	.013	.035
Low Flow Channel	1699.2	.035	.03	.016	.013	.035
Low Flow Channel	1510	.035	.03	.016	.013	.035
Low Flow Channel	1500	.035	.03	.016	.013	.035
Low Flow Channel	957.5	.035	.03	.035		

SUMMARY OF REACH LENGTHS

River: Desert Knolls Wa

Reach	River Sta.	Left	Channel	Right
Main	12028.1	282.84	282.84	282.84
Main	11745.2*	90.2	90.2	90.2
Main	11655	8	8	8
Main	11647	4	4	4
Main	11645	Lat Struct		
Main	11643	8	8	8
Main	11635	172.6	172.6	172.6
Main	11462.4*	282.84	282.84	282.84
Main	11179.5*	282.84	282.84	282.84
Main	10896.7*	176.3	176.3	176.3
Main	10720.4	61	61	61
Main	10694.4	Culvert		
Main	10659.4	45.5	45.5	45.5
Main	10613.9	269.45	269.45	269.45
Main	10525	8	8	8
Main	10517	4	4	4
Main	10515	Lat Struct		
Main	10513	8	8	8
Main	10505	160.6	160.6	160.6
Main	10344.4*	269.45	269.45	269.45
Main	10075*	269.45	269.45	269.45
Main	9805.55*	230.55	230.55	230.55
Main	9575	38.9	38.9	38.9
Main	9536.1	20.9	20.9	20.9
Main	9525.6	Culvert		
Main	9515.1	159.77	159.77	159.77
Main	9355.33*	159.77	159.77	159.77
Main	9195.56*	159.77	159.77	159.77
Main	9035.8	30.7	30.7	30.7
Main	9020.399	Culvert		
Main	9005	120	120	120
Main	8885	8	8	8
Main	8877	4	4	4
Main	8875	Lat Struct		
Main	8873	8	8	8
Main	8865	108.78	108.78	108.78
Main	8756.22*	248.78	248.78	248.78
Main	8507.43*	248.78	248.78	248.78
Main	8258.66*	248.78	248.78	248.78
Main	8009.88*	209.88	209.88	209.88
Main	7800	38.9	38.9	38.9
Main	7761.1	22.5	22.5	22.5
Main	7749.9	Culvert		
Main	7738.6	38.6	38.6	38.6
Main	7700	200	200	200
Main	7500.*	195	195	195
Main	7305	38.1	38.1	38.1

Main	7266.9		35.6	35.6	35.6
Main	7249.1	Culvert			
Main	7231.3		44.2	44.2	44.2
Main	7187.1		62.1	62.1	62.1
Main	7125		8	8	8
Main	7117		4	4	4
Main	7115	Lat Struct			
Main	7113		8	8	8
Main	7105		91.45	91.45	91.45
Main	7013.55*		173.55	173.55	173.55
Main	6840		38.4	38.4	38.4
Main	6801.6		32	32	32
Main	6785.6	Culvert			
Main	6769.6		62.5	62.5	62.5
Main	6707.1		322.1	322.1	322.1
Main	6385		40	40	40
Main	6345		.3	.3	.3
Main	6344.7		32.1	32.1	32.1
Main	6328.7	Culvert			
Main	6312.6		.5	.5	.5
Main	6312.1		45	45	45
Main	6267.1		267.1	267.1	267.1
Main	6000		50	50	50
Main	5950		177.9	177.9	177.9
Main	5772.1		30.1	30.1	30.1
Main	5742		132.4	132.4	132.4
Main	5679.8	Culvert			
Main	5609.6		28.3	28.3	28.3
Main	5581.3		66	66	66
Main	5515.3		50.3	50.3	50.3
Main	5135		260	260	260
Main	4875		240	240	240
Main	4635		250	250	250
Main	4385		250	250	250
Main	4135		165.4	165.4	165.4
Main	3969.6		134.6	134.6	134.6
Main	3835		95	95	95
Main	3740		8	8	8
Main	3732		4	4	4
Main	3730	Lat Struct			
Main	3728		8	8	8
Main	3720		199.7	199.7	199.7
Main	3520.3		98.3	98.3	98.3
Main	3422		12	12	12
Main	3410		10	10	10
Main	3400.*		133.6	133.6	133.6
Main	3266.4		46.4	46.4	46.4
Main	3220		8	8	8
Main	3212		4	4	4
Main	3210	Lat Struct			
Main	3208		8	8	8
Main	3200		257.4	257.4	257.4
Main	2942.6		32.6	32.6	32.6
Main	2910		10	10	10
Main	2900		130	130	130
Main	2770		8	8	8
Main	2762		4	4	4
Main	2760	Lat Struct			
Main	2758		8	8	8
Main	2750		19.2	19.2	19.2
Main	2730.8		216.9	216.9	216.9
Main	2513.9		103.9	103.9	103.9
Main	2410		10	10	10
Main	2400		80	80	80
Main	2320		8	8	8

Main	2312	4	4	4
Main	2310	Lat Struct		
Main	2308	8	8	8
Main	2300	39.6	39.6	39.6
Main	2260.4	273.8	273.8	273.8
Main	1986.6	76.6	76.6	76.6
Main	1910	10	10	10
Main	1900	180	180	180
Main	1720	8	8	8
Main	1712	4	4	4
Main	1710	Lat Struct		
Main	1708	8.8	8.8	8.8
Main	1699.2	199.21	199.21	199.21
Main	1500	300	300	300
Main	1200.*	242.5	242.5	242.5
Main	957.5	0	0	0
Low Flow Channel	11179.5	848.5	848.5	848.5
Low Flow Channel	10613.9	1077.8	1077.8	1077.8
Low Flow Channel	9536.1	500.3	500.3	500.3
Low Flow Channel	9035.8	30.7	30.7	30.7
Low Flow Channel	9005	330.1	330.1	330.1
Low Flow Channel	8674.9	167.5	167.5	167.5
Low Flow Channel	8507.43	248.78	248.78	248.78
Low Flow Channel	8258.66	248.7	248.7	248.7
Low Flow Channel	8009.9	1274.9	1274.9	1274.9
Low Flow Channel	6735	3325	3325	3325
Low Flow Channel	3410	10	10	10
Low Flow Channel	3400	133.6	133.6	133.6
Low Flow Channel	2900	490	490	490
Low Flow Channel	2410	10	10	10
Low Flow Channel	2400	500	500	500
Low Flow Channel	1900	200.8	200.8	200.8
Low Flow Channel	1699.2	189.2	189.2	189.2
Low Flow Channel	1510	10	10	10
Low Flow Channel	1500	542.2	542.2	542.2
Low Flow Channel	957.5	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Desert Knolls Wa

Reach	River Sta.	Contr.	Expan.
Main	12028.1	.1	.3
Main	11745.2*	.1	.3
Main	11655	.1	.3
Main	11647	.1	.3
Main	11645	Lat Struct	
Main	11643	.1	.3
Main	11635	.1	.3
Main	11462.4*	.1	.3
Main	11179.5*	.1	.3
Main	10896.7*	.1	.3
Main	10720.4	.3	.5
Main	10694.4	Culvert	
Main	10659.4	.3	.5
Main	10613.9	.1	.3
Main	10525	.1	.3
Main	10517	.1	.3
Main	10515	Lat Struct	
Main	10513	.1	.3
Main	10505	.1	.3

Main	10344.4*		.1	.3
Main	10075*		.1	.3
Main	9805.55*		.1	.3
Main	9575		.1	.3
Main	9536.1		.3	.5
Main	9525.6	Culvert		
Main	9515.1		.3	.5
Main	9355.33*		.3	.5
Main	9195.56*		.3	.5
Main	9035.8		.3	.5
Main	9020.399	Culvert		
Main	9005		.3	.5
Main	8885		.3	.5
Main	8877		.3	.5
Main	8875	Lat Struct		
Main	8873		.3	.5
Main	8865		.3	.5
Main	8756.22*		.3	.5
Main	8507.43*		.3	.5
Main	8258.66*		.3	.5
Main	8009.88*		.3	.5
Main	7800		.3	.5
Main	7761.1		.3	.5
Main	7749.9	Culvert		
Main	7738.6		.3	.5
Main	7700		.3	.5
Main	7500.*		.3	.5
Main	7305		.1	.3
Main	7266.9		.3	.5
Main	7249.1	Culvert		
Main	7231.3		.3	.5
Main	7187.1		.1	.3
Main	7125		.1	.3
Main	7117		.1	.3
Main	7115	Lat Struct		
Main	7113		.1	.3
Main	7105		.1	.3
Main	7013.55*		.1	.3
Main	6840		.1	.3
Main	6801.6		.1	.3
Main	6785.6	Culvert		
Main	6769.6		.1	.3
Main	6707.1		.1	.3
Main	6385		.1	.3
Main	6345		.1	.3
Main	6344.7		.3	.5
Main	6328.7	Culvert		
Main	6312.6		.3	.5
Main	6312.1		.1	.3
Main	6267.1		.1	.3
Main	6000		.1	.3
Main	5950		.1	.3
Main	5772.1		.1	.3
Main	5742		.3	.5
Main	5679.8	Culvert		
Main	5609.6		.3	.5
Main	5581.3		.1	.3
Main	5515.3		.1	.3
Main	5135		.1	.3
Main	4875		.1	.3
Main	4635		.1	.3
Main	4385		.1	.3
Main	4135		.1	.3
Main	3969.6		.1	.3
Main	3835		.1	.3

Main	3740	.1	.3
Main	3732	.1	.3
Main	3730	Lat Struct	
Main	3728	.1	.3
Main	3720	.1	.3
Main	3520.3	.1	.3
Main	3422	.1	.3
Main	3410	.1	.3
Main	3400.*	.1	.3
Main	3266.4	.1	.3
Main	3220	.1	.3
Main	3212	.1	.3
Main	3210	Lat Struct	
Main	3208	.1	.3
Main	3200	.1	.3
Main	2942.6	.1	.3
Main	2910	.1	.3
Main	2900	.1	.3
Main	2770	.1	.3
Main	2762	.1	.3
Main	2760	Lat Struct	
Main	2758	.1	.3
Main	2750	.1	.3
Main	2730.8	.1	.3
Main	2513.9	.1	.3
Main	2410	.1	.3
Main	2400	.1	.3
Main	2320	.1	.3
Main	2312	.1	.3
Main	2310	Lat Struct	
Main	2308	.1	.3
Main	2300	.1	.3
Main	2260.4	.1	.3
Main	1986.6	.1	.3
Main	1910	.1	.3
Main	1900	.1	.3
Main	1720	.1	.3
Main	1712	.1	.3
Main	1710	Lat Struct	
Main	1708	.1	.3
Main	1699.2	.1	.3
Main	1500	.1	.3
Main	1200.*	.1	.3
Main	957.5	.1	.3
Low Flow Channel	11179.5	.1	.3
Low Flow Channel	10613.9	.1	.3
Low Flow Channel	9536.1	.3	.5
Low Flow Channel	9035.8	.3	.5
Low Flow Channel	9005	.3	.5
Low Flow Channel	8674.9	.3	.5
Low Flow Channel	8507.43	.3	.5
Low Flow Channel	8258.66	.3	.5
Low Flow Channel	8009.9	.3	.5
Low Flow Channel	6735	.3	.5
Low Flow Channel	3410	.1	.3
Low Flow Channel	3400	.1	.3
Low Flow Channel	2900	.1	.3
Low Flow Channel	2410	.1	.3
Low Flow Channel	2400	.1	.3
Low Flow Channel	1900	.1	.3
Low Flow Channel	1699.2	.1	.3
Low Flow Channel	1510	.1	.3
Low Flow Channel	1500	.1	.3
Low Flow Channel	957.5	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Low Flow Channel	11179.5	100-yr SBCFCD	30.70	2848.40	2849.26	2848.96	2849.36	0.003718	2.52	12.17	43.99	0.50
Low Flow Channel	11179.5	100-yr FIS	26.70	2848.40	2849.19	2848.90	2849.28	0.003727	2.40	11.12	43.60	0.49
Low Flow Channel	11179.5	50-yr FIS	15.70	2848.40	2848.98	2848.75	2849.04	0.003607	1.96	8.01	42.39	0.47
Low Flow Channel	11179.5	10-yr FIS	2.40	2848.40	2848.60	2848.50	2848.61	0.002918	0.90	2.67	40.20	0.36
Low Flow Channel	11179.5	10-yr SBCFCD	14.40	2848.40	2848.96	2848.73	2849.01	0.003469	1.87	7.68	42.26	0.45
Low Flow Channel	11179.5	5-yr SBCFCD	9.70	2848.40	2848.85	2848.65	2848.89	0.003335	1.60	6.07	41.61	0.43
Low Flow Channel	11179.5	2-yr SBCFCD	6.00	2848.40	2848.75	2848.59	2848.77	0.002994	1.29	4.65	41.03	0.39
Low Flow Channel	10613.9	100-yr SBCFCD	30.70	2844.00	2844.67	2844.54	2844.83	0.008246	3.20	9.60	47.68	0.72
Low Flow Channel	10613.9	100-yr FIS	26.70	2844.00	2844.62	2844.50	2844.76	0.008229	3.04	8.78	47.32	0.71
Low Flow Channel	10613.9	50-yr FIS	15.70	2844.00	2844.45	2844.36	2844.55	0.008470	2.53	6.20	46.13	0.69
Low Flow Channel	10613.9	10-yr FIS	2.40	2844.00	2844.13	2844.10	2844.16	0.012118	1.38	1.74	43.92	0.68
Low Flow Channel	10613.9	10-yr SBCFCD	14.40	2844.00	2844.42	2844.33	2844.51	0.009026	2.50	5.76	45.91	0.70
Low Flow Channel	10613.9	5-yr SBCFCD	9.70	2844.00	2844.32	2844.25	2844.40	0.009585	2.20	4.41	45.26	0.70
Low Flow Channel	10613.9	2-yr SBCFCD	6.00	2844.00	2844.23	2844.17	2844.29	0.011733	1.95	3.08	44.60	0.73
Low Flow Channel	9536.1	100-yr SBCFCD	30.70	2835.70	2836.40	2836.24	2836.54	0.007180	3.06	10.03	47.88	0.68
Low Flow Channel	9536.1	100-yr FIS	26.70	2835.70	2836.34	2836.20	2836.47	0.007186	2.91	9.17	47.49	0.67
Low Flow Channel	9536.1	50-yr FIS	15.70	2835.70	2836.17	2836.06	2836.26	0.007005	2.38	6.59	46.31	0.63
Low Flow Channel	9536.1	10-yr FIS	2.40	2835.70	2835.87	2835.80	2835.89	0.005285	1.07	2.24	44.17	0.47
Low Flow Channel	9536.1	10-yr SBCFCD	14.40	2835.70	2836.16	2836.03	2836.24	0.006612	2.27	6.35	46.20	0.61
Low Flow Channel	9536.1	5-yr SBCFCD	9.70	2835.70	2836.07	2835.95	2836.12	0.006288	1.93	5.03	45.57	0.58
Low Flow Channel	9536.1	2-yr SBCFCD	6.00	2835.70	2835.99	2835.87	2836.03	0.005398	1.53	3.91	45.02	0.51
Low Flow Channel	9035.8	100-yr SBCFCD	30.70	2830.40	2830.94	2830.94	2831.19	0.017365	4.06	7.56	46.76	1.01
Low Flow Channel	9035.8	100-yr FIS	26.70	2830.40	2830.90	2830.90	2831.13	0.017349	3.86	6.92	46.46	1.00
Low Flow Channel	9035.8	50-yr FIS	15.70	2830.40	2830.76	2830.76	2830.92	0.018081	3.21	4.89	45.50	0.97
Low Flow Channel	9035.8	10-yr FIS	2.40	2830.40	2830.50	2830.50	2830.55	0.031417	1.85	1.30	43.69	1.05
Low Flow Channel	9035.8	10-yr SBCFCD	14.40	2830.40	2830.73	2830.73	2830.89	0.019839	3.20	4.50	45.31	1.01
Low Flow Channel	9035.8	5-yr SBCFCD	9.70	2830.40	2830.65	2830.65	2830.78	0.021825	2.84	3.42	44.77	1.01
Low Flow Channel	9035.8	2-yr SBCFCD	6.00	2830.40	2830.57	2830.57	2830.68	0.030152	2.61	2.30	44.21	1.12
Low Flow Channel	9005	100-yr SBCFCD	30.70	2829.00	2830.42	2829.54	2830.45	0.000628	1.37	22.41	52.91	0.22
Low Flow Channel	9005	100-yr FIS	26.70	2829.00	2830.32	2829.50	2830.35	0.000600	1.29	20.71	52.27	0.21
Low Flow Channel	9005	50-yr FIS	15.70	2829.00	2830.03	2829.36	2830.04	0.000499	1.02	15.46	50.19	0.19
Low Flow Channel	9005	10-yr FIS	2.40	2829.00	2829.42	2829.10	2829.43	0.000239	0.41	5.85	45.96	0.11
Low Flow Channel	9005	10-yr SBCFCD	14.40	2829.00	2829.99	2829.33	2830.00	0.000484	0.98	14.76	49.90	0.18
Low Flow Channel	9005	5-yr SBCFCD	9.70	2829.00	2829.82	2829.25	2829.83	0.000411	0.81	12.01	48.74	0.17
Low Flow Channel	9005	2-yr SBCFCD	6.00	2829.00	2829.66	2829.17	2829.67	0.000330	0.63	9.45	47.62	0.14
Low Flow Channel	8674.9	100-yr SBCFCD	30.70	2829.00	2829.54	2829.54	2829.79	0.017365	4.06	7.56	46.76	1.01
Low Flow Channel	8674.9	100-yr FIS	26.70	2829.00	2829.50	2829.50	2829.73	0.017349	3.86	6.92	46.46	1.00
Low Flow Channel	8674.9	50-yr FIS	15.70	2829.00	2829.36	2829.36	2829.52	0.018081	3.21	4.89	45.50	0.97
Low Flow Channel	8674.9	10-yr FIS	2.40	2829.00	2829.10	2829.10	2829.15	0.026101	1.75	1.37	43.73	0.96
Low Flow Channel	8674.9	10-yr SBCFCD	14.40	2829.00	2829.33	2829.33	2829.49	0.019839	3.20	4.50	45.31	1.01
Low Flow Channel	8674.9	5-yr SBCFCD	9.70	2829.00	2829.25	2829.25	2829.38	0.021825	2.84	3.42	44.77	1.01
Low Flow Channel	8674.9	2-yr SBCFCD	6.00	2829.00	2829.17	2829.17	2829.28	0.030152	2.61	2.30	44.21	1.12
Low Flow Channel	8507.43	100-yr SBCFCD	30.70	2824.20	2824.59	2824.74	2825.09	0.050493	5.69	5.39	45.74	1.65
Low Flow Channel	8507.43	100-yr FIS	26.70	2824.20	2824.56	2824.70	2825.02	0.051106	5.42	4.92	45.51	1.64
Low Flow Channel	8507.43	50-yr FIS	15.70	2824.20	2824.63	2824.56	2824.74	0.009495	2.62	5.98	46.02	0.73
Low Flow Channel	8507.43	10-yr FIS	2.40	2824.20	2824.30	2824.30	2824.35	0.031679	1.85	1.30	43.69	1.05
Low Flow Channel	8507.43	10-yr SBCFCD	14.40	2824.20	2824.46	2824.53	2824.72	0.043711	4.09	3.52	44.82	1.44
Low Flow Channel	8507.43	5-yr SBCFCD	9.70	2824.20	2824.53	2824.45	2824.60	0.008589	2.12	4.56	45.34	0.66
Low Flow Channel	8507.43	2-yr SBCFCD	6.00	2824.20	2824.37	2824.37	2824.48	0.030010	2.60	2.30	44.21	1.12
Low Flow Channel	8258.66	100-yr SBCFCD	30.70	2821.80	2822.53	2822.34	2822.66	0.006250	2.93	10.49	48.08	0.63
Low Flow Channel	8258.66	100-yr FIS	26.70	2821.80	2822.47	2822.30	2822.59	0.006245	2.78	9.59	47.68	0.63
Low Flow Channel	8258.66	50-yr FIS	15.70	2821.80	2822.23	2822.16	2822.34	0.009866	2.66	5.91	45.99	0.74
Low Flow Channel	8258.66	10-yr FIS	2.40	2821.80	2821.97	2821.90	2821.99	0.004690	1.03	2.32	44.22	0.44

Low Flow Channel	8258.66	10-yr SBCFCD	14.40	2821.80	2822.21	2822.13	2822.31	0.009917	2.58	5.59	45.83	0.73
Low Flow Channel	8258.66	5-yr SBCFCD	9.70	2821.80	2822.11	2822.05	2822.19	0.010995	2.30	4.23	45.17	0.74
Low Flow Channel	8258.66	2-yr SBCFCD	6.00	2821.80	2822.10	2821.97	2822.13	0.004787	1.48	4.06	45.09	0.49
Low Flow Channel	8009.9	100-yr SBCFCD	30.70	2819.40	2819.94	2819.94	2820.19	0.017365	4.06	7.56	46.76	1.01
Low Flow Channel	8009.9	100-yr FIS	26.70	2819.40	2819.90	2819.90	2820.13	0.017349	3.86	6.92	46.46	1.00
Low Flow Channel	8009.9	50-yr FIS	15.70	2819.40	2819.83	2819.76	2819.94	0.009388	2.61	6.01	46.03	0.72
Low Flow Channel	8009.9	10-yr FIS	2.40	2819.40	2819.50	2819.50	2819.55	0.031417	1.85	1.30	43.69	1.05
Low Flow Channel	8009.9	10-yr SBCFCD	14.40	2819.40	2819.81	2819.73	2819.91	0.009355	2.53	5.69	45.88	0.71
Low Flow Channel	8009.9	5-yr SBCFCD	9.70	2819.40	2819.74	2819.65	2819.81	0.008463	2.12	4.59	45.35	0.66
Low Flow Channel	8009.9	2-yr SBCFCD	6.00	2819.40	2819.57	2819.57	2819.68	0.030152	2.61	2.30	44.21	1.12
Low Flow Channel	6735	100-yr SBCFCD	31.10	2803.00	2803.70	2803.55	2803.85	0.007171	3.07	10.12	15.81	0.68
Low Flow Channel	6735	100-yr FIS	26.70	2803.00	2803.64	2803.50	2803.77	0.007205	2.91	9.16	15.57	0.67
Low Flow Channel	6735	50-yr FIS	14.80	2803.00	2803.34	2803.34	2803.50	0.019229	3.20	4.62	14.35	0.99
Low Flow Channel	6735	10-yr FIS	2.00	2803.00	2803.09	2803.09	2803.13	0.026086	1.63	1.23	13.37	0.95
Low Flow Channel	6735	10-yr SBCFCD	14.60	2803.00	2803.34	2803.34	2803.49	0.018712	3.16	4.62	14.35	0.98
Low Flow Channel	6735	5-yr SBCFCD	9.80	2803.00	2803.26	2803.26	2803.38	0.021780	2.85	3.44	14.02	1.01
Low Flow Channel	6735	2-yr SBCFCD	6.00	2803.00	2803.18	2803.18	2803.28	0.024852	2.46	2.44	13.73	1.03
Low Flow Channel	3410	100-yr SBCFCD	31.10	2768.00	2769.03	2769.03	2769.31	0.016339	4.23	7.36	103.82	1.00
Low Flow Channel	3410	100-yr FIS	26.70	2768.00	2768.97	2768.97	2769.22	0.016234	4.06	6.58	101.74	0.99
Low Flow Channel	3410	50-yr FIS	14.80	2768.00	2768.75	2768.75	2768.95	0.017482	3.60	4.12	94.72	0.99
Low Flow Channel	3410	10-yr FIS	2.00	2768.00	2768.30	2768.30	2768.39	0.021890	2.35	0.85	84.84	0.97
Low Flow Channel	3410	10-yr SBCFCD	14.60	2768.00	2768.73	2768.73	2768.94	0.018785	3.68	3.97	94.38	1.02
Low Flow Channel	3410	5-yr SBCFCD	9.80	2768.00	2768.63	2768.63	2768.79	0.018148	3.29	2.98	92.03	0.98
Low Flow Channel	3410	2-yr SBCFCD	6.00	2768.00	2768.49	2768.49	2768.64	0.021923	3.12	1.93	89.00	1.04
Low Flow Channel	3400	100-yr SBCFCD	31.80	2757.00	2757.66	2758.72	2767.80	0.939075	25.55	1.24	2.76	6.71
Low Flow Channel	3400	100-yr FIS	27.30	2757.00	2757.60	2758.60	2767.71	1.044419	25.53	1.07	2.59	7.00
Low Flow Channel	3400	50-yr FIS	15.20	2757.00	2757.39	2758.21	2767.39	1.586917	25.37	0.60	2.05	8.27
Low Flow Channel	3400	10-yr FIS	2.00	2757.00	2757.10	2757.41	2761.49	2.925896	16.80	0.12	1.28	9.70
Low Flow Channel	3400	10-yr SBCFCD	15.00	2757.00	2757.39	2758.20	2767.34	1.592792	25.31	0.59	2.04	8.28
Low Flow Channel	3400	5-yr SBCFCD	10.00	2757.00	2757.29	2757.98	2767.20	2.189498	25.27	0.40	1.76	9.40
Low Flow Channel	3400	2-yr SBCFCD	6.20	2757.00	2757.18	2757.77	2768.98	4.251826	27.57	0.22	1.48	12.48
Low Flow Channel	2900	100-yr SBCFCD	31.80	2751.00	2753.21	2752.39	2753.31	0.002145	2.57	12.40	33.86	0.39
Low Flow Channel	2900	100-yr FIS	27.30	2751.00	2753.09	2752.27	2753.18	0.002020	2.41	11.31	33.11	0.38
Low Flow Channel	2900	50-yr FIS	15.20	2751.00	2752.65	2751.94	2752.71	0.001739	1.97	7.73	30.34	0.34
Low Flow Channel	2900	10-yr FIS	2.00	2751.00	2751.67	2751.28	2751.69	0.001072	0.96	2.09	24.22	0.24
Low Flow Channel	2900	10-yr SBCFCD	15.00	2751.00	2752.64	2751.92	2752.69	0.001738	1.96	7.66	30.27	0.34
Low Flow Channel	2900	5-yr SBCFCD	10.00	2751.00	2752.38	2751.75	2752.43	0.001549	1.69	5.92	28.70	0.31
Low Flow Channel	2900	2-yr SBCFCD	6.20	2751.00	2752.13	2751.57	2752.16	0.001384	1.43	4.33	27.07	0.29
Low Flow Channel	2410	100-yr SBCFCD	31.80	2750.00	2750.77	2750.77	2751.03	0.016367	4.04	7.87	52.14	0.99
Low Flow Channel	2410	100-yr FIS	27.30	2750.00	2750.71	2750.71	2750.95	0.017596	3.98	6.85	51.03	1.02
Low Flow Channel	2410	50-yr FIS	15.20	2750.00	2750.52	2750.52	2750.71	0.018382	3.44	4.41	48.01	1.00
Low Flow Channel	2410	10-yr FIS	2.00	2750.00	2750.16	2750.16	2750.23	0.026994	2.12	0.94	42.05	1.02
Low Flow Channel	2410	10-yr SBCFCD	15.00	2750.00	2750.52	2750.52	2750.70	0.017902	3.40	4.41	48.01	0.99
Low Flow Channel	2410	5-yr SBCFCD	10.00	2750.00	2750.41	2750.41	2750.56	0.020101	3.15	3.17	46.20	1.01
Low Flow Channel	2410	2-yr SBCFCD	6.20	2750.00	2750.32	2750.32	2750.43	0.020565	2.76	2.24	44.66	0.99
Low Flow Channel	2400	100-yr SBCFCD	31.80	2745.00	2745.33	2745.98	2750.09	0.643355	17.51	1.82	26.50	5.61
Low Flow Channel	2400	100-yr FIS	27.30	2745.00	2745.29	2745.87	2749.98	0.744510	17.38	1.57	26.25	5.93
Low Flow Channel	2400	50-yr FIS	15.20	2745.00	2745.62	2745.62	2745.88	0.017137	4.12	3.69	28.26	0.99
Low Flow Channel	2400	10-yr FIS	2.00	2745.00	2745.21	2745.17	2745.26	0.011424	1.78	1.12	25.78	0.70
Low Flow Channel	2400	10-yr SBCFCD	15.00	2745.00	2745.60	2745.60	2745.88	0.018302	4.20	3.57	28.16	1.02
Low Flow Channel	2400	5-yr SBCFCD	10.00	2745.00	2745.48	2745.48	2745.69	0.018264	3.66	2.73	27.39	0.99
Low Flow Channel	2400	2-yr SBCFCD	6.20	2745.00	2745.35	2745.35	2745.51	0.019570	3.18	1.95	26.64	0.99
Low Flow Channel	1900	100-yr SBCFCD	31.80	2739.00	2740.26	2739.81	2740.39	0.003417	2.84	11.20	35.56	0.49
Low Flow Channel	1900	100-yr FIS	27.30	2739.00	2740.15	2739.74	2740.27	0.003465	2.72	10.04	34.90	0.49
Low Flow Channel	1900	50-yr FIS	15.20	2739.00	2739.79	2739.50	2739.88	0.003917	2.34	6.48	32.75	0.50
Low Flow Channel	1900	10-yr FIS	2.00	2739.00	2739.17	2739.14	2739.21	0.012820	1.65	1.21	29.00	0.72
Low Flow Channel	1900	10-yr SBCFCD	15.00	2739.00	2739.79	2739.50	2739.87	0.003934	2.34	6.42	32.71	0.50
Low Flow Channel	1900	5-yr SBCFCD	10.00	2739.00	2739.60	2739.39	2739.67	0.004459	2.12	4.71	31.58	0.51

Low Flow Channel	1900	2-yr SBCFCD	6.20	2739.00	2739.42	2739.28	2739.48	0.005662	1.94	3.20	30.51	0.55
Low Flow Channel	1699.2	100-yr SBCFCD	31.80	2738.50	2739.94	2739.15	2739.99	0.001151	1.85	17.15	61.53	0.29
Low Flow Channel	1699.2	100-yr FIS	27.30	2738.50	2739.84	2739.10	2739.88	0.001095	1.73	15.74	60.93	0.28
Low Flow Channel	1699.2	50-yr FIS	15.20	2738.50	2739.49	2738.90	2739.52	0.000937	1.35	11.23	58.93	0.25
Low Flow Channel	1699.2	10-yr FIS	2.00	2738.50	2738.82	2738.61	2738.83	0.000715	0.60	3.35	55.02	0.19
Low Flow Channel	1699.2	10-yr SBCFCD	15.00	2738.50	2739.49	2738.90	2739.51	0.000934	1.35	11.14	58.89	0.25
Low Flow Channel	1699.2	5-yr SBCFCD	10.00	2738.50	2739.30	2738.81	2739.32	0.000851	1.13	8.81	57.79	0.23
Low Flow Channel	1699.2	2-yr SBCFCD	6.20	2738.50	2739.11	2738.73	2739.13	0.000785	0.93	6.64	56.73	0.22
Low Flow Channel	1510	100-yr SBCFCD	31.80	2738.00	2739.13	2739.13	2739.43	0.015567	4.40	7.23	42.61	0.99
Low Flow Channel	1510	100-yr FIS	27.30	2738.00	2739.05	2739.05	2739.34	0.016212	4.30	6.36	41.63	1.00
Low Flow Channel	1510	50-yr FIS	15.20	2738.00	2738.81	2738.81	2739.04	0.017342	3.80	4.00	38.63	0.99
Low Flow Channel	1510	10-yr FIS	2.00	2738.00	2738.31	2738.31	2738.41	0.024000	2.56	0.78	32.27	1.02
Low Flow Channel	1510	10-yr SBCFCD	15.00	2738.00	2738.81	2738.81	2739.03	0.017383	3.79	3.96	38.57	1.00
Low Flow Channel	1510	5-yr SBCFCD	10.00	2738.00	2738.68	2738.68	2738.87	0.018418	3.50	2.86	36.86	1.00
Low Flow Channel	1510	2-yr SBCFCD	6.20	2738.00	2738.54	2738.54	2738.70	0.019839	3.19	1.95	35.17	1.00
Low Flow Channel	1500	100-yr SBCFCD	31.80	2732.50	2733.29	2734.16	2738.51	0.397194	18.32	1.74	3.38	4.51
Low Flow Channel	1500	100-yr FIS	27.30	2732.50	2733.22	2734.01	2738.40	0.437424	18.26	1.50	3.16	4.68
Low Flow Channel	1500	50-yr FIS	15.20	2732.50	2732.99	2733.65	2738.04	0.643299	18.03	0.84	2.46	5.43
Low Flow Channel	1500	10-yr FIS	2.00	2732.50	2732.60	2732.90	2737.16	3.178187	17.14	0.12	1.30	10.09
Low Flow Channel	1500	10-yr SBCFCD	15.00	2732.50	2732.98	2733.66	2738.04	0.650233	18.04	0.83	2.45	5.45
Low Flow Channel	1500	5-yr SBCFCD	10.00	2732.50	2732.86	2733.45	2737.83	0.862145	17.88	0.56	2.09	6.09
Low Flow Channel	1500	2-yr SBCFCD	6.20	2732.50	2732.75	2733.24	2737.61	1.226480	17.68	0.35	1.76	6.99
Low Flow Channel	957.5	100-yr SBCFCD	31.80	2727.00	2727.36	2727.16	2727.38	0.001501	0.96	33.26	94.51	0.28
Low Flow Channel	957.5	100-yr FIS	27.30	2727.00	2727.33	2727.14	2727.34	0.001501	0.90	30.29	94.06	0.28
Low Flow Channel	957.5	50-yr FIS	15.20	2727.00	2727.23	2727.10	2727.24	0.001500	0.72	21.19	92.66	0.26
Low Flow Channel	957.5	10-yr FIS	2.00	2727.00	2727.03	2727.03	2727.04	0.042414	0.88	2.27	89.69	0.97
Low Flow Channel	957.5	10-yr SBCFCD	15.00	2727.00	2727.23	2727.10	2727.24	0.001502	0.71	21.01	92.64	0.26
Low Flow Channel	957.5	5-yr SBCFCD	10.00	2727.00	2727.18	2727.07	2727.19	0.001498	0.61	16.44	91.93	0.25
Low Flow Channel	957.5	2-yr SBCFCD	6.20	2727.00	2727.14	2727.05	2727.14	0.001499	0.50	12.30	91.28	0.24
Main	12028.1	100-yr SBCFCD	1730.00	2853.30	2858.99	2854.37	2859.00	0.000009	1.07	1617.41	293.05	0.08
Main	12028.1	100-yr FIS	700.00	2853.30	2856.29	2853.89	2856.31	0.000013	0.83	839.83	284.98	0.09
Main	12028.1	50-yr FIS	500.00	2853.30	2854.75	2853.77	2854.78	0.000072	1.24	404.16	280.36	0.18
Main	12028.1	10-yr FIS	100.00	2853.30	2853.46	2853.46	2853.54	0.004239	2.22	45.05	276.49	0.97
Main	12028.1	10-yr SBCFCD	810.00	2853.30	2856.09	2853.94	2856.11	0.000021	1.04	781.94	284.37	0.11
Main	12028.1	5-yr SBCFCD	550.00	2853.30	2854.99	2853.79	2855.01	0.000053	1.17	469.95	281.06	0.16
Main	12028.1	2-yr SBCFCD	340.00	2853.30	2853.99	2853.67	2854.04	0.000396	1.77	191.68	278.08	0.38
Main	11745.2*	100-yr SBCFCD	1730.00	2850.44	2857.29	2856.49	2858.84	0.001072	9.99	173.16	35.55	0.80
Main	11745.2*	100-yr FIS	700.00	2850.44	2855.73	2854.05	2856.24	0.000470	5.78	121.19	30.86	0.51
Main	11745.2*	50-yr FIS	500.00	2850.44	2853.74	2853.39	2854.64	0.001341	7.60	65.79	24.90	0.82
Main	11745.2*	10-yr FIS	100.00	2850.44	2851.30	2851.51	2852.10	0.005592	7.18	13.93	17.57	1.42
Main	11745.2*	10-yr SBCFCD	810.00	2850.44	2854.87	2854.37	2855.98	0.001206	8.44	96.00	28.30	0.81
Main	11745.2*	5-yr SBCFCD	550.00	2850.44	2853.94	2853.55	2854.88	0.001310	7.76	70.92	25.51	0.82
Main	11745.2*	2-yr SBCFCD	340.00	2850.44	2853.01	2852.75	2853.77	0.001501	7.02	48.43	22.71	0.85
Main	11655	100-yr SBCFCD	1730.00	2850.10	2857.37	2856.15	2858.68	0.000853	9.19	188.24	36.80	0.72
Main	11655	100-yr FIS	700.00	2850.10	2855.75	2853.70	2856.18	0.000367	5.28	132.54	31.94	0.46
Main	11655	50-yr FIS	500.00	2850.10	2853.80	2853.04	2854.47	0.000890	6.58	75.96	26.09	0.68
Main	11655	10-yr FIS	100.00	2850.10	2851.52	2851.17	2851.78	0.001013	4.12	24.26	19.25	0.65
Main	11655	10-yr SBCFCD	810.00	2850.10	2854.94	2854.03	2855.82	0.000872	7.51	107.79	29.53	0.69
Main	11655	5-yr SBCFCD	550.00	2850.10	2854.00	2853.21	2854.71	0.000886	6.76	81.37	26.71	0.68
Main	11655	2-yr SBCFCD	340.00	2850.10	2853.06	2852.41	2853.60	0.000910	5.91	57.56	23.88	0.67
Main	11647	100-yr SBCFCD	1730.00	2848.20	2857.78	2854.44	2858.49	0.000350	6.79	254.86	38.22	0.46
Main	11647	100-yr FIS	700.00	2848.20	2855.90	2851.89	2856.11	0.000133	3.74	187.26	33.66	0.28
Main	11647	50-yr FIS	500.00	2848.20	2854.11	2851.20	2854.33	0.000182	3.82	130.89	29.32	0.32
Main	11647	10-yr FIS	100.00	2848.20	2851.67	2849.28	2851.71	0.000049	1.50	66.74	23.42	0.16
Main	11647	10-yr SBCFCD	810.00	2848.20	2855.30	2852.22	2855.66	0.000241	4.83	167.55	32.21	0.37
Main	11647	5-yr SBCFCD	550.00	2848.20	2854.32	2851.38	2854.57	0.000193	4.01	137.23	29.84	0.33
Main	11647	2-yr SBCFCD	340.00	2848.20	2853.33	2850.57	2853.48	0.000141	3.12	108.89	27.44	0.28

Main	11645		Lat Struct									
Main	11643	100-yr SBCFCD	1730.00	2848.20	2857.78	2854.44	2858.49	0.000351	6.79	254.78	38.21	0.46
Main	11643	100-yr FIS	700.00	2848.20	2855.90	2851.89	2856.11	0.000133	3.74	187.24	33.66	0.28
Main	11643	50-yr FIS	500.00	2848.20	2854.11	2851.20	2854.33	0.000182	3.82	130.86	29.32	0.32
Main	11643	10-yr FIS	100.00	2848.20	2851.67	2849.28	2851.71	0.000049	1.50	66.74	23.42	0.16
Main	11643	10-yr SBCFCD	810.00	2848.20	2855.30	2852.22	2855.66	0.000242	4.84	167.51	32.21	0.37
Main	11643	5-yr SBCFCD	550.00	2848.20	2854.32	2851.38	2854.57	0.000193	4.01	137.20	29.84	0.33
Main	11643	2-yr SBCFCD	340.00	2848.20	2853.33	2850.57	2853.48	0.000141	3.12	108.88	27.44	0.28
Main	11635	100-yr SBCFCD	1730.00	2850.10	2856.15	2856.15	2858.34	0.001723	11.87	145.72	33.16	1.00
Main	11635	100-yr FIS	700.00	2850.10	2855.63	2853.71	2856.09	0.000397	5.44	128.77	31.58	0.47
Main	11635	50-yr FIS	500.00	2850.10	2853.04	2853.04	2854.23	0.002029	8.78	56.95	23.81	1.00
Main	11635	10-yr FIS	100.00	2850.10	2851.17	2851.17	2851.66	0.002596	5.61	17.83	18.22	1.00
Main	11635	10-yr SBCFCD	810.00	2850.10	2854.02	2854.02	2855.54	0.001885	9.89	81.94	26.77	1.00
Main	11635	5-yr SBCFCD	550.00	2850.10	2853.21	2853.21	2854.47	0.001995	8.98	61.21	24.34	1.00
Main	11635	2-yr SBCFCD	340.00	2850.10	2852.42	2852.42	2853.40	0.002156	7.95	42.78	21.95	1.00
Main	11462.4*	100-yr SBCFCD	1960.00	2847.58	2852.42	2854.07	2857.55	0.005104	18.18	107.82	29.53	1.68
Main	11462.4*	100-yr FIS	1700.00	2847.58	2853.58	2853.58	2855.74	0.001721	11.81	143.96	33.00	1.00
Main	11462.4*	50-yr FIS	1000.00	2847.58	2851.66	2852.03	2853.75	0.002489	11.60	86.21	27.24	1.15
Main	11462.4*	10-yr FIS	150.00	2847.58	2848.39	2848.98	2850.44	0.015383	11.49	13.06	17.42	2.34
Main	11462.4*	10-yr SBCFCD	920.00	2847.58	2850.47	2851.81	2854.67	0.007241	16.45	55.93	23.68	1.89
Main	11462.4*	5-yr SBCFCD	620.00	2847.58	2849.75	2850.92	2853.54	0.008938	15.62	39.69	21.52	2.03
Main	11462.4*	2-yr SBCFCD	380.00	2847.58	2849.09	2850.07	2852.40	0.011851	14.61	26.00	19.52	2.23
Main	11179.5*	100-yr SBCFCD	1960.00	2844.72	2849.13	2851.21	2855.71	0.007235	20.59	95.19	28.22	1.98
Main	11179.5*	100-yr FIS	1700.00	2844.72	2848.91	2850.72	2854.54	0.006517	19.04	89.28	27.58	1.86
Main	11179.5*	50-yr FIS	1000.00	2844.72	2847.69	2849.17	2852.34	0.007794	17.31	57.76	23.91	1.96
Main	11179.5*	10-yr FIS	150.00	2844.72	2845.68	2846.08	2847.08	0.008479	9.49	15.81	17.88	1.78
Main	11179.5*	10-yr SBCFCD	920.00	2844.72	2847.44	2848.93	2852.32	0.008996	17.73	51.89	23.16	2.09
Main	11179.5*	5-yr SBCFCD	620.00	2844.72	2846.84	2848.07	2850.87	0.009807	16.12	38.46	21.35	2.12
Main	11179.5*	2-yr SBCFCD	380.00	2844.72	2846.31	2847.21	2849.24	0.009830	13.73	27.67	19.77	2.05
Main	10896.7*	100-yr SBCFCD	1960.00	2841.86	2846.08	2848.35	2853.43	0.008435	21.75	90.13	27.67	2.12
Main	10896.7*	100-yr FIS	1700.00	2841.86	2845.81	2847.85	2852.39	0.008137	20.60	82.53	26.84	2.07
Main	10896.7*	50-yr FIS	1000.00	2841.86	2844.70	2846.31	2849.90	0.009166	18.31	54.61	23.51	2.12
Main	10896.7*	10-yr FIS	150.00	2841.86	2842.76	2843.25	2844.38	0.010618	10.20	14.70	17.70	1.97
Main	10896.7*	10-yr SBCFCD	920.00	2841.86	2844.52	2846.08	2849.66	0.009678	18.18	50.60	22.99	2.16
Main	10896.7*	5-yr SBCFCD	620.00	2841.86	2843.96	2845.21	2848.06	0.010018	16.24	38.18	21.31	2.14
Main	10896.7*	2-yr SBCFCD	380.00	2841.86	2843.44	2844.35	2846.42	0.010087	13.85	27.43	19.74	2.07
Main	10720.4	100-yr SBCFCD	1960.00	2839.50	2850.40	2843.02	2850.50	0.000029	2.43	806.37	99.21	0.15
Main	10720.4	100-yr FIS	1700.00	2839.50	2850.53	2842.71	2850.59	0.000021	2.08	818.62	99.58	0.13
Main	10720.4	50-yr FIS	1000.00	2839.50	2847.32	2841.80	2847.38	0.000027	1.92	520.86	85.23	0.14
Main	10720.4	10-yr FIS	150.00	2839.50	2841.65	2840.17	2841.67	0.000055	1.32	113.90	58.21	0.17
Main	10720.4	10-yr SBCFCD	920.00	2839.50	2846.46	2841.65	2846.53	0.000034	2.05	449.53	81.15	0.15
Main	10720.4	5-yr SBCFCD	620.00	2839.50	2844.98	2841.19	2845.04	0.000037	1.85	334.76	74.11	0.15
Main	10720.4	2-yr SBCFCD	380.00	2839.50	2843.52	2840.72	2843.57	0.000041	1.64	231.67	67.16	0.16
Main	10694.4		Culvert									
Main	10659.4	100-yr SBCFCD	1960.00	2839.50	2849.77	2843.02	2849.88	0.000037	2.64	743.78	96.89	0.17
Main	10659.4	100-yr FIS	1700.00	2839.50	2850.05	2842.73	2850.12	0.000025	2.20	771.00	98.14	0.14
Main	10659.4	50-yr FIS	1000.00	2839.50	2847.12	2841.80	2847.18	0.000029	1.99	503.71	84.27	0.14
Main	10659.4	10-yr FIS	150.00	2839.50	2841.59	2840.16	2841.62	0.000061	1.36	110.58	57.94	0.17
Main	10659.4	10-yr SBCFCD	920.00	2839.50	2846.25	2841.68	2846.32	0.000038	2.13	432.09	80.12	0.16
Main	10659.4	5-yr SBCFCD	620.00	2839.50	2844.83	2841.17	2844.89	0.000040	1.92	323.49	73.38	0.16
Main	10659.4	2-yr SBCFCD	380.00	2839.50	2843.42	2840.73	2843.46	0.000045	1.69	224.74	66.67	0.16
Main	10613.9	100-yr SBCFCD	2590.00	2839.00	2847.15	2846.56	2849.27	0.001214	11.68	221.71	39.00	0.86
Main	10613.9	100-yr FIS	2700.00	2839.00	2847.32	2846.75	2849.49	0.001205	11.81	228.54	39.00	0.86
Main	10613.9	50-yr FIS	1500.00	2839.00	2845.01	2844.60	2846.69	0.001329	10.39	144.40	33.04	0.88
Main	10613.9	10-yr FIS	200.00	2839.00	2840.67	2840.67	2841.40	0.002306	6.84	29.24	20.01	1.00
Main	10613.9	10-yr SBCFCD	1220.00	2839.00	2844.32	2843.98	2845.87	0.001389	9.97	122.39	30.97	0.88
Main	10613.9	5-yr SBCFCD	820.00	2839.00	2843.17	2842.95	2844.50	0.001545	9.24	88.70	27.52	0.91

Main	10613.9	2-yr SBCFCD	500.00	2839.00	2842.02	2841.94	2843.14	0.001826	8.46	59.08	24.07	0.95
Main	10525	100-yr SBCFCD	2590.00	2838.30	2847.21	2845.86	2848.85	0.000837	10.31	251.29	39.00	0.72
Main	10525	100-yr FIS	2700.00	2838.30	2847.38	2846.04	2849.08	0.000840	10.46	258.09	39.00	0.72
Main	10525	50-yr FIS	1500.00	2838.30	2845.05	2843.89	2846.27	0.000853	8.84	169.59	35.25	0.71
Main	10525	10-yr FIS	200.00	2838.30	2840.46	2839.97	2840.86	0.000948	5.07	39.44	21.49	0.66
Main	10525	10-yr SBCFCD	1220.00	2838.30	2844.35	2843.28	2845.44	0.000858	8.37	145.69	33.15	0.70
Main	10525	5-yr SBCFCD	820.00	2838.30	2843.18	2842.24	2844.06	0.000871	7.54	108.81	29.63	0.69
Main	10525	2-yr SBCFCD	500.00	2838.30	2842.00	2841.23	2842.67	0.000891	6.58	75.93	26.09	0.68
Main	10517	100-yr SBCFCD	2590.00	2836.40	2847.65	2844.25	2848.66	0.000405	8.07	320.97	39.00	0.50
Main	10517	100-yr FIS	2700.00	2836.40	2847.83	2844.42	2848.88	0.000414	8.23	328.00	39.00	0.50
Main	10517	50-yr FIS	1500.00	2836.40	2845.46	2842.17	2846.08	0.000325	6.35	236.24	37.18	0.44
Main	10517	10-yr FIS	200.00	2836.40	2840.68	2838.09	2840.76	0.000093	2.31	86.67	25.49	0.22
Main	10517	10-yr SBCFCD	1220.00	2836.40	2844.74	2841.52	2845.26	0.000295	5.80	210.29	35.43	0.42
Main	10517	5-yr SBCFCD	820.00	2836.40	2843.54	2840.43	2843.90	0.000241	4.84	169.38	32.47	0.37
Main	10517	2-yr SBCFCD	500.00	2836.40	2842.31	2839.39	2842.53	0.000181	3.81	131.33	29.47	0.32
Main	10515		Lat Struct									
Main	10513	100-yr SBCFCD	2590.00	2836.40	2847.64	2844.25	2848.66	0.000406	8.07	320.87	39.00	0.50
Main	10513	100-yr FIS	2700.00	2836.40	2847.82	2844.42	2848.88	0.000414	8.23	327.90	39.00	0.50
Main	10513	50-yr FIS	1500.00	2836.40	2845.45	2842.17	2846.08	0.000325	6.35	236.17	37.17	0.44
Main	10513	10-yr FIS	200.00	2836.40	2840.68	2838.09	2840.76	0.000093	2.31	86.66	25.48	0.22
Main	10513	10-yr SBCFCD	1220.00	2836.40	2844.74	2841.52	2845.26	0.000295	5.80	210.23	35.42	0.42
Main	10513	5-yr SBCFCD	820.00	2836.40	2843.53	2840.43	2843.90	0.000241	4.84	169.33	32.47	0.37
Main	10513	2-yr SBCFCD	500.00	2836.40	2842.31	2839.39	2842.53	0.000181	3.81	131.31	29.46	0.32
Main	10505	100-yr SBCFCD	2590.00	2838.30	2845.86	2845.86	2848.49	0.001642	13.02	198.98	37.67	1.00
Main	10505	100-yr FIS	2700.00	2838.30	2846.04	2846.04	2848.71	0.001624	13.11	205.96	38.22	1.00
Main	10505	50-yr FIS	1500.00	2838.30	2843.90	2843.90	2845.94	0.001742	11.46	130.91	31.79	1.00
Main	10505	10-yr FIS	200.00	2838.30	2839.96	2839.96	2840.70	0.002342	6.88	29.09	19.99	1.00
Main	10505	10-yr SBCFCD	1220.00	2838.30	2843.28	2843.28	2845.13	0.001779	10.89	111.99	29.95	0.99
Main	10505	5-yr SBCFCD	820.00	2838.30	2842.25	2842.25	2843.78	0.001878	9.91	82.76	26.86	0.99
Main	10505	2-yr SBCFCD	500.00	2838.30	2841.25	2841.25	2842.43	0.001999	8.73	57.26	23.84	0.99
Main	10344.4*	100-yr SBCFCD	2590.00	2836.93	2842.99	2844.49	2847.87	0.003837	17.73	146.08	33.19	1.49
Main	10344.4*	100-yr FIS	2700.00	2836.93	2843.15	2844.67	2848.10	0.003791	17.86	151.20	33.65	1.48
Main	10344.4*	50-yr FIS	1500.00	2836.93	2841.25	2842.51	2845.30	0.004542	16.15	92.86	27.97	1.56
Main	10344.4*	10-yr FIS	200.00	2836.93	2838.02	2838.60	2839.90	0.009771	11.00	18.19	18.28	1.94
Main	10344.4*	10-yr SBCFCD	1220.00	2836.93	2840.72	2841.91	2844.49	0.004862	15.58	78.31	26.36	1.59
Main	10344.4*	5-yr SBCFCD	820.00	2836.93	2839.84	2840.88	2843.12	0.005602	14.53	56.44	23.74	1.66
Main	10344.4*	2-yr SBCFCD	500.00	2836.93	2839.01	2839.88	2841.74	0.006754	13.25	37.72	21.24	1.75
Main	10075*	100-yr SBCFCD	2590.00	2834.85	2840.43	2842.41	2846.55	0.005244	19.85	130.47	31.75	1.73
Main	10075*	100-yr FIS	2700.00	2834.85	2840.57	2842.56	2846.79	0.005189	20.01	134.96	32.17	1.72
Main	10075*	50-yr FIS	1500.00	2834.85	2838.85	2840.45	2843.81	0.006041	17.87	83.93	26.99	1.79
Main	10075*	10-yr FIS	200.00	2834.85	2836.05	2836.53	2837.57	0.007044	9.89	20.23	18.61	1.67
Main	10075*	10-yr SBCFCD	1220.00	2834.85	2838.36	2839.83	2842.92	0.006364	17.13	71.23	25.54	1.81
Main	10075*	5-yr SBCFCD	820.00	2834.85	2837.59	2838.81	2841.39	0.006943	15.65	52.41	23.23	1.84
Main	10075*	2-yr SBCFCD	500.00	2834.85	2836.87	2837.80	2839.80	0.007502	13.73	36.41	21.06	1.84
Main	9805.55*	100-yr SBCFCD	2590.00	2832.77	2838.13	2840.33	2844.96	0.006111	20.98	123.47	31.08	1.85
Main	9805.55*	100-yr FIS	2700.00	2832.77	2838.26	2840.51	2845.21	0.006056	21.15	127.64	31.48	1.85
Main	9805.55*	50-yr FIS	1500.00	2832.77	2836.64	2838.37	2842.04	0.006811	18.65	80.44	26.60	1.89
Main	9805.55*	10-yr FIS	200.00	2832.77	2833.94	2834.44	2835.56	0.007816	10.23	19.56	18.50	1.75
Main	9805.55*	10-yr SBCFCD	1220.00	2832.77	2836.18	2837.75	2841.08	0.007055	17.76	68.70	25.24	1.90
Main	9805.55*	5-yr SBCFCD	820.00	2832.77	2835.46	2836.71	2839.44	0.007426	16.01	51.20	23.07	1.89
Main	9805.55*	2-yr SBCFCD	500.00	2832.77	2834.78	2835.70	2837.75	0.007664	13.83	36.14	21.02	1.86
Main	9575	100-yr SBCFCD	2590.00	2830.30	2833.10	2835.63	2842.64	0.014222	24.78	104.52	37.67	2.62
Main	9575	100-yr FIS	2700.00	2830.30	2833.19	2835.77	2842.90	0.013954	25.01	107.96	37.69	2.60
Main	9575	50-yr FIS	1500.00	2830.30	2832.16	2834.00	2839.45	0.017734	21.67	69.22	37.44	2.81
Main	9575	10-yr FIS	200.00	2830.30	2830.80	2831.27	2832.63	0.023771	10.87	18.40	37.12	2.72
Main	9575	10-yr SBCFCD	1220.00	2830.30	2831.90	2833.53	2838.41	0.019008	20.48	59.58	37.38	2.86
Main	9575	5-yr SBCFCD	820.00	2830.30	2831.52	2832.78	2836.64	0.021071	18.16	45.16	37.29	2.91

Main	9575	2-yr SBCFCD	500.00	2830.30	2831.18	2832.09	2834.85	0.022847	15.37	32.53	37.21	2.90
Main	9536.1	100-yr SBCFCD	2590.00	2830.00	2838.73	2834.70	2839.40	0.000287	6.60	392.71	45.00	0.39
Main	9536.1	100-yr FIS	2700.00	2830.00	2838.92	2834.83	2839.62	0.000292	6.73	401.41	45.00	0.40
Main	9536.1	50-yr FIS	1500.00	2830.00	2836.11	2833.27	2836.57	0.000281	5.45	274.99	45.00	0.39
Main	9536.1	10-yr FIS	200.00	2830.00	2831.43	2830.85	2831.58	0.000497	3.10	64.41	45.00	0.46
Main	9536.1	10-yr SBCFCD	1220.00	2830.00	2835.32	2832.86	2835.72	0.000285	5.10	239.16	45.00	0.39
Main	9536.1	5-yr SBCFCD	820.00	2830.00	2833.96	2832.17	2834.29	0.000321	4.60	178.17	45.00	0.41
Main	9536.1	2-yr SBCFCD	500.00	2830.00	2830.80	2831.57	2833.79	0.020742	13.87	36.05	45.00	2.73
Main	9525.6		Culvert									
Main	9515.1	100-yr SBCFCD	2620.00	2830.00	2837.84	2834.71	2838.69	0.000404	7.43	352.63	45.00	0.47
Main	9515.1	100-yr FIS	2700.00	2830.00	2837.99	2834.83	2838.86	0.000406	7.51	359.34	45.00	0.47
Main	9515.1	50-yr FIS	1500.00	2830.00	2835.48	2833.26	2836.05	0.000392	6.08	246.56	45.00	0.46
Main	9515.1	10-yr FIS	200.00	2830.00	2830.85	2830.85	2831.28	0.002694	5.21	38.41	45.00	0.99
Main	9515.1	10-yr SBCFCD	1230.00	2830.00	2834.75	2832.84	2835.27	0.000409	5.75	213.84	45.00	0.47
Main	9515.1	5-yr SBCFCD	830.00	2830.00	2833.46	2832.21	2833.90	0.000502	5.33	155.78	45.00	0.50
Main	9515.1	2-yr SBCFCD	510.00	2830.00	2831.57	2831.57	2832.35	0.002386	7.07	70.70	45.00	0.99
Main	9355.33*	100-yr SBCFCD	2620.00	2828.00	2835.49	2835.49	2838.06	0.001623	12.87	203.64	39.35	1.00
Main	9355.33*	100-yr FIS	2700.00	2828.00	2835.59	2835.59	2838.22	0.001636	13.01	207.53	39.67	1.00
Main	9355.33*	50-yr FIS	1500.00	2828.00	2833.53	2833.53	2835.52	0.001726	11.31	132.67	32.97	0.99
Main	9355.33*	10-yr FIS	200.00	2828.00	2829.35	2829.67	2830.50	0.004699	8.61	23.22	19.39	1.39
Main	9355.33*	10-yr SBCFCD	1230.00	2828.00	2832.94	2832.94	2834.76	0.001778	10.81	113.75	31.05	1.00
Main	9355.33*	5-yr SBCFCD	830.00	2828.00	2831.95	2831.95	2833.44	0.001860	9.82	84.51	27.83	0.99
Main	9355.33*	2-yr SBCFCD	510.00	2828.00	2830.96	2830.96	2832.14	0.001998	8.71	58.53	24.61	1.00
Main	9195.56*	100-yr SBCFCD	2620.00	2826.00	2832.03	2833.56	2836.97	0.003918	17.84	146.84	33.74	1.51
Main	9195.56*	100-yr FIS	2700.00	2826.00	2832.14	2833.68	2837.13	0.003881	17.93	150.60	34.09	1.50
Main	9195.56*	50-yr FIS	1500.00	2826.00	2830.23	2831.57	2834.42	0.004814	16.42	91.34	28.17	1.61
Main	9195.56*	10-yr FIS	200.00	2826.00	2827.04	2827.67	2829.11	0.011404	11.54	17.33	18.24	2.09
Main	9195.56*	10-yr SBCFCD	1230.00	2826.00	2829.71	2830.97	2833.67	0.005229	15.96	77.07	26.54	1.65
Main	9195.56*	5-yr SBCFCD	830.00	2826.00	2828.85	2829.95	2832.35	0.006163	15.02	55.27	23.85	1.74
Main	9195.56*	2-yr SBCFCD	510.00	2826.00	2828.02	2828.96	2831.03	0.007709	13.91	36.67	21.29	1.87
Main	9035.8	100-yr SBCFCD	2620.00	2824.00	2833.21	2828.74	2833.83	0.000250	6.32	414.55	45.00	0.37
Main	9035.8	100-yr FIS	2700.00	2824.00	2833.38	2828.82	2834.01	0.000252	6.40	421.86	45.00	0.37
Main	9035.8	50-yr FIS	1500.00	2824.00	2830.60	2827.28	2830.99	0.000223	5.05	296.83	45.00	0.35
Main	9035.8	10-yr FIS	200.00	2824.00	2824.41	2824.85	2826.21	0.029392	10.75	18.61	45.00	2.94
Main	9035.8	10-yr SBCFCD	1230.00	2824.00	2829.81	2826.87	2830.16	0.000220	4.70	261.60	45.00	0.34
Main	9035.8	5-yr SBCFCD	830.00	2824.00	2828.46	2826.21	2828.73	0.000226	4.13	200.84	45.00	0.34
Main	9035.8	2-yr SBCFCD	510.00	2824.00	2827.13	2825.57	2827.33	0.000262	3.63	140.68	45.00	0.36
Main	9020.399		Culvert									
Main	9005	100-yr SBCFCD	2620.00	2824.00	2832.43	2828.74	2833.17	0.000325	6.90	379.49	45.00	0.42
Main	9005	100-yr FIS	2700.00	2824.00	2832.57	2828.83	2833.33	0.000329	7.00	385.80	45.00	0.42
Main	9005	50-yr FIS	1500.00	2824.00	2830.10	2827.27	2830.57	0.000282	5.46	274.61	45.00	0.39
Main	9005	10-yr FIS	200.00	2824.00	2824.85	2824.85	2825.28	0.002694	5.21	38.41	45.00	0.99
Main	9005	10-yr SBCFCD	1230.00	2824.00	2829.39	2826.87	2829.79	0.000278	5.08	242.34	45.00	0.39
Main	9005	5-yr SBCFCD	830.00	2824.00	2828.14	2826.19	2828.45	0.000286	4.46	186.27	45.00	0.39
Main	9005	2-yr SBCFCD	510.00	2824.00	2826.86	2825.58	2827.10	0.000347	3.96	128.74	45.00	0.41
Main	8885	100-yr SBCFCD	2620.00	2822.90	2831.72	2829.70	2832.97	0.000593	8.97	292.00	44.00	0.61
Main	8885	100-yr FIS	2700.00	2822.90	2831.85	2829.83	2833.13	0.000594	9.06	297.85	44.00	0.61
Main	8885	50-yr FIS	1500.00	2822.90	2829.48	2827.82	2830.39	0.000601	7.63	196.60	39.74	0.60
Main	8885	10-yr FIS	200.00	2822.90	2824.96	2824.31	2825.24	0.000648	4.20	47.60	26.18	0.55
Main	8885	10-yr SBCFCD	1230.00	2822.90	2828.81	2827.28	2829.62	0.000602	7.22	170.45	37.72	0.60
Main	8885	5-yr SBCFCD	830.00	2822.90	2827.66	2826.35	2828.30	0.000602	6.43	129.04	34.27	0.58
Main	8885	2-yr SBCFCD	510.00	2822.90	2826.49	2825.45	2826.98	0.000616	5.59	91.19	30.78	0.57
Main	8877	100-yr SBCFCD	2620.00	2821.00	2831.94	2828.00	2832.75	0.000310	7.23	362.34	44.00	0.44
Main	8877	100-yr FIS	2700.00	2821.00	2832.07	2828.12	2832.90	0.000314	7.33	368.26	44.00	0.45
Main	8877	50-yr FIS	1500.00	2821.00	2829.68	2826.05	2830.18	0.000247	5.66	264.91	41.04	0.39
Main	8877	10-yr FIS	200.00	2821.00	2825.07	2822.43	2825.13	0.000066	1.97	101.36	29.86	0.19

Main	8877	10-yr SBCFCD	1230.00	2821.00	2829.00	2825.47	2829.42	0.000224	5.18	237.56	39.39	0.37
Main	8877	5-yr SBCFCD	830.00	2821.00	2827.83	2824.51	2828.12	0.000182	4.30	193.18	36.56	0.33
Main	8877	2-yr SBCFCD	510.00	2821.00	2826.64	2823.59	2826.82	0.000136	3.37	151.49	33.68	0.28
Main	8875		Lat Struct									
Main	8873	100-yr SBCFCD	2620.00	2821.00	2831.93	2828.00	2832.75	0.000310	7.23	362.26	44.00	0.44
Main	8873	100-yr FIS	2700.00	2821.00	2832.07	2828.12	2832.90	0.000314	7.33	368.18	44.00	0.45
Main	8873	50-yr FIS	1500.00	2821.00	2829.68	2826.05	2830.18	0.000247	5.66	264.86	41.04	0.39
Main	8873	10-yr FIS	200.00	2821.00	2825.07	2822.43	2825.13	0.000066	1.97	101.36	29.86	0.19
Main	8873	10-yr SBCFCD	1230.00	2821.00	2829.00	2825.47	2829.42	0.000224	5.18	237.51	39.39	0.37
Main	8873	5-yr SBCFCD	830.00	2821.00	2827.83	2824.51	2828.12	0.000182	4.30	193.16	36.56	0.33
Main	8873	2-yr SBCFCD	510.00	2821.00	2826.64	2823.59	2826.82	0.000136	3.37	151.48	33.68	0.28
Main	8865	100-yr SBCFCD	2620.00	2822.90	2829.70	2829.70	2832.23	0.001620	12.75	205.49	40.41	1.00
Main	8865	100-yr FIS	2700.00	2822.90	2829.82	2829.82	2832.38	0.001612	12.84	210.35	40.77	1.00
Main	8865	50-yr FIS	1500.00	2822.90	2827.82	2827.82	2829.75	0.001735	11.13	134.83	34.77	1.00
Main	8865	10-yr FIS	200.00	2822.90	2824.30	2824.30	2824.95	0.002405	6.46	30.97	24.20	1.01
Main	8865	10-yr SBCFCD	1230.00	2822.90	2827.28	2827.28	2829.01	0.001780	10.58	116.26	33.13	1.00
Main	8865	5-yr SBCFCD	830.00	2822.90	2826.33	2826.33	2827.77	0.001925	9.63	86.15	30.28	1.01
Main	8865	2-yr SBCFCD	510.00	2822.90	2825.46	2825.46	2826.54	0.002006	8.36	61.00	27.68	0.99
Main	8756.22*	100-yr SBCFCD	2620.00	2821.60	2828.85	2829.22	2831.88	0.001977	13.97	187.50	36.74	1.09
Main	8756.22*	100-yr FIS	2700.00	2821.60	2828.96	2829.34	2832.04	0.001973	14.08	191.80	37.09	1.09
Main	8756.22*	50-yr FIS	1500.00	2821.60	2826.71	2827.20	2829.32	0.002454	12.96	115.72	30.32	1.17
Main	8756.22*	10-yr FIS	200.00	2821.60	2822.82	2823.27	2824.29	0.006715	9.73	20.55	18.66	1.63
Main	8756.22*	10-yr SBCFCD	1230.00	2821.60	2826.09	2826.61	2828.56	0.002667	12.62	97.46	28.46	1.20
Main	8756.22*	5-yr SBCFCD	830.00	2821.60	2825.04	2825.57	2827.27	0.003185	11.98	69.31	25.31	1.28
Main	8756.22*	2-yr SBCFCD	510.00	2821.60	2824.04	2824.58	2825.99	0.004030	11.19	45.58	22.33	1.38
Main	8507.43*	100-yr SBCFCD	2620.00	2819.20	2825.10	2826.81	2830.48	0.004343	18.60	140.84	32.71	1.58
Main	8507.43*	100-yr FIS	2700.00	2819.20	2825.21	2826.94	2830.64	0.004302	18.69	144.43	33.04	1.58
Main	8507.43*	50-yr FIS	1500.00	2819.20	2823.34	2824.80	2827.88	0.005336	17.10	87.70	27.41	1.69
Main	8507.43*	10-yr FIS	200.00	2819.20	2820.29	2820.87	2822.17	0.009741	10.99	18.21	18.28	1.94
Main	8507.43*	10-yr SBCFCD	1230.00	2819.20	2822.84	2824.18	2827.09	0.005726	16.54	74.35	25.91	1.72
Main	8507.43*	5-yr SBCFCD	830.00	2819.20	2822.00	2823.18	2825.71	0.006645	15.47	53.65	23.39	1.80
Main	8507.43*	2-yr SBCFCD	510.00	2819.20	2821.21	2822.18	2824.28	0.007894	14.06	36.27	21.04	1.89
Main	8258.66*	100-yr SBCFCD	2620.00	2816.80	2822.28	2824.42	2828.87	0.005766	20.61	127.13	31.43	1.81
Main	8258.66*	100-yr FIS	2700.00	2816.80	2822.38	2824.54	2829.04	0.005713	20.71	130.35	31.74	1.80
Main	8258.66*	50-yr FIS	1500.00	2816.80	2820.65	2822.40	2826.10	0.006899	18.73	80.08	26.56	1.90
Main	8258.66*	10-yr FIS	200.00	2816.80	2817.90	2818.47	2819.75	0.009567	10.92	18.31	18.30	1.92
Main	8258.66*	10-yr SBCFCD	1230.00	2816.80	2820.20	2821.81	2825.24	0.007300	18.02	68.28	25.19	1.93
Main	8258.66*	5-yr SBCFCD	830.00	2816.80	2819.44	2820.78	2823.72	0.008152	16.60	50.00	22.91	1.98
Main	8258.66*	2-yr SBCFCD	510.00	2816.80	2818.74	2819.78	2822.09	0.009011	14.70	34.68	20.81	2.01
Main	8009.88*	100-yr SBCFCD	2620.00	2814.40	2819.64	2822.02	2827.07	0.006803	21.87	119.78	30.72	1.95
Main	8009.88*	100-yr FIS	2700.00	2814.40	2819.74	2822.12	2827.25	0.006743	21.99	122.79	31.01	1.95
Main	8009.88*	50-yr FIS	1500.00	2814.40	2818.11	2819.99	2824.10	0.007891	19.64	76.37	26.14	2.02
Main	8009.88*	10-yr FIS	200.00	2814.40	2815.50	2816.06	2817.36	0.009654	10.95	18.26	18.29	1.93
Main	8009.88*	10-yr SBCFCD	1230.00	2814.40	2817.68	2819.41	2823.17	0.008249	18.80	65.42	24.85	2.04
Main	8009.88*	5-yr SBCFCD	830.00	2814.40	2816.97	2818.38	2821.52	0.008903	17.11	48.51	22.72	2.06
Main	8009.88*	2-yr SBCFCD	510.00	2814.40	2816.31	2817.38	2819.77	0.009418	14.92	34.17	20.74	2.05
Main	7800	100-yr SBCFCD	2620.00	2811.50	2814.27	2816.87	2824.26	0.015110	25.37	103.28	37.62	2.70
Main	7800	100-yr FIS	2700.00	2811.50	2814.34	2816.96	2824.44	0.014860	25.51	105.82	37.63	2.68
Main	7800	50-yr FIS	1500.00	2811.50	2813.30	2815.19	2821.08	0.019681	22.39	67.01	37.40	2.95
Main	7800	10-yr FIS	200.00	2811.50	2811.97	2812.48	2814.04	0.029020	11.55	17.32	37.10	2.98
Main	7800	10-yr SBCFCD	1230.00	2811.50	2813.06	2814.75	2820.08	0.021275	21.27	57.83	37.35	3.01
Main	7800	5-yr SBCFCD	830.00	2811.50	2812.68	2813.99	2818.30	0.024182	19.03	43.61	37.26	3.10
Main	7800	2-yr SBCFCD	510.00	2811.50	2812.35	2813.30	2816.46	0.026844	16.27	31.34	37.19	3.12
Main	7761.1	100-yr SBCFCD	2620.00	2811.00	2813.27	2815.75	2823.53	0.019325	25.71	101.92	45.00	3.01
Main	7761.1	100-yr FIS	2700.00	2811.00	2813.32	2815.83	2823.71	0.019004	25.86	104.39	45.00	2.99
Main	7761.1	50-yr FIS	1500.00	2811.00	2812.50	2814.27	2820.19	0.024131	22.26	67.38	45.00	3.21
Main	7761.1	10-yr FIS	200.00	2811.00	2811.48	2811.85	2812.79	0.017458	9.18	21.79	45.00	2.33

Main	7761.1	10-yr SBCFCD	1230.00	2811.00	2812.31	2813.87	2819.05	0.024914	20.83	59.06	45.00	3.20
Main	7761.1	5-yr SBCFCD	830.00	2811.00	2812.03	2813.19	2817.02	0.025181	17.94	46.27	45.00	3.12
Main	7761.1	2-yr SBCFCD	510.00	2811.00	2811.78	2812.59	2815.06	0.023573	14.53	35.09	45.00	2.90
Main	7749.9		Culvert									
Main	7738.6	100-yr SBCFCD	2970.00	2811.00	2815.75	2815.75	2818.08	0.002396	12.27	213.55	45.00	0.99
Main	7738.6	100-yr FIS	2700.00	2811.00	2815.81	2815.81	2818.23	0.001899	12.47	216.44	45.00	1.00
Main	7738.6	50-yr FIS	1500.00	2811.00	2814.28	2814.28	2815.88	0.001951	10.17	147.46	45.00	0.99
Main	7738.6	10-yr FIS	200.00	2811.00	2811.85	2811.85	2812.27	0.002719	5.22	38.30	45.00	1.00
Main	7738.6	10-yr SBCFCD	1400.00	2811.00	2813.87	2813.87	2815.28	0.002589	9.53	129.13	45.00	0.99
Main	7738.6	5-yr SBCFCD	930.00	2811.00	2813.21	2813.21	2814.29	0.002650	8.36	99.27	45.00	0.99
Main	7738.6	2-yr SBCFCD	570.00	2811.00	2812.59	2812.59	2813.38	0.002847	7.11	71.71	45.00	0.99
Main	7700	100-yr SBCFCD	2970.00	2810.60	2816.26	2816.26	2819.07	0.001932	13.46	220.65	39.00	1.00
Main	7700	100-yr FIS	2700.00	2810.60	2815.91	2815.91	2818.55	0.001932	13.03	207.24	39.00	1.00
Main	7700	50-yr FIS	1500.00	2810.60	2814.20	2814.20	2815.97	0.001986	10.69	140.37	39.00	0.99
Main	7700	10-yr FIS	200.00	2810.60	2811.54	2811.54	2812.00	0.002613	5.44	36.75	39.00	0.99
Main	7700	10-yr SBCFCD	1400.00	2810.60	2814.04	2814.04	2815.73	0.001996	10.44	134.10	39.00	0.99
Main	7700	5-yr SBCFCD	930.00	2810.60	2813.22	2813.22	2814.51	0.002078	9.10	102.17	39.00	0.99
Main	7700	2-yr SBCFCD	570.00	2810.60	2812.48	2812.48	2813.42	0.002272	7.79	73.13	39.00	1.00
Main	7500.*	100-yr SBCFCD	2970.00	2809.00	2813.44	2814.77	2818.00	0.004047	17.14	173.29	39.00	1.43
Main	7500.*	100-yr FIS	2700.00	2809.00	2813.14	2814.38	2817.49	0.004174	16.74	161.31	39.00	1.45
Main	7500.*	50-yr FIS	1500.00	2809.00	2811.65	2812.57	2814.92	0.005193	14.50	103.46	39.00	1.57
Main	7500.*	10-yr FIS	200.00	2809.00	2809.58	2809.94	2810.79	0.012717	8.81	22.70	39.00	2.04
Main	7500.*	10-yr SBCFCD	1400.00	2809.00	2811.52	2812.41	2814.68	0.005344	14.26	98.18	39.00	1.58
Main	7500.*	5-yr SBCFCD	930.00	2809.00	2810.85	2811.60	2813.44	0.006350	12.91	72.04	39.00	1.67
Main	7500.*	2-yr SBCFCD	570.00	2809.00	2810.27	2810.87	2812.32	0.007933	11.47	49.69	39.00	1.79
Main	7305	100-yr SBCFCD	2970.00	2807.30	2815.08	2812.97	2816.57	0.000745	9.79	303.31	39.00	0.62
Main	7305	100-yr FIS	2700.00	2807.30	2811.08	2812.62	2816.29	0.005526	18.32	147.39	39.00	1.66
Main	7305	50-yr FIS	1500.00	2807.30	2809.74	2810.90	2813.59	0.006746	15.74	95.29	39.00	1.77
Main	7305	10-yr FIS	200.00	2807.30	2808.00	2808.21	2808.83	0.006811	7.29	27.44	39.00	1.53
Main	7305	10-yr SBCFCD	1400.00	2807.30	2809.62	2810.74	2813.33	0.006891	15.44	90.64	39.00	1.79
Main	7305	5-yr SBCFCD	930.00	2807.30	2809.04	2809.92	2811.97	0.007754	13.74	67.71	39.00	1.84
Main	7305	2-yr SBCFCD	570.00	2807.30	2808.55	2809.18	2810.68	0.008523	11.73	48.61	39.00	1.85
Main	7266.9	100-yr SBCFCD	2970.00	2807.00	2815.43	2812.15	2816.38	0.000418	7.83	379.35	45.00	0.48
Main	7266.9	100-yr FIS	2700.00	2807.00	2814.69	2811.83	2815.64	0.000454	7.80	346.12	45.00	0.50
Main	7266.9	50-yr FIS	1500.00	2807.00	2812.10	2810.28	2812.76	0.000489	6.54	229.53	45.00	0.51
Main	7266.9	10-yr FIS	200.00	2807.00	2808.26	2807.86	2808.46	0.000748	3.52	56.81	45.00	0.55
Main	7266.9	10-yr SBCFCD	1400.00	2807.00	2812.00	2810.11	2812.60	0.000454	6.23	224.81	45.00	0.49
Main	7266.9	5-yr SBCFCD	930.00	2807.00	2810.62	2809.38	2811.13	0.000546	5.71	163.00	45.00	0.53
Main	7266.9	2-yr SBCFCD	570.00	2807.00	2808.05	2808.71	2810.30	0.011023	12.04	47.34	45.00	2.07
Main	7249.1		Culvert									
Main	7231.3	100-yr SBCFCD	3150.00	2807.00	2814.85	2812.36	2816.08	0.000582	8.92	353.13	45.00	0.56
Main	7231.3	100-yr FIS	2700.00	2807.00	2814.08	2811.83	2815.19	0.000583	8.48	318.44	45.00	0.56
Main	7231.3	50-yr FIS	1500.00	2807.00	2811.64	2810.21	2812.44	0.000655	7.18	208.83	45.00	0.59
Main	7231.3	10-yr FIS	200.00	2807.00	2807.85	2807.85	2808.27	0.002740	5.23	38.21	45.00	1.00
Main	7231.3	10-yr SBCFCD	1480.00	2807.00	2811.59	2810.23	2812.39	0.000659	7.16	206.59	45.00	0.59
Main	7231.3	5-yr SBCFCD	990.00	2807.00	2810.20	2809.48	2810.93	0.000915	6.87	144.03	45.00	0.68
Main	7231.3	2-yr SBCFCD	610.00	2807.00	2808.72	2808.72	2809.56	0.002556	7.37	77.30	45.00	0.99
Main	7187.1	100-yr SBCFCD	3150.00	2806.60	2814.04	2812.49	2815.87	0.000958	10.86	289.95	39.00	0.70
Main	7187.1	100-yr FIS	2700.00	2806.60	2813.40	2811.91	2815.01	0.000916	10.18	265.34	39.00	0.69
Main	7187.1	50-yr FIS	1500.00	2806.60	2811.29	2810.20	2812.34	0.000873	8.20	182.99	39.00	0.67
Main	7187.1	10-yr FIS	200.00	2806.60	2807.39	2807.53	2808.05	0.004761	6.54	30.60	39.00	1.30
Main	7187.1	10-yr SBCFCD	1480.00	2806.60	2811.25	2810.17	2812.28	0.000875	8.17	181.24	39.00	0.67
Main	7187.1	5-yr SBCFCD	990.00	2806.60	2809.95	2809.33	2810.84	0.001085	7.58	130.57	39.00	0.73
Main	7187.1	2-yr SBCFCD	610.00	2806.60	2808.62	2808.57	2809.55	0.002045	7.74	78.84	39.00	0.96
Main	7125	100-yr SBCFCD	3150.00	2805.10	2814.05	2812.64	2815.79	0.000788	10.57	298.31	44.94	0.72
Main	7125	100-yr FIS	2700.00	2805.10	2813.38	2812.02	2814.95	0.000808	10.07	268.12	44.27	0.72

Main	7125	50-yr FIS	1500.00	2805.10	2811.13	2810.02	2812.27	0.000830	8.56	175.13	38.09	0.70
Main	7125	10-yr FIS	200.00	2805.10	2806.04	2806.52	2807.57	0.009182	9.92	20.16	22.82	1.86
Main	7125	10-yr SBCFCD	1480.00	2805.10	2811.09	2809.98	2812.22	0.000830	8.53	173.43	37.96	0.70
Main	7125	5-yr SBCFCD	990.00	2805.10	2809.87	2808.94	2810.78	0.000845	7.63	129.67	34.32	0.69
Main	7125	2-yr SBCFCD	610.00	2805.10	2808.71	2807.96	2809.40	0.000865	6.65	91.77	30.83	0.68
Main	7117	100-yr SBCFCD	3150.00	2803.20	2814.51	2811.00	2815.58	0.000380	8.31	379.78	45.38	0.50
Main	7117	100-yr FIS	2700.00	2803.20	2813.82	2810.34	2814.75	0.000362	7.75	348.64	44.71	0.49
Main	7117	50-yr FIS	1500.00	2803.20	2811.53	2808.24	2812.09	0.000287	5.98	250.78	40.20	0.42
Main	7117	10-yr FIS	200.00	2803.20	2807.14	2804.62	2807.21	0.000074	2.05	97.74	29.56	0.20
Main	7117	10-yr SBCFCD	1480.00	2803.20	2811.49	2808.20	2812.04	0.000285	5.95	248.94	40.09	0.42
Main	7117	5-yr SBCFCD	990.00	2803.20	2810.24	2807.10	2810.62	0.000232	4.93	200.89	37.07	0.37
Main	7117	2-yr SBCFCD	610.00	2803.20	2809.03	2806.10	2809.26	0.000174	3.87	157.65	34.12	0.32
Main	7115		Lat Struct									
Main	7113	100-yr SBCFCD	3150.00	2803.20	2814.51	2811.00	2815.58	0.000380	8.32	379.68	45.38	0.50
Main	7113	100-yr FIS	2700.00	2803.20	2813.82	2810.34	2814.75	0.000363	7.75	348.54	44.70	0.49
Main	7113	50-yr FIS	1500.00	2803.20	2811.53	2808.24	2812.09	0.000287	5.98	250.71	40.19	0.42
Main	7113	10-yr FIS	200.00	2803.20	2807.14	2804.62	2807.21	0.000074	2.05	97.73	29.56	0.20
Main	7113	10-yr SBCFCD	1480.00	2803.20	2811.48	2808.20	2812.03	0.000285	5.95	248.88	40.08	0.42
Main	7113	5-yr SBCFCD	990.00	2803.20	2810.24	2807.10	2810.62	0.000232	4.93	200.85	37.06	0.37
Main	7113	2-yr SBCFCD	610.00	2803.20	2809.03	2806.10	2809.26	0.000174	3.87	157.62	34.12	0.32
Main	7105	100-yr SBCFCD	3150.00	2805.10	2812.63	2812.63	2815.41	0.001605	13.38	235.43	42.57	1.00
Main	7105	100-yr FIS	2700.00	2805.10	2812.03	2812.03	2814.58	0.001609	12.83	210.47	40.78	1.00
Main	7105	50-yr FIS	1500.00	2805.10	2810.02	2810.02	2811.95	0.001737	11.13	134.79	34.77	1.00
Main	7105	10-yr FIS	200.00	2805.10	2806.51	2806.51	2807.15	0.002385	6.44	31.06	24.21	1.00
Main	7105	10-yr SBCFCD	1480.00	2805.10	2809.98	2809.98	2811.89	0.001740	11.09	133.44	34.65	1.00
Main	7105	5-yr SBCFCD	990.00	2805.10	2808.94	2808.94	2810.50	0.001833	10.00	98.96	31.52	1.00
Main	7105	2-yr SBCFCD	610.00	2805.10	2807.96	2807.96	2809.16	0.001959	8.79	69.40	28.57	0.99
Main	7013.55*	100-yr SBCFCD	3150.00	2805.00	2811.68	2812.14	2815.18	0.002092	15.00	210.03	36.86	1.11
Main	7013.55*	100-yr FIS	2700.00	2805.00	2810.91	2811.49	2814.33	0.002323	14.83	182.10	35.61	1.16
Main	7013.55*	50-yr FIS	1500.00	2805.00	2808.82	2809.45	2811.65	0.003082	13.49	111.17	32.21	1.28
Main	7013.55*	10-yr FIS	200.00	2805.00	2806.03	2806.22	2806.84	0.004194	7.23	27.66	27.67	1.27
Main	7013.55*	10-yr SBCFCD	1480.00	2805.00	2808.78	2809.45	2811.59	0.003097	13.46	109.99	32.15	1.28
Main	7013.55*	5-yr SBCFCD	990.00	2805.00	2807.85	2808.42	2810.18	0.003530	12.25	80.81	30.64	1.33
Main	7013.55*	2-yr SBCFCD	610.00	2805.00	2807.05	2807.52	2808.85	0.004033	10.78	56.59	29.32	1.37
Main	6840	100-yr SBCFCD	3150.00	2803.30	2807.27	2809.44	2814.22	0.006953	21.16	148.87	37.99	1.88
Main	6840	100-yr FIS	2700.00	2803.30	2806.82	2808.73	2813.35	0.007487	20.51	131.65	37.88	1.94
Main	6840	50-yr FIS	1500.00	2803.30	2805.54	2806.98	2810.55	0.009736	17.97	83.48	37.56	2.12
Main	6840	10-yr FIS	200.00	2803.30	2803.83	2804.26	2805.42	0.018760	10.11	19.77	37.13	2.44
Main	6840	10-yr SBCFCD	1480.00	2803.30	2805.52	2806.95	2810.50	0.009791	17.91	82.64	37.55	2.13
Main	6840	5-yr SBCFCD	990.00	2803.30	2804.95	2806.09	2809.01	0.011461	16.17	61.23	37.41	2.23
Main	6840	2-yr SBCFCD	610.00	2803.30	2804.46	2805.32	2807.55	0.013423	14.10	43.25	37.29	2.31
Main	6801.6	100-yr SBCFCD	3150.00	2803.00	2811.51	2808.36	2812.57	0.000457	8.23	382.70	45.00	0.50
Main	6801.6	100-yr FIS	2700.00	2803.00	2810.69	2807.84	2811.64	0.000455	7.81	345.68	45.00	0.50
Main	6801.6	50-yr FIS	1500.00	2803.00	2804.81	2806.27	2810.10	0.013091	18.45	81.30	44.92	2.42
Main	6801.6	10-yr FIS	200.00	2803.00	2804.38	2803.86	2804.54	0.000569	3.24	61.73	44.92	0.49
Main	6801.6	10-yr SBCFCD	1480.00	2803.00	2804.79	2806.24	2810.04	0.013153	18.38	80.51	44.92	2.42
Main	6801.6	5-yr SBCFCD	990.00	2803.00	2804.35	2805.48	2808.50	0.014823	16.34	60.58	44.92	2.48
Main	6801.6	2-yr SBCFCD	610.00	2803.00	2803.98	2804.80	2806.96	0.015965	13.85	44.03	44.91	2.47
Main	6785.6		Culvert									
Main	6769.6	100-yr SBCFCD	3150.00	2803.00	2808.36	2808.36	2811.02	0.001855	13.08	240.86	44.97	1.00
Main	6769.6	100-yr FIS	2700.00	2803.00	2807.84	2807.84	2810.23	0.001867	12.41	217.50	44.96	0.99
Main	6769.6	50-yr FIS	1500.00	2803.00	2806.27	2806.27	2807.89	0.001973	10.22	146.81	44.94	1.00
Main	6769.6	10-yr FIS	200.00	2803.00	2803.85	2803.85	2804.28	0.002705	5.22	38.33	44.91	1.00
Main	6769.6	10-yr SBCFCD	1480.00	2803.00	2806.25	2806.25	2807.85	0.001963	10.15	145.83	44.94	0.99
Main	6769.6	5-yr SBCFCD	990.00	2803.00	2805.45	2805.45	2806.71	0.002164	9.01	109.85	44.93	1.02
Main	6769.6	2-yr SBCFCD	610.00	2803.00	2804.80	2804.80	2805.68	0.002202	7.54	80.88	44.92	0.99

Main	6707.1	100-yr SBCFCD	3150.00	2798.00	2804.47	2806.36	2810.51	0.004437	19.72	159.73	34.40	1.61
Main	6707.1	100-yr FIS	2700.00	2798.00	2803.85	2805.74	2809.71	0.004788	19.43	138.94	32.54	1.66
Main	6707.1	50-yr FIS	1500.00	2798.00	2803.60	2803.60	2805.64	0.001744	11.46	130.87	31.78	1.00
Main	6707.1	10-yr FIS	200.00	2798.00	2798.72	2799.67	2803.42	0.040889	17.41	11.49	17.14	3.75
Main	6707.1	10-yr SBCFCD	1480.00	2798.00	2803.56	2803.56	2805.58	0.001738	11.41	129.76	31.68	0.99
Main	6707.1	5-yr SBCFCD	990.00	2798.00	2802.42	2802.42	2804.09	0.001824	10.36	95.59	28.26	0.99
Main	6707.1	2-yr SBCFCD	610.00	2798.00	2801.32	2801.32	2802.63	0.001956	9.21	66.26	24.95	1.00
Main	6385	100-yr SBCFCD	3150.00	2796.20	2802.52	2804.53	2808.97	0.004860	20.38	154.53	33.94	1.68
Main	6385	100-yr FIS	2700.00	2796.20	2801.95	2803.94	2808.09	0.005101	19.88	135.80	32.25	1.71
Main	6385	50-yr FIS	1500.00	2796.20	2800.52	2801.80	2804.57	0.004543	16.15	92.86	27.97	1.56
Main	6385	10-yr FIS	200.00	2796.20	2797.52	2797.87	2798.76	0.005170	8.93	22.39	18.96	1.45
Main	6385	10-yr SBCFCD	1480.00	2796.20	2800.49	2801.76	2804.52	0.004565	16.12	91.82	27.86	1.56
Main	6385	5-yr SBCFCD	990.00	2796.20	2799.52	2800.62	2802.98	0.005140	14.93	66.31	24.96	1.61
Main	6385	2-yr SBCFCD	610.00	2796.20	2798.62	2799.52	2801.46	0.005948	13.53	45.10	22.26	1.67
Main	6345	100-yr SBCFCD	3150.00	2796.00	2802.31	2804.36	2808.78	0.004875	20.41	154.36	33.93	1.69
Main	6345	100-yr FIS	2700.00	2796.00	2801.75	2803.71	2807.88	0.005093	19.87	135.88	32.25	1.71
Main	6345	50-yr FIS	1500.00	2796.00	2800.31	2801.60	2804.39	0.004583	16.20	92.57	27.94	1.57
Main	6345	10-yr FIS	200.00	2796.00	2797.32	2797.66	2798.56	0.005170	8.93	22.39	18.96	1.45
Main	6345	10-yr SBCFCD	1480.00	2796.00	2800.28	2801.56	2804.33	0.004603	16.17	91.55	27.83	1.57
Main	6345	5-yr SBCFCD	990.00	2796.00	2799.33	2800.42	2802.76	0.005064	14.85	66.66	25.00	1.60
Main	6345	2-yr SBCFCD	610.00	2796.00	2798.45	2799.32	2801.21	0.005687	13.32	45.80	22.36	1.64
Main	6344.7	100-yr SBCFCD	3150.00	2796.00	2805.15	2801.33	2806.06	0.000369	7.65	411.54	45.00	0.45
Main	6344.7	100-yr FIS	2700.00	2796.00	2798.48	2800.82	2807.58	0.015382	24.21	111.51	45.00	2.71
Main	6344.7	50-yr FIS	1500.00	2796.00	2797.63	2799.26	2804.14	0.018420	20.49	73.22	45.00	2.83
Main	6344.7	10-yr FIS	200.00	2796.00	2796.38	2796.85	2798.47	0.037722	11.59	17.26	45.00	3.30
Main	6344.7	10-yr SBCFCD	1480.00	2796.00	2797.61	2799.23	2804.09	0.018557	20.43	72.45	45.00	2.84
Main	6344.7	5-yr SBCFCD	990.00	2796.00	2797.18	2798.48	2802.56	0.022708	18.61	53.20	45.00	3.02
Main	6344.7	2-yr SBCFCD	610.00	2796.00	2796.82	2797.79	2801.05	0.028466	16.51	36.95	45.00	3.21
Main	6328.7		Culvert									
Main	6312.6	100-yr SBCFCD	3150.00	2796.00	2803.98	2801.34	2805.17	0.000554	8.78	358.97	45.00	0.55
Main	6312.6	100-yr FIS	2700.00	2796.00	2800.83	2800.83	2803.23	0.001878	12.43	217.24	45.00	1.00
Main	6312.6	50-yr FIS	1500.00	2796.00	2799.28	2799.28	2800.88	0.001953	10.18	147.39	45.00	0.99
Main	6312.6	10-yr FIS	200.00	2796.00	2796.86	2796.86	2797.28	0.002676	5.20	38.49	45.00	0.99
Main	6312.6	10-yr SBCFCD	1480.00	2796.00	2799.22	2799.22	2800.84	0.002017	10.23	144.67	45.00	1.01
Main	6312.6	5-yr SBCFCD	990.00	2796.00	2798.48	2798.48	2799.70	0.002060	8.87	111.64	45.00	0.99
Main	6312.6	2-yr SBCFCD	610.00	2796.00	2797.79	2797.79	2798.68	0.002246	7.58	80.44	45.00	1.00
Main	6312.1	100-yr SBCFCD	3150.00	2796.00	2801.80	2801.80	2804.67	0.001911	13.61	231.45	39.97	1.00
Main	6312.1	100-yr FIS	2700.00	2796.00	2801.23	2801.23	2803.83	0.001921	12.93	208.81	39.97	1.00
Main	6312.1	50-yr FIS	1500.00	2796.00	2799.55	2799.55	2801.29	0.001971	10.59	141.66	39.94	0.99
Main	6312.1	10-yr FIS	200.00	2796.00	2796.92	2796.92	2797.38	0.002664	5.43	36.85	39.91	1.00
Main	6312.1	10-yr SBCFCD	1480.00	2796.00	2799.51	2799.51	2801.24	0.001981	10.56	140.21	39.94	0.99
Main	6312.1	5-yr SBCFCD	990.00	2796.00	2798.68	2798.68	2800.01	0.002095	9.27	106.77	39.93	1.00
Main	6312.1	2-yr SBCFCD	610.00	2796.00	2797.95	2797.95	2798.90	0.002196	7.85	77.70	39.92	0.99
Main	6267.1	100-yr SBCFCD	3150.00	2792.00	2794.96	2797.36	2803.89	0.012358	23.98	131.35	48.87	2.58
Main	6267.1	100-yr FIS	2700.00	2792.00	2794.64	2796.87	2803.06	0.013351	23.29	115.93	47.91	2.64
Main	6267.1	50-yr FIS	1500.00	2792.00	2793.67	2795.36	2800.58	0.019051	21.09	71.13	45.02	2.96
Main	6267.1	10-yr FIS	200.00	2792.00	2792.30	2792.91	2796.63	0.110653	16.71	11.97	40.89	5.44
Main	6267.1	10-yr SBCFCD	1480.00	2792.00	2793.66	2795.33	2800.53	0.019216	21.04	70.34	44.97	2.96
Main	6267.1	5-yr SBCFCD	990.00	2792.00	2793.19	2794.57	2799.31	0.025741	19.85	49.88	43.58	3.27
Main	6267.1	2-yr SBCFCD	610.00	2792.00	2792.79	2793.88	2798.20	0.038236	18.66	32.69	42.38	3.74
Main	6000	100-yr SBCFCD	3150.00	2787.50	2790.32	2792.86	2800.22	0.014489	25.25	124.74	48.46	2.77
Main	6000	100-yr FIS	2700.00	2787.50	2790.04	2792.37	2799.19	0.015180	24.27	111.23	47.62	2.80
Main	6000	50-yr FIS	1500.00	2787.50	2789.23	2790.86	2795.64	0.016909	20.31	73.87	45.20	2.80
Main	6000	10-yr FIS	200.00	2787.50	2788.10	2788.41	2789.13	0.010400	8.14	24.58	41.80	1.87
Main	6000	10-yr SBCFCD	1480.00	2787.50	2789.22	2790.83	2795.56	0.016904	20.21	73.25	45.16	2.80
Main	6000	5-yr SBCFCD	990.00	2787.50	2788.87	2790.08	2793.46	0.016260	17.19	57.58	44.11	2.65
Main	6000	2-yr SBCFCD	610.00	2787.50	2788.56	2789.38	2791.53	0.014524	13.83	44.10	43.18	2.41

Main	5950	100-yr SBCFCD	3150.00	2786.80	2790.00	2792.56	2799.42	0.011987	24.63	127.87	39.98	2.43
Main	5950	100-yr FIS	2700.00	2786.80	2789.65	2792.00	2798.37	0.012673	23.69	113.96	39.97	2.47
Main	5950	50-yr FIS	1500.00	2786.80	2788.70	2790.32	2794.76	0.014290	19.75	75.95	39.95	2.52
Main	5950	10-yr FIS	200.00	2786.80	2787.38	2787.72	2788.55	0.012404	8.67	23.07	39.91	2.01
Main	5950	10-yr SBCFCD	1480.00	2786.80	2788.69	2790.28	2794.68	0.014293	19.65	75.31	39.95	2.52
Main	5950	5-yr SBCFCD	990.00	2786.80	2788.28	2789.46	2792.64	0.013989	16.75	59.11	39.94	2.43
Main	5950	2-yr SBCFCD	610.00	2786.80	2787.92	2788.73	2790.82	0.013215	13.66	44.66	39.93	2.28
Main	5772.1	100-yr SBCFCD	3150.00	2784.40	2794.89	2790.19	2795.77	0.000330	7.52	418.98	40.00	0.41
Main	5772.1	100-yr FIS	2700.00	2784.40	2793.51	2789.61	2794.36	0.000366	7.42	363.77	39.99	0.43
Main	5772.1	50-yr FIS	1500.00	2784.40	2786.33	2787.95	2792.22	0.013672	19.48	77.00	39.92	2.47
Main	5772.1	10-yr FIS	200.00	2784.40	2784.96	2785.32	2786.21	0.013797	8.95	22.34	39.91	2.11
Main	5772.1	10-yr SBCFCD	1480.00	2784.40	2786.31	2787.90	2792.15	0.013668	19.38	76.37	39.92	2.47
Main	5772.1	5-yr SBCFCD	990.00	2784.40	2785.90	2787.08	2790.16	0.013526	16.58	59.72	39.91	2.39
Main	5772.1	2-yr SBCFCD	610.00	2784.40	2785.51	2786.34	2788.44	0.013453	13.73	44.42	39.91	2.29
Main	5742	100-yr SBCFCD	3150.00	2784.00	2795.24	2789.27	2795.61	0.000141	4.90	643.18	81.69	0.31
Main	5742	100-yr FIS	2700.00	2784.00	2793.82	2788.74	2794.22	0.000170	5.06	533.21	73.83	0.33
Main	5742	50-yr FIS	1500.00	2784.00	2790.44	2787.19	2790.79	0.000214	4.77	314.71	55.39	0.35
Main	5742	10-yr FIS	200.00	2784.00	2785.48	2784.83	2785.61	0.000409	2.88	69.47	47.00	0.42
Main	5742	10-yr SBCFCD	1480.00	2784.00	2790.38	2787.14	2790.73	0.000214	4.75	311.47	55.07	0.35
Main	5742	5-yr SBCFCD	990.00	2784.00	2788.78	2786.41	2789.08	0.000237	4.34	228.02	50.57	0.36
Main	5742	2-yr SBCFCD	610.00	2784.00	2787.37	2785.74	2787.60	0.000271	3.85	158.50	47.74	0.37
Main	5679.8		Culvert									
Main	5609.6	100-yr SBCFCD	3150.00	2784.00	2794.10	2789.28	2794.81	0.000262	6.78	464.46	46.00	0.38
Main	5609.6	100-yr FIS	2700.00	2784.00	2793.11	2788.77	2793.75	0.000261	6.44	418.98	46.00	0.38
Main	5609.6	50-yr FIS	1500.00	2784.00	2790.06	2787.22	2790.51	0.000274	5.38	278.77	46.00	0.39
Main	5609.6	10-yr FIS	200.00	2784.00	2785.21	2784.84	2785.41	0.000813	3.58	55.83	46.00	0.57
Main	5609.6	10-yr SBCFCD	1480.00	2784.00	2790.01	2787.20	2790.45	0.000274	5.36	276.24	46.00	0.39
Main	5609.6	5-yr SBCFCD	990.00	2784.00	2788.48	2786.42	2788.84	0.000303	4.80	206.14	46.00	0.40
Main	5609.6	2-yr SBCFCD	610.00	2784.00	2787.11	2785.77	2787.39	0.000362	4.26	143.14	46.00	0.43
Main	5581.3	100-yr SBCFCD	3150.00	2783.60	2790.66	2790.66	2794.01	0.001674	14.75	224.93	38.89	0.98
Main	5581.3	100-yr FIS	2700.00	2783.60	2789.98	2789.98	2793.02	0.001735	14.03	199.29	36.58	0.98
Main	5581.3	50-yr FIS	1500.00	2783.60	2787.88	2787.88	2790.00	0.002028	11.66	128.99	31.01	0.99
Main	5581.3	10-yr FIS	200.00	2783.60	2784.72	2784.72	2785.27	0.002549	5.94	33.68	30.02	0.99
Main	5581.3	10-yr SBCFCD	1480.00	2783.60	2787.84	2787.84	2789.94	0.002043	11.63	127.58	30.96	1.00
Main	5581.3	5-yr SBCFCD	990.00	2783.60	2786.85	2786.85	2788.45	0.002126	10.15	97.56	30.03	0.99
Main	5581.3	2-yr SBCFCD	610.00	2783.60	2785.95	2785.95	2787.11	0.002217	8.64	70.61	30.02	0.99
Main	5515.3	100-yr SBCFCD	3150.00	2783.00	2786.94	2788.94	2793.49	0.006906	20.54	153.37	46.28	1.99
Main	5515.3	100-yr FIS	2700.00	2783.00	2786.60	2788.42	2792.53	0.006902	19.53	138.26	45.09	1.97
Main	5515.3	50-yr FIS	1500.00	2783.00	2785.56	2786.80	2789.58	0.006946	16.08	93.29	41.29	1.89
Main	5515.3	10-yr FIS	200.00	2783.00	2783.69	2784.05	2784.90	0.010387	8.82	22.69	34.13	1.91
Main	5515.3	10-yr SBCFCD	1480.00	2783.00	2785.54	2786.76	2789.52	0.006949	16.01	92.45	41.21	1.88
Main	5515.3	5-yr SBCFCD	990.00	2783.00	2784.99	2785.93	2788.07	0.007160	14.07	70.38	39.16	1.85
Main	5515.3	2-yr SBCFCD	610.00	2783.00	2784.47	2785.16	2786.75	0.007705	12.13	50.31	37.15	1.84
Main	5135	100-yr SBCFCD	3150.00	2782.21	2786.58	2788.63	2793.18	0.004936	21.45	159.52	43.09	1.81
Main	5135	100-yr FIS	2700.00	2782.21	2786.18	2788.03	2792.22	0.005094	20.44	142.55	41.90	1.81
Main	5135	50-yr FIS	1500.00	2782.21	2784.93	2786.24	2789.23	0.005855	17.06	92.85	38.17	1.82
Main	5135	10-yr FIS	200.00	2782.21	2782.89	2783.31	2784.32	0.012013	9.66	21.01	32.03	2.07
Main	5135	10-yr SBCFCD	1480.00	2782.21	2784.91	2786.21	2789.18	0.005885	17.00	91.91	38.10	1.82
Main	5135	5-yr SBCFCD	990.00	2782.21	2784.28	2785.31	2787.69	0.006645	15.11	68.35	36.20	1.85
Main	5135	2-yr SBCFCD	610.00	2782.21	2783.69	2784.48	2786.32	0.007906	13.20	47.68	34.44	1.91
Main	4875	100-yr SBCFCD	3150.00	2779.75	2783.81	2786.17	2791.62	0.006401	23.26	146.36	42.17	2.04
Main	4875	100-yr FIS	2700.00	2779.75	2783.43	2785.57	2790.60	0.006663	22.22	130.49	41.02	2.04
Main	4875	50-yr FIS	1500.00	2779.75	2782.26	2783.78	2787.40	0.007786	18.62	84.72	37.53	2.07
Main	4875	10-yr FIS	200.00	2779.75	2780.50	2780.84	2781.65	0.008368	8.66	23.47	32.26	1.76
Main	4875	10-yr SBCFCD	1480.00	2779.75	2782.24	2783.75	2787.34	0.007817	18.55	83.89	37.46	2.07
Main	4875	5-yr SBCFCD	990.00	2779.75	2781.67	2782.85	2785.67	0.008595	16.35	63.00	35.75	2.08
Main	4875	2-yr SBCFCD	610.00	2779.75	2781.16	2782.02	2784.07	0.009284	13.86	45.34	34.23	2.06

Main	4635	100-yr SBCFCD	3150.00	2777.45	2781.35	2783.87	2789.90	0.007368	24.30	139.72	41.69	2.17
Main	4635	100-yr FIS	2700.00	2777.45	2780.98	2783.27	2788.82	0.007654	23.19	124.69	40.60	2.17
Main	4635	50-yr FIS	1500.00	2777.45	2779.88	2781.48	2785.40	0.008714	19.28	81.72	37.29	2.18
Main	4635	10-yr FIS	200.00	2777.45	2778.17	2778.54	2779.45	0.010001	9.14	22.22	32.15	1.90
Main	4635	10-yr SBCFCD	1480.00	2777.45	2779.86	2781.45	2785.33	0.008717	19.18	81.01	37.23	2.18
Main	4635	5-yr SBCFCD	990.00	2777.45	2779.33	2780.55	2783.51	0.009220	16.70	61.61	35.63	2.15
Main	4635	2-yr SBCFCD	610.00	2777.45	2778.85	2779.72	2781.80	0.009529	13.97	44.97	34.20	2.08
Main	4385	100-yr SBCFCD	3150.00	2775.05	2778.85	2781.47	2787.92	0.008084	25.01	135.52	41.39	2.26
Main	4385	100-yr FIS	2700.00	2775.05	2778.50	2780.87	2786.78	0.008348	23.83	121.20	40.34	2.26
Main	4385	50-yr FIS	1500.00	2775.05	2777.44	2779.08	2783.14	0.009165	19.58	80.41	37.18	2.23
Main	4385	10-yr FIS	200.00	2775.05	2775.78	2776.15	2777.01	0.009382	8.97	22.66	32.19	1.85
Main	4385	10-yr SBCFCD	1480.00	2775.05	2777.43	2779.05	2783.07	0.009169	19.48	79.71	37.13	2.23
Main	4385	5-yr SBCFCD	990.00	2775.05	2776.91	2778.15	2781.17	0.009467	16.84	61.10	35.59	2.17
Main	4385	2-yr SBCFCD	610.00	2775.05	2776.45	2777.32	2779.41	0.009557	13.98	44.93	34.20	2.08
Main	4135	100-yr SBCFCD	3150.00	2772.65	2776.38	2779.07	2785.80	0.008574	25.47	132.92	41.20	2.32
Main	4135	100-yr FIS	2700.00	2772.65	2776.05	2778.47	2784.61	0.008794	24.21	119.16	40.19	2.32
Main	4135	50-yr FIS	1500.00	2772.65	2775.03	2776.68	2780.81	0.009391	19.73	79.78	37.13	2.26
Main	4135	10-yr FIS	200.00	2772.65	2773.37	2773.74	2774.63	0.009707	9.06	22.42	32.16	1.88
Main	4135	10-yr SBCFCD	1480.00	2772.65	2775.01	2776.65	2780.74	0.009397	19.63	79.09	37.07	2.25
Main	4135	5-yr SBCFCD	990.00	2772.65	2774.51	2775.75	2778.79	0.009570	16.89	60.89	35.57	2.18
Main	4135	2-yr SBCFCD	610.00	2772.65	2774.05	2774.92	2777.01	0.009597	14.00	44.87	34.19	2.09
Main	3969.6	100-yr SBCFCD	3380.00	2771.00	2774.82	2777.51	2784.25	0.010223	24.64	137.17	41.80	2.40
Main	3969.6	100-yr FIS	2700.00	2771.00	2774.26	2776.67	2782.95	0.011306	23.67	114.09	40.07	2.47
Main	3969.6	50-yr FIS	1500.00	2771.00	2773.31	2774.96	2779.11	0.011227	19.32	77.63	37.16	2.36
Main	3969.6	10-yr FIS	200.00	2771.00	2771.71	2772.09	2772.97	0.010357	9.00	22.22	32.24	1.91
Main	3969.6	10-yr SBCFCD	1600.00	2771.00	2773.49	2775.12	2779.10	0.009974	19.01	84.17	37.70	2.24
Main	3969.6	5-yr SBCFCD	1070.00	2771.00	2772.97	2774.20	2777.16	0.009813	16.43	65.14	36.12	2.16
Main	3969.6	2-yr SBCFCD	650.00	2771.00	2772.46	2773.33	2775.40	0.009851	13.75	47.27	34.56	2.07
Main	3835	100-yr SBCFCD	3380.00	2769.77	2773.79	2776.48	2782.99	0.007637	25.24	144.65	42.05	2.22
Main	3835	100-yr FIS	2700.00	2769.77	2773.21	2775.59	2781.53	0.008404	23.88	120.94	40.32	2.27
Main	3835	50-yr FIS	1500.00	2769.77	2772.21	2773.80	2777.70	0.008639	19.23	81.95	37.31	2.17
Main	3835	10-yr FIS	200.00	2769.77	2770.52	2770.87	2771.68	0.008525	8.71	23.34	32.25	1.77
Main	3835	10-yr SBCFCD	1600.00	2769.77	2772.35	2773.97	2777.86	0.008060	19.30	87.33	37.74	2.12
Main	3835	5-yr SBCFCD	1070.00	2769.77	2771.80	2773.03	2775.94	0.008272	16.65	66.99	36.08	2.06
Main	3835	2-yr SBCFCD	650.00	2769.77	2771.28	2772.13	2774.16	0.008475	13.82	48.54	34.51	1.99
Main	3740	100-yr SBCFCD	3380.00	2766.70	2772.42	2775.35	2782.18	0.008156	25.07	134.81	32.15	2.16
Main	3740	100-yr FIS	2700.00	2766.70	2771.70	2774.44	2780.66	0.008623	24.02	112.40	29.99	2.19
Main	3740	50-yr FIS	1500.00	2766.70	2770.30	2772.29	2776.77	0.008797	20.41	73.51	25.81	2.13
Main	3740	10-yr FIS	200.00	2766.70	2767.61	2768.37	2770.39	0.017875	13.37	14.96	17.74	2.56
Main	3740	10-yr SBCFCD	1600.00	2766.70	2770.49	2772.51	2776.98	0.008379	20.45	78.26	26.35	2.09
Main	3740	5-yr SBCFCD	1070.00	2766.70	2769.67	2771.32	2775.01	0.008955	18.55	57.69	23.90	2.10
Main	3740	2-yr SBCFCD	650.00	2766.70	2768.85	2770.15	2773.13	0.010253	16.62	39.12	21.44	2.17
Main	3732	100-yr SBCFCD	3380.00	2765.00	2770.69	2774.06	2781.96	0.009397	26.93	125.49	29.09	2.29
Main	3732	100-yr FIS	2700.00	2765.00	2769.92	2773.02	2780.43	0.010190	26.01	103.79	27.18	2.35
Main	3732	50-yr FIS	1500.00	2765.00	2773.80	2770.75	2774.48	0.000359	6.58	227.96	36.78	0.47
Main	3732	10-yr FIS	200.00	2765.00	2769.07	2766.70	2769.16	0.000110	2.45	81.56	25.07	0.24
Main	3732	10-yr SBCFCD	1600.00	2765.00	2768.60	2770.96	2776.73	0.010962	22.89	69.91	23.89	2.36
Main	3732	5-yr SBCFCD	1070.00	2765.00	2772.68	2769.73	2773.18	0.000308	5.69	188.09	34.00	0.43
Main	3732	2-yr SBCFCD	650.00	2765.00	2771.29	2768.52	2771.61	0.000240	4.53	143.38	30.57	0.37
Main	3730		Lat Struct									
Main	3728	100-yr SBCFCD	3380.00	2765.00	2770.71	2774.06	2781.91	0.009326	26.86	125.83	29.12	2.28
Main	3728	100-yr FIS	2700.00	2765.00	2769.93	2773.02	2780.38	0.010101	25.93	104.12	27.21	2.34
Main	3728	50-yr FIS	1500.00	2765.00	2773.80	2770.75	2774.48	0.000359	6.58	227.88	36.78	0.47
Main	3728	10-yr FIS	200.00	2765.00	2769.07	2766.70	2769.16	0.000110	2.45	81.54	25.07	0.24
Main	3728	10-yr SBCFCD	1600.00	2765.00	2774.04	2770.96	2774.75	0.000369	6.76	236.52	37.36	0.47
Main	3728	5-yr SBCFCD	1070.00	2765.00	2772.68	2769.74	2773.18	0.000309	5.69	188.04	33.99	0.43
Main	3728	2-yr SBCFCD	650.00	2765.00	2771.29	2768.52	2771.61	0.000240	4.53	143.34	30.57	0.37

Main	3720	100-yr SBCFCD	3380.00	2766.70	2772.82	2775.34	2780.92	0.006297	22.83	148.05	33.37	1.91
Main	3720	100-yr FIS	2700.00	2766.70	2772.11	2774.44	2779.36	0.006425	21.61	124.94	31.22	1.90
Main	3720	50-yr FIS	1500.00	2766.70	2772.30	2772.30	2774.33	0.001742	11.46	130.91	31.79	1.00
Main	3720	10-yr FIS	200.00	2766.70	2768.36	2768.36	2769.10	0.002347	6.88	29.07	19.99	1.01
Main	3720	10-yr SBCFCD	1600.00	2766.70	2772.51	2772.51	2774.60	0.001722	11.62	137.75	32.43	0.99
Main	3720	5-yr SBCFCD	1070.00	2766.70	2771.32	2771.32	2773.05	0.001812	10.57	101.27	28.86	0.99
Main	3720	2-yr SBCFCD	650.00	2766.70	2770.16	2770.16	2771.50	0.001916	9.32	69.78	25.37	0.99
Main	3520.3	100-yr SBCFCD	3380.00	2761.30	2766.55	2769.95	2778.85	0.011240	28.14	120.09	30.75	2.51
Main	3520.3	100-yr FIS	2700.00	2761.30	2765.87	2769.04	2777.23	0.012024	27.06	99.80	28.70	2.56
Main	3520.3	50-yr FIS	1500.00	2761.30	2764.54	2766.90	2772.96	0.012813	23.28	64.43	24.73	2.54
Main	3520.3	10-yr FIS	200.00	2761.30	2761.97	2762.97	2767.36	0.050663	18.63	10.73	17.01	4.13
Main	3520.3	10-yr SBCFCD	1600.00	2761.30	2764.70	2767.09	2773.24	0.012380	23.45	68.22	25.19	2.51
Main	3520.3	5-yr SBCFCD	1070.00	2761.30	2763.84	2765.92	2771.64	0.015495	22.41	47.75	22.62	2.72
Main	3520.3	2-yr SBCFCD	650.00	2761.30	2763.04	2764.76	2770.03	0.021206	21.22	30.63	20.22	3.04
Main	3422	100-yr SBCFCD	3380.00	2758.30	2763.30	2766.96	2777.45	0.013584	30.18	111.99	29.77	2.74
Main	3422	100-yr FIS	2700.00	2758.30	2762.64	2766.05	2775.76	0.014632	29.07	92.89	27.81	2.80
Main	3422	50-yr FIS	1500.00	2758.30	2761.33	2763.91	2771.38	0.016449	25.44	58.97	23.94	2.86
Main	3422	10-yr FIS	200.00	2758.30	2759.07	2759.98	2763.07	0.031555	16.04	12.47	17.28	3.33
Main	3422	10-yr SBCFCD	1600.00	2758.30	2761.47	2764.12	2771.69	0.015946	25.66	62.35	24.36	2.83
Main	3422	5-yr SBCFCD	1070.00	2758.30	2760.68	2762.93	2769.81	0.019400	24.24	44.15	22.04	3.02
Main	3422	2-yr SBCFCD	650.00	2758.30	2759.97	2761.76	2767.71	0.024624	22.33	29.10	19.92	3.26
Main	3410	100-yr SBCFCD	3380.00	2758.00	2762.96	2766.87	2777.27	0.013867	30.35	111.37	29.89	2.77
Main	3410	100-yr FIS	2700.00	2758.00	2762.31	2765.74	2775.56	0.014916	29.21	92.42	27.92	2.83
Main	3410	50-yr FIS	1500.00	2758.00	2761.01	2763.60	2771.16	0.016787	25.58	58.65	24.02	2.88
Main	3410	10-yr FIS	200.00	2758.00	2758.78	2759.65	2762.66	0.030204	15.81	12.65	17.35	3.26
Main	3410	10-yr SBCFCD	1600.00	2758.00	2761.14	2763.79	2771.49	0.016287	25.81	61.99	24.43	2.86
Main	3410	5-yr SBCFCD	1070.00	2758.00	2760.37	2762.62	2769.56	0.019684	24.32	43.99	22.11	3.04
Main	3410	2-yr SBCFCD	650.00	2758.00	2759.66	2761.46	2767.42	0.024765	22.35	29.08	19.99	3.27
Main	3400.*	100-yr SBCFCD	3380.00	2758.00	2762.99	2767.30	2777.06	0.013542	30.09	112.32	29.98	2.74
Main	3400.*	100-yr FIS	2700.00	2758.00	2762.34	2765.72	2775.34	0.014515	28.93	93.32	28.02	2.79
Main	3400.*	50-yr FIS	1500.00	2758.00	2761.04	2763.60	2770.92	0.016136	25.23	59.46	24.12	2.83
Main	3400.*	10-yr FIS	200.00	2758.00	2758.83	2759.67	2762.25	0.024807	14.85	13.47	17.49	2.98
Main	3400.*	10-yr SBCFCD	1600.00	2758.00	2761.18	2763.81	2771.25	0.015681	25.47	62.81	24.53	2.81
Main	3400.*	5-yr SBCFCD	1070.00	2758.00	2760.41	2762.62	2769.27	0.018672	23.89	44.79	22.22	2.97
Main	3400.*	2-yr SBCFCD	650.00	2758.00	2759.70	2761.45	2767.07	0.022914	21.78	29.84	20.10	3.15
Main	3266.4	100-yr SBCFCD	3380.00	2754.50	2759.30	2763.67	2774.95	0.015728	31.75	106.45	29.39	2.94
Main	3266.4	100-yr FIS	2700.00	2754.50	2758.67	2762.24	2773.10	0.016825	30.49	88.55	27.50	2.99
Main	3266.4	50-yr FIS	1500.00	2754.50	2757.40	2760.10	2768.48	0.019009	26.70	56.17	23.71	3.06
Main	3266.4	10-yr FIS	200.00	2754.50	2755.32	2756.17	2758.85	0.026025	15.07	13.27	17.45	3.05
Main	3266.4	10-yr SBCFCD	1600.00	2754.50	2757.53	2760.31	2768.85	0.018544	27.00	59.25	24.09	3.03
Main	3266.4	5-yr SBCFCD	1070.00	2754.50	2756.82	2759.12	2766.53	0.021345	25.01	42.79	21.95	3.16
Main	3266.4	2-yr SBCFCD	650.00	2754.50	2756.17	2757.95	2763.87	0.024493	22.27	29.19	20.00	3.25
Main	3220	100-yr SBCFCD	3380.00	2753.60	2758.38	2762.56	2774.20	0.015964	31.92	105.89	29.33	2.96
Main	3220	100-yr FIS	2700.00	2753.60	2757.75	2761.31	2772.31	0.017017	30.61	88.20	27.46	3.01
Main	3220	50-yr FIS	1500.00	2753.60	2756.50	2759.18	2767.59	0.019049	26.72	56.13	23.70	3.06
Main	3220	10-yr FIS	200.00	2753.60	2754.46	2755.26	2757.63	0.022007	14.29	14.00	17.58	2.82
Main	3220	10-yr SBCFCD	1600.00	2753.60	2756.63	2759.37	2767.98	0.018618	27.04	59.17	24.08	3.04
Main	3220	5-yr SBCFCD	1070.00	2753.60	2755.93	2758.19	2765.50	0.020904	24.83	43.10	21.99	3.13
Main	3220	2-yr SBCFCD	650.00	2753.60	2755.30	2757.03	2762.66	0.022869	21.77	29.86	20.10	3.15
Main	3212	100-yr SBCFCD	3380.00	2751.70	2756.54	2760.76	2773.91	0.017116	33.44	101.07	26.74	3.03
Main	3212	100-yr FIS	2700.00	2751.70	2755.88	2759.70	2772.00	0.018544	32.23	83.78	25.12	3.11
Main	3212	50-yr FIS	1500.00	2751.70	2754.54	2757.44	2767.27	0.022057	28.63	52.40	21.89	3.26
Main	3212	10-yr FIS	200.00	2751.70	2755.98	2753.38	2756.06	0.000093	2.31	86.42	25.38	0.22
Main	3212	10-yr SBCFCD	1600.00	2751.70	2754.67	2757.66	2767.66	0.021436	28.92	55.32	22.21	3.23
Main	3212	5-yr SBCFCD	1070.00	2751.70	2753.95	2756.42	2765.15	0.025126	26.86	39.83	20.45	3.39
Main	3212	2-yr SBCFCD	650.00	2751.70	2758.23	2755.20	2758.52	0.000212	4.34	149.61	30.83	0.35
Main	3210		Lat Struct									

Main	3208	100-yr SBCFCD	3380.00	2751.70	2756.56	2760.76	2773.81	0.016958	33.33	101.40	26.77	3.02
Main	3208	100-yr FIS	2700.00	2751.70	2755.89	2759.69	2771.89	0.018341	32.10	84.11	25.16	3.09
Main	3208	50-yr FIS	1500.00	2751.70	2754.56	2757.44	2767.14	0.021694	28.46	52.70	21.92	3.24
Main	3208	10-yr FIS	200.00	2751.70	2755.98		2756.06	0.000093	2.31	86.40	25.38	0.22
Main	3208	10-yr SBCFCD	1600.00	2751.70	2754.69	2757.65	2767.54	0.021098	28.77	55.62	22.24	3.21
Main	3208	5-yr SBCFCD	1070.00	2751.70	2753.96	2756.41	2765.01	0.024592	26.67	40.12	20.48	3.36
Main	3208	2-yr SBCFCD	650.00	2751.70	2758.23		2758.52	0.000213	4.35	149.58	30.83	0.35
Main	3200	100-yr SBCFCD	3380.00	2753.60	2758.58	2762.56	2772.76	0.013706	30.22	111.83	29.93	2.76
Main	3200	100-yr FIS	2700.00	2753.60	2757.96	2761.34	2770.82	0.014304	28.78	93.81	28.07	2.77
Main	3200	50-yr FIS	1500.00	2753.60	2756.72	2759.20	2766.01	0.014766	24.46	61.32	24.35	2.72
Main	3200	10-yr FIS	200.00	2753.60	2755.27	2755.27	2756.00	0.002311	6.84	29.22	20.01	1.00
Main	3200	10-yr SBCFCD	1600.00	2753.60	2756.84	2759.41	2766.42	0.014571	24.83	64.44	24.73	2.71
Main	3200	5-yr SBCFCD	1070.00	2753.60	2756.15	2758.22	2763.86	0.015227	22.28	48.03	22.65	2.70
Main	3200	2-yr SBCFCD	650.00	2753.60	2756.99	2756.99	2758.41	0.002055	9.55	68.08	25.17	1.02
Main	2942.6	100-yr SBCFCD	3380.00	2750.00	2754.97	2758.98	2769.22	0.013791	30.29	111.59	29.91	2.76
Main	2942.6	100-yr FIS	2700.00	2750.00	2754.37	2757.72	2767.13	0.014138	28.66	94.20	28.11	2.76
Main	2942.6	50-yr FIS	1500.00	2750.00	2753.15	2755.60	2762.20	0.014228	24.15	62.12	24.45	2.67
Main	2942.6	10-yr FIS	200.00	2750.00	2750.82	2751.67	2754.31	0.025610	15.00	13.34	17.46	3.02
Main	2942.6	10-yr SBCFCD	1600.00	2750.00	2753.27	2755.81	2762.66	0.014179	24.59	65.06	24.81	2.68
Main	2942.6	5-yr SBCFCD	1070.00	2750.00	2752.60	2754.62	2759.96	0.014224	21.76	49.17	22.80	2.61
Main	2942.6	2-yr SBCFCD	650.00	2750.00	2752.02	2753.45	2756.98	0.012710	17.87	36.37	21.05	2.40
Main	2910	100-yr SBCFCD	3380.00	2750.00	2755.07	2759.23	2768.56	0.012774	29.47	114.70	30.22	2.67
Main	2910	100-yr FIS	2700.00	2750.00	2754.48	2757.74	2766.46	0.012944	27.78	97.21	28.43	2.65
Main	2910	50-yr FIS	1500.00	2750.00	2753.27	2755.60	2761.54	0.012512	23.09	64.97	24.80	2.51
Main	2910	10-yr FIS	200.00	2750.00	2750.98	2751.67	2753.38	0.014299	12.44	16.08	17.93	2.31
Main	2910	10-yr SBCFCD	1600.00	2750.00	2753.38	2755.81	2762.00	0.012538	23.56	67.92	25.15	2.53
Main	2910	5-yr SBCFCD	1070.00	2750.00	2752.73	2754.62	2759.29	0.012069	20.56	52.03	23.18	2.42
Main	2910	2-yr SBCFCD	650.00	2750.00	2752.16	2753.46	2756.39	0.010065	16.51	39.37	21.48	2.15
Main	2900	100-yr SBCFCD	3380.00	2750.00	2755.11	2759.22	2768.37	0.012478	29.22	115.67	30.31	2.64
Main	2900	100-yr FIS	2700.00	2750.00	2754.51	2757.74	2766.26	0.012597	27.51	98.15	28.53	2.61
Main	2900	50-yr FIS	1500.00	2750.00	2753.30	2755.60	2761.35	0.012023	22.77	65.88	24.91	2.47
Main	2900	10-yr FIS	200.00	2750.00	2751.03	2751.67	2753.17	0.012001	11.75	17.02	18.09	2.14
Main	2900	10-yr SBCFCD	1600.00	2750.00	2753.42	2755.81	2761.81	0.012070	23.25	68.83	25.26	2.48
Main	2900	5-yr SBCFCD	1070.00	2750.00	2752.77	2754.62	2759.11	0.011479	20.21	52.94	23.29	2.36
Main	2900	2-yr SBCFCD	650.00	2750.00	2752.20	2753.46	2756.24	0.009363	16.11	40.34	21.61	2.08
Main	2770	100-yr SBCFCD	3380.00	2747.90	2752.94	2756.58	2766.66	0.013080	29.72	113.73	30.12	2.70
Main	2770	100-yr FIS	2700.00	2747.90	2752.35	2755.64	2764.53	0.013257	28.01	96.38	28.34	2.68
Main	2770	50-yr FIS	1500.00	2747.90	2751.12	2753.50	2759.67	0.013106	23.47	63.92	24.67	2.57
Main	2770	10-yr FIS	200.00	2747.90	2748.86	2749.58	2751.38	0.015415	12.74	15.69	17.87	2.40
Main	2770	10-yr SBCFCD	1600.00	2747.90	2751.24	2753.71	2760.13	0.013100	23.92	66.88	25.03	2.58
Main	2770	5-yr SBCFCD	1070.00	2747.90	2750.57	2752.52	2757.47	0.012956	21.07	50.78	23.01	2.50
Main	2770	2-yr SBCFCD	650.00	2747.90	2749.94	2751.33	2754.77	0.012223	17.63	36.86	21.12	2.35
Main	2762	100-yr SBCFCD	3380.00	2746.00	2751.09	2755.10	2766.38	0.014323	31.38	107.70	27.33	2.79
Main	2762	100-yr FIS	2700.00	2746.00	2750.44	2754.04	2764.26	0.014902	29.83	90.51	25.77	2.80
Main	2762	50-yr FIS	1500.00	2746.00	2749.11	2751.76	2759.38	0.016170	25.72	58.31	22.53	2.82
Main	2762	10-yr FIS	200.00	2746.00	2750.28	2747.69	2750.37	0.000093	2.31	86.44	25.38	0.22
Main	2762	10-yr SBCFCD	1600.00	2746.00	2749.24	2751.97	2759.85	0.015992	26.14	61.21	22.84	2.81
Main	2762	5-yr SBCFCD	1070.00	2746.00	2753.92	2750.75	2754.39	0.000279	5.49	194.74	34.19	0.41
Main	2762	2-yr SBCFCD	650.00	2746.00	2752.52	2749.52	2752.81	0.000214	4.35	149.33	30.81	0.35
Main	2760		Lat Struct									
Main	2758	100-yr SBCFCD	3380.00	2746.00	2751.10	2755.10	2766.31	0.014211	31.30	108.00	27.36	2.78
Main	2758	100-yr FIS	2700.00	2746.00	2750.45	2754.04	2764.17	0.014745	29.72	90.85	25.80	2.79
Main	2758	50-yr FIS	1500.00	2746.00	2749.12	2751.76	2759.29	0.015917	25.58	58.63	22.57	2.80
Main	2758	10-yr FIS	200.00	2746.00	2750.28	2747.69	2750.36	0.000093	2.31	86.42	25.38	0.22
Main	2758	10-yr SBCFCD	1600.00	2746.00	2749.25	2751.97	2759.75	0.015750	26.00	61.53	22.88	2.79
Main	2758	5-yr SBCFCD	1070.00	2746.00	2753.92	2750.75	2754.39	0.000279	5.50	194.69	34.19	0.41
Main	2758	2-yr SBCFCD	650.00	2746.00	2752.52	2749.52	2752.81	0.000214	4.35	149.29	30.80	0.35

Main	2750	100-yr SBCFCD	3380.00	2747.90	2753.18	2756.50	2765.27	0.010969	27.90	121.15	30.85	2.48
Main	2750	100-yr FIS	2700.00	2747.90	2752.61	2755.62	2763.10	0.010755	26.00	103.85	29.12	2.43
Main	2750	50-yr FIS	1500.00	2747.90	2751.45	2753.49	2758.16	0.009267	20.78	72.17	25.65	2.18
Main	2750	10-yr FIS	200.00	2747.90	2749.56	2749.56	2750.30	0.002355	6.89	29.04	19.98	1.01
Main	2750	10-yr SBCFCD	1600.00	2747.90	2751.56	2753.71	2758.63	0.009451	21.33	75.00	25.98	2.21
Main	2750	5-yr SBCFCD	1070.00	2747.90	2752.49	2752.49	2754.25	0.001852	10.65	100.49	28.77	1.00
Main	2750	2-yr SBCFCD	650.00	2747.90	2751.36	2751.36	2752.70	0.001916	9.32	69.77	25.37	0.99
Main	2730.8	100-yr SBCFCD	3380.00	2747.60	2752.87	2756.01	2765.05	0.011091	28.01	120.67	30.81	2.49
Main	2730.8	100-yr FIS	2700.00	2747.60	2752.29	2755.34	2762.88	0.010890	26.11	103.39	29.07	2.44
Main	2730.8	50-yr FIS	1500.00	2747.60	2751.12	2753.20	2757.97	0.009537	20.99	71.45	25.57	2.21
Main	2730.8	10-yr FIS	200.00	2747.60	2748.91	2749.27	2750.17	0.005309	9.01	22.19	18.93	1.47
Main	2730.8	10-yr SBCFCD	1600.00	2747.60	2751.23	2753.41	2758.43	0.009703	21.53	74.31	25.90	2.24
Main	2730.8	5-yr SBCFCD	1070.00	2747.60	2751.59	2752.22	2754.12	0.003082	12.76	83.85	26.98	1.28
Main	2730.8	2-yr SBCFCD	650.00	2747.60	2750.51	2750.99	2752.58	0.003556	11.56	56.25	23.72	1.32
Main	2513.9	100-yr SBCFCD	3380.00	2744.90	2750.13	2753.78	2762.58	0.011435	28.32	119.35	30.68	2.53
Main	2513.9	100-yr FIS	2700.00	2744.90	2749.54	2752.62	2760.44	0.011338	26.49	101.91	28.92	2.49
Main	2513.9	50-yr FIS	1500.00	2744.90	2748.31	2750.49	2755.72	0.010674	21.84	68.68	25.24	2.33
Main	2513.9	10-yr FIS	200.00	2744.90	2745.88	2746.56	2748.28	0.014299	12.44	16.08	17.93	2.31
Main	2513.9	10-yr SBCFCD	1600.00	2744.90	2748.43	2750.71	2756.17	0.010754	22.32	71.67	25.59	2.35
Main	2513.9	5-yr SBCFCD	1070.00	2744.90	2747.97	2749.49	2752.87	0.007909	17.76	60.24	24.22	1.98
Main	2513.9	2-yr SBCFCD	650.00	2744.90	2747.09	2748.36	2751.18	0.009579	16.24	40.03	21.57	2.10
Main	2410	100-yr SBCFCD	3380.00	2743.50	2748.69	2752.64	2761.36	0.011702	28.56	118.36	30.58	2.56
Main	2410	100-yr FIS	2700.00	2743.50	2748.11	2751.24	2759.22	0.011656	26.76	100.91	28.82	2.52
Main	2410	50-yr FIS	1500.00	2743.50	2746.86	2749.10	2754.55	0.011253	22.25	67.42	25.09	2.39
Main	2410	10-yr FIS	200.00	2743.50	2744.49	2745.17	2746.82	0.013587	12.24	16.35	17.97	2.26
Main	2410	10-yr SBCFCD	1600.00	2743.50	2746.98	2749.31	2755.00	0.011300	22.71	70.44	25.45	2.41
Main	2410	5-yr SBCFCD	1070.00	2743.50	2746.43	2748.12	2751.92	0.009316	18.80	56.91	23.80	2.14
Main	2410	2-yr SBCFCD	650.00	2743.50	2745.61	2746.96	2750.09	0.010931	16.98	38.28	21.32	2.23
Main	2400	100-yr SBCFCD	3380.00	2743.50	2748.73	2752.01	2761.18	0.011431	28.32	119.37	30.68	2.53
Main	2400	100-yr FIS	2700.00	2743.50	2748.14	2751.24	2759.04	0.011344	26.50	101.89	28.92	2.49
Main	2400	50-yr FIS	1500.00	2743.50	2746.90	2749.10	2754.38	0.010814	21.94	68.37	25.20	2.35
Main	2400	10-yr FIS	200.00	2743.50	2744.54	2745.17	2746.62	0.011395	11.56	17.30	18.13	2.09
Main	2400	10-yr SBCFCD	1600.00	2743.50	2747.02	2749.31	2754.82	0.010878	22.41	71.39	25.56	2.36
Main	2400	5-yr SBCFCD	1070.00	2743.50	2746.48	2748.12	2751.78	0.008856	18.48	57.91	23.93	2.09
Main	2400	2-yr SBCFCD	650.00	2743.50	2745.65	2746.96	2749.92	0.010173	16.57	39.22	21.46	2.16
Main	2320	100-yr SBCFCD	3380.00	2742.20	2747.37	2751.69	2760.20	0.011925	28.75	117.57	30.50	2.58
Main	2320	100-yr FIS	2700.00	2742.20	2746.78	2749.94	2758.07	0.011916	26.97	100.12	28.74	2.55
Main	2320	50-yr FIS	1500.00	2742.20	2745.53	2747.79	2753.43	0.011720	22.57	66.47	24.98	2.44
Main	2320	10-yr FIS	200.00	2742.20	2743.18	2743.86	2745.57	0.014215	12.41	16.11	17.93	2.31
Main	2320	10-yr SBCFCD	1600.00	2742.20	2745.65	2748.01	2753.88	0.011739	23.02	69.50	25.34	2.45
Main	2320	5-yr SBCFCD	1070.00	2742.20	2745.05	2746.80	2750.94	0.010323	19.48	54.92	23.55	2.25
Main	2320	2-yr SBCFCD	650.00	2742.20	2744.26	2745.66	2748.99	0.011856	17.45	37.24	21.18	2.32
Main	2312	100-yr SBCFCD	3380.00	2740.30	2745.50	2749.40	2759.94	0.013207	30.49	110.86	27.61	2.68
Main	2312	100-yr FIS	2700.00	2740.30	2744.86	2748.32	2757.81	0.013606	28.88	93.48	26.04	2.69
Main	2312	50-yr FIS	1500.00	2740.30	2743.49	2746.06	2753.15	0.014796	24.95	60.13	22.73	2.70
Main	2312	10-yr FIS	200.00	2740.30	2744.58	2741.99	2744.67	0.000093	2.31	86.47	25.38	0.22
Main	2312	10-yr SBCFCD	1600.00	2740.30	2743.62	2746.26	2753.59	0.014628	25.35	63.13	23.05	2.70
Main	2312	5-yr SBCFCD	1070.00	2740.30	2748.21	2745.05	2748.68	0.000279	5.50	194.64	34.19	0.41
Main	2312	2-yr SBCFCD	650.00	2740.30	2746.82	2743.82	2747.11	0.000214	4.35	149.33	30.81	0.35
Main	2310		Lat Struct									
Main	2308	100-yr SBCFCD	3380.00	2740.30	2745.51	2749.40	2759.87	0.013107	30.41	111.17	27.64	2.67
Main	2308	100-yr FIS	2700.00	2740.30	2744.87	2748.32	2757.74	0.013486	28.79	93.77	26.07	2.68
Main	2308	50-yr FIS	1500.00	2740.30	2743.50	2746.06	2753.06	0.014566	24.81	60.46	22.76	2.68
Main	2308	10-yr FIS	200.00	2740.30	2744.58	2741.99	2744.67	0.000093	2.31	86.45	25.38	0.22
Main	2308	10-yr SBCFCD	1600.00	2740.30	2743.63	2746.26	2753.51	0.014412	25.21	63.46	23.08	2.68
Main	2308	5-yr SBCFCD	1070.00	2740.30	2748.21	2745.05	2748.68	0.000280	5.50	194.59	34.18	0.41
Main	2308	2-yr SBCFCD	650.00	2740.30	2746.82	2743.82	2747.11	0.000214	4.35	149.29	30.80	0.35

Main	2300	100-yr SBCFCD	3380.00	2742.20	2747.64	2750.84	2758.84	0.009874	26.86	125.83	31.30	2.36
Main	2300	100-yr FIS	2700.00	2742.20	2747.07	2749.94	2756.67	0.009496	24.87	108.59	29.61	2.29
Main	2300	50-yr FIS	1500.00	2742.20	2745.91	2747.79	2751.92	0.007940	19.68	76.21	26.12	2.03
Main	2300	10-yr FIS	200.00	2742.20	2743.85	2743.85	2744.60	0.002394	6.93	28.88	19.96	1.01
Main	2300	10-yr SBCFCD	1600.00	2742.20	2746.02	2748.01	2752.37	0.008131	20.23	79.09	26.45	2.06
Main	2300	5-yr SBCFCD	1070.00	2742.20	2746.82	2746.82	2748.55	0.001816	10.57	101.20	28.85	0.99
Main	2300	2-yr SBCFCD	650.00	2742.20	2745.66	2745.66	2747.00	0.001920	9.32	69.73	25.36	0.99
Main	2260.4	100-yr SBCFCD	3380.00	2741.50	2746.88	2750.01	2758.41	0.010275	27.25	124.04	31.13	2.41
Main	2260.4	100-yr FIS	2700.00	2741.50	2746.31	2749.24	2756.25	0.009972	25.31	106.70	29.41	2.34
Main	2260.4	50-yr FIS	1500.00	2741.50	2745.11	2747.10	2751.55	0.008752	20.37	73.64	25.82	2.13
Main	2260.4	10-yr FIS	200.00	2741.50	2742.65	2743.17	2744.34	0.008336	10.44	19.15	18.44	1.81
Main	2260.4	10-yr SBCFCD	1600.00	2741.50	2745.22	2747.31	2751.99	0.008896	20.88	76.62	26.17	2.15
Main	2260.4	5-yr SBCFCD	1070.00	2741.50	2745.18	2746.12	2748.30	0.004160	14.19	75.42	26.03	1.47
Main	2260.4	2-yr SBCFCD	650.00	2741.50	2744.14	2744.96	2746.76	0.004970	12.97	50.10	22.93	1.55
Main	1986.6	100-yr SBCFCD	3480.00	2737.90	2743.29	2747.07	2755.46	0.010827	28.00	124.30	31.16	2.47
Main	1986.6	100-yr FIS	2700.00	2737.90	2742.57	2745.62	2753.29	0.011076	26.27	102.77	29.01	2.46
Main	1986.6	50-yr FIS	1500.00	2737.90	2741.30	2743.49	2748.79	0.010842	21.96	68.31	25.20	2.35
Main	1986.6	10-yr FIS	200.00	2737.90	2738.87	2739.56	2741.31	0.014593	12.52	15.97	17.91	2.34
Main	1986.6	10-yr SBCFCD	1650.00	2737.90	2741.52	2743.80	2749.26	0.010490	22.33	73.88	25.85	2.33
Main	1986.6	5-yr SBCFCD	1120.00	2737.90	2740.94	2742.65	2746.44	0.008965	18.81	59.53	24.13	2.11
Main	1986.6	2-yr SBCFCD	680.00	2737.90	2740.08	2741.44	2744.62	0.010706	17.11	39.75	21.53	2.22
Main	1910	100-yr SBCFCD	3480.00	2737.10	2742.49	2746.68	2754.62	0.010770	27.94	124.54	31.18	2.46
Main	1910	100-yr FIS	2700.00	2737.10	2741.78	2744.84	2752.43	0.010967	26.18	103.13	29.05	2.45
Main	1910	50-yr FIS	1500.00	2737.10	2740.51	2742.70	2747.94	0.010731	21.88	68.55	25.23	2.34
Main	1910	10-yr FIS	200.00	2737.10	2738.15	2738.77	2740.21	0.011279	11.52	17.36	18.14	2.08
Main	1910	10-yr SBCFCD	1650.00	2737.10	2740.72	2742.95	2748.45	0.010465	22.31	73.95	25.86	2.33
Main	1910	5-yr SBCFCD	1120.00	2737.10	2740.12	2741.85	2745.73	0.009246	19.02	58.89	24.05	2.14
Main	1910	2-yr SBCFCD	680.00	2737.10	2739.28	2740.64	2743.79	0.010582	17.04	39.91	21.55	2.21
Main	1900	100-yr SBCFCD	3480.00	2737.00	2742.39	2745.54	2754.52	0.010770	27.94	124.54	31.18	2.46
Main	1900	100-yr FIS	2700.00	2737.00	2741.68	2744.74	2752.33	0.010967	26.18	103.13	29.05	2.45
Main	1900	50-yr FIS	1500.00	2737.00	2740.41	2742.60	2747.84	0.010731	21.88	68.55	25.23	2.34
Main	1900	10-yr FIS	200.00	2737.00	2738.05	2738.67	2740.10	0.011164	11.48	17.42	18.15	2.07
Main	1900	10-yr SBCFCD	1650.00	2737.00	2740.62	2742.90	2748.35	0.010465	22.31	73.95	25.86	2.33
Main	1900	5-yr SBCFCD	1120.00	2737.00	2740.01	2741.75	2745.65	0.009289	19.05	58.80	24.04	2.15
Main	1900	2-yr SBCFCD	680.00	2737.00	2739.18	2740.54	2743.69	0.010582	17.04	39.91	21.55	2.21
Main	1720	100-yr SBCFCD	3480.00	2735.40	2740.88	2744.01	2752.49	0.010137	27.34	127.29	31.44	2.39
Main	1720	100-yr FIS	2700.00	2735.40	2740.18	2743.14	2750.26	0.010158	25.47	105.99	29.34	2.36
Main	1720	50-yr FIS	1500.00	2735.40	2738.90	2741.00	2745.87	0.009783	21.18	70.81	25.49	2.24
Main	1720	10-yr FIS	200.00	2735.40	2736.54	2737.06	2738.25	0.008488	10.51	19.04	18.42	1.82
Main	1720	10-yr SBCFCD	1650.00	2735.40	2739.10	2741.30	2746.42	0.009690	21.72	75.98	26.09	2.24
Main	1720	5-yr SBCFCD	1120.00	2735.40	2738.44	2740.14	2743.97	0.009045	18.87	59.35	24.11	2.12
Main	1720	2-yr SBCFCD	680.00	2735.40	2737.67	2738.94	2741.80	0.009302	16.31	41.69	21.80	2.08
Main	1712	100-yr SBCFCD	3480.00	2733.40	2738.87	2742.62	2752.23	0.011624	29.34	118.61	28.39	2.53
Main	1712	100-yr FIS	2700.00	2733.40	2738.10	2741.42	2749.98	0.012075	27.66	97.61	26.52	2.54
Main	1712	50-yr FIS	1500.00	2733.40	2736.70	2739.17	2745.57	0.013125	23.91	62.73	23.07	2.56
Main	1712	10-yr FIS	200.00	2733.40	2737.68	2735.08	2737.76	0.000093	2.31	86.55	25.47	0.22
Main	1712	10-yr SBCFCD	1650.00	2733.40	2736.91	2739.49	2746.14	0.012774	24.39	67.66	23.59	2.54
Main	1712	5-yr SBCFCD	1120.00	2733.40	2741.42	2738.27	2741.91	0.000289	5.63	199.01	34.64	0.41
Main	1712	2-yr SBCFCD	680.00	2733.40	2740.01	2737.02	2740.32	0.000220	4.45	152.70	31.19	0.35
Main	1710		Lat Struct									
Main	1708	100-yr SBCFCD	3480.00	2733.40	2738.88	2742.62	2752.17	0.011537	29.26	118.93	28.42	2.52
Main	1708	100-yr FIS	2700.00	2733.40	2738.11	2741.42	2749.92	0.011970	27.57	97.92	26.54	2.53
Main	1708	50-yr FIS	1500.00	2733.40	2736.71	2739.17	2745.51	0.012956	23.81	63.01	23.10	2.54
Main	1708	10-yr FIS	200.00	2733.40	2737.68	2735.08	2737.76	0.000093	2.31	86.54	25.47	0.22
Main	1708	10-yr SBCFCD	1650.00	2733.40	2736.92	2739.49	2746.08	0.012619	24.28	67.95	23.62	2.52
Main	1708	5-yr SBCFCD	1120.00	2733.40	2741.42	2738.27	2741.91	0.000289	5.63	198.95	34.63	0.41
Main	1708	2-yr SBCFCD	680.00	2733.40	2740.01	2737.02	2740.32	0.000220	4.45	152.66	31.19	0.35

Main	1699.2	100-yr SBCFCD	3480.00	2735.30	2741.02	2744.12	2751.13	0.008463	25.52	136.36	32.69	2.20
Main	1699.2	100-yr FIS	2700.00	2735.30	2740.36	2743.00	2748.84	0.008059	23.36	115.59	30.66	2.12
Main	1699.2	50-yr FIS	1500.00	2735.30	2739.23	2740.88	2744.32	0.006314	18.09	82.91	27.16	1.83
Main	1699.2	10-yr FIS	200.00	2735.30	2736.95	2736.95	2737.69	0.002414	6.93	28.86	20.09	1.02
Main	1699.2	10-yr SBCFCD	1650.00	2735.30	2739.40	2741.18	2744.91	0.006540	18.84	87.60	27.69	1.87
Main	1699.2	5-yr SBCFCD	1120.00	2735.30	2740.03	2740.03	2741.78	0.001792	10.62	105.44	29.62	0.99
Main	1699.2	2-yr SBCFCD	680.00	2735.30	2738.82	2738.82	2740.21	0.001936	9.45	71.99	25.89	1.00
Main	1500	100-yr SBCFCD	3480.00	2734.00	2739.92	2743.20	2749.32	0.007572	24.60	141.44	32.77	2.09
Main	1500	100-yr FIS	2700.00	2734.00	2739.24	2741.74	2747.15	0.007251	22.57	119.62	30.70	2.02
Main	1500	50-yr FIS	1500.00	2734.00	2737.95	2739.60	2743.06	0.006297	18.14	82.70	26.86	1.82
Main	1500	10-yr FIS	200.00	2734.00	2735.16	2735.67	2736.80	0.007928	10.27	19.47	18.49	1.76
Main	1500	10-yr SBCFCD	1650.00	2734.00	2738.14	2739.90	2743.62	0.006424	18.78	87.86	27.43	1.85
Main	1500	5-yr SBCFCD	1120.00	2734.00	2737.70	2738.75	2741.08	0.004477	14.76	75.90	26.08	1.52
Main	1500	2-yr SBCFCD	680.00	2734.00	2736.67	2737.54	2739.47	0.005273	13.43	50.64	23.00	1.59
Main	1200.*	100-yr SBCFCD	3480.00	2730.00	2731.90	2734.43	2744.85	0.031974	28.89	120.47	74.96	3.91
Main	1200.*	100-yr FIS	2700.00	2730.00	2731.61	2733.81	2742.76	0.033412	26.80	100.75	71.51	3.91
Main	1200.*	50-yr FIS	1500.00	2730.00	2731.10	2732.66	2738.97	0.037625	22.51	66.64	65.26	3.91
Main	1200.*	10-yr FIS	200.00	2730.00	2730.32	2730.73	2732.15	0.042286	10.86	18.42	58.57	3.41
Main	1200.*	10-yr SBCFCD	1650.00	2730.00	2731.17	2732.81	2739.50	0.036813	23.15	71.28	66.14	3.91
Main	1200.*	5-yr SBCFCD	1120.00	2730.00	2730.90	2732.21	2737.69	0.041918	20.91	53.57	63.19	4.00
Main	1200.*	2-yr SBCFCD	680.00	2730.00	2730.65	2731.60	2735.68	0.047420	18.01	37.76	61.16	4.04
Main	957.5	100-yr SBCFCD	3480.00	2727.00	2729.14	2730.27	2732.86	0.045999	15.48	224.84	127.54	2.05
Main	957.5	100-yr FIS	2700.00	2727.00	2728.93	2729.92	2731.78	0.036766	13.53	199.51	117.01	1.83
Main	957.5	50-yr FIS	1500.00	2727.00	2728.57	2728.94	2729.97	0.023219	9.49	158.03	111.82	1.41
Main	957.5	10-yr FIS	200.00	2727.00	2727.55	2727.53	2727.79	0.015007	3.94	50.80	97.13	0.96
Main	957.5	10-yr SBCFCD	1650.00	2727.00	2728.63	2729.09	2730.19	0.024939	10.05	164.25	112.61	1.47
Main	957.5	5-yr SBCFCD	1120.00	2727.00	2728.41	2728.61	2729.40	0.018828	8.00	140.04	109.49	1.25
Main	957.5	2-yr SBCFCD	680.00	2727.00	2728.15	2728.17	2728.72	0.013700	6.04	112.65	105.85	1.03

Profile Output Table - Standard Table 2

Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Low Flow Channel	11179.5	100-yr SBCFCD	2849.36	2849.26	0.10	4.52	0.01		30.70		43.99
Low Flow Channel	11179.5	100-yr FIS	2849.28	2849.19	0.09	4.52	0.01		26.70		43.60
Low Flow Channel	11179.5	50-yr FIS	2849.04	2848.98	0.06	4.48	0.00		15.70		42.39
Low Flow Channel	11179.5	10-yr FIS	2848.61	2848.60	0.01	4.46	0.00		2.40		40.20
Low Flow Channel	11179.5	10-yr SBCFCD	2849.01	2848.96	0.05	4.49	0.00		14.40		42.26
Low Flow Channel	11179.5	5-yr SBCFCD	2848.89	2848.85	0.04	4.48	0.00		9.70		41.61
Low Flow Channel	11179.5	2-yr SBCFCD	2848.77	2848.75	0.03	4.49	0.00		6.00		41.03
Low Flow Channel	10613.9	100-yr SBCFCD	2844.83	2844.67	0.16	8.28	0.00		30.70		47.68
Low Flow Channel	10613.9	100-yr FIS	2844.76	2844.62	0.14	8.28	0.00		26.70		47.32
Low Flow Channel	10613.9	50-yr FIS	2844.55	2844.45	0.10	8.28	0.00		15.70		46.13
Low Flow Channel	10613.9	10-yr FIS	2844.16	2844.13	0.03	8.26	0.00		2.40		43.92
Low Flow Channel	10613.9	10-yr SBCFCD	2844.51	2844.42	0.10	8.28	0.01		14.40		45.91
Low Flow Channel	10613.9	5-yr SBCFCD	2844.40	2844.32	0.08	8.28	0.01		9.70		45.26
Low Flow Channel	10613.9	2-yr SBCFCD	2844.29	2844.23	0.06	8.26	0.01		6.00		44.60
Low Flow Channel	9536.1	100-yr SBCFCD	2836.54	2836.40	0.15	5.32	0.03		30.70		47.88
Low Flow Channel	9536.1	100-yr FIS	2836.47	2836.34	0.13	5.32	0.03		26.70		47.49
Low Flow Channel	9536.1	50-yr FIS	2836.26	2836.17	0.09	5.33	0.02		15.70		46.31
Low Flow Channel	9536.1	10-yr FIS	2835.89	2835.87	0.02	5.32	0.01		2.40		44.17
Low Flow Channel	9536.1	10-yr SBCFCD	2836.24	2836.16	0.08	5.32	0.02		14.40		46.20
Low Flow Channel	9536.1	5-yr SBCFCD	2836.12	2836.07	0.06	5.33	0.02		9.70		45.57
Low Flow Channel	9536.1	2-yr SBCFCD	2836.03	2835.99	0.04	5.33	0.02		6.00		45.02

Low Flow Channel	9035.8	100-yr SBCFCD	2831.19	2830.94	0.26	0.05	0.11	30.70	46.76
Low Flow Channel	9035.8	100-yr FIS	2831.13	2830.90	0.23	0.05	0.10	26.70	46.46
Low Flow Channel	9035.8	50-yr FIS	2830.92	2830.76	0.16	0.05	0.07	15.70	45.50
Low Flow Channel	9035.8	10-yr FIS	2830.55	2830.50	0.05	0.02	0.03	2.40	43.69
Low Flow Channel	9035.8	10-yr SBCFCD	2830.89	2830.73	0.16	0.04	0.07	14.40	45.31
Low Flow Channel	9035.8	5-yr SBCFCD	2830.78	2830.65	0.13	0.04	0.06	9.70	44.77
Low Flow Channel	9035.8	2-yr SBCFCD	2830.68	2830.57	0.11	0.03	0.05	6.00	44.21
Low Flow Channel	9005	100-yr SBCFCD	2830.45	2830.42	0.03	0.59	0.07	30.70	52.91
Low Flow Channel	9005	100-yr FIS	2830.35	2830.32	0.03	0.56	0.06	26.70	52.27
Low Flow Channel	9005	50-yr FIS	2830.04	2830.03	0.02	0.48	0.04	15.70	50.19
Low Flow Channel	9005	10-yr FIS	2829.43	2829.42	0.00	0.26	0.01	2.40	45.96
Low Flow Channel	9005	10-yr SBCFCD	2830.00	2829.99	0.01	0.48	0.04	14.40	49.90
Low Flow Channel	9005	5-yr SBCFCD	2829.83	2829.82	0.01	0.42	0.03	9.70	48.74
Low Flow Channel	9005	2-yr SBCFCD	2829.67	2829.66	0.01	0.36	0.03	6.00	47.62
Low Flow Channel	8674.9	100-yr SBCFCD	2829.79	2829.54	0.26	2.70	0.01	30.70	46.76
Low Flow Channel	8674.9	100-yr FIS	2829.73	2829.50	0.23	2.69	0.01	26.70	46.46
Low Flow Channel	8674.9	50-yr FIS	2829.52	2829.36	0.16	2.14	0.03	15.70	45.50
Low Flow Channel	8674.9	10-yr FIS	2829.15	2829.10	0.05	4.81	0.00	2.40	43.73
Low Flow Channel	8674.9	10-yr SBCFCD	2829.49	2829.33	0.16	2.21	0.03	14.40	45.31
Low Flow Channel	8674.9	5-yr SBCFCD	2829.38	2829.25	0.13	2.17	0.03	9.70	44.77
Low Flow Channel	8674.9	2-yr SBCFCD	2829.28	2829.17	0.11	4.63	0.01	6.00	44.21
Low Flow Channel	8507.43	100-yr SBCFCD	2825.09	2824.59	0.50	4.62	0.07	30.70	45.74
Low Flow Channel	8507.43	100-yr FIS	2825.02	2824.56	0.46	4.64	0.07	26.70	45.51
Low Flow Channel	8507.43	50-yr FIS	2824.74	2824.63	0.11	2.41	0.00	15.70	46.02
Low Flow Channel	8507.43	10-yr FIS	2824.35	2824.30	0.05			2.40	43.69
Low Flow Channel	8507.43	10-yr SBCFCD	2824.72	2824.46	0.26	4.74	0.03	14.40	44.82
Low Flow Channel	8507.43	5-yr SBCFCD	2824.60	2824.53	0.07	2.41	0.00	9.70	45.34
Low Flow Channel	8507.43	2-yr SBCFCD	2824.48	2824.37	0.11	5.04	0.00	6.00	44.21
Low Flow Channel	8258.66	100-yr SBCFCD	2822.66	2822.53	0.13	2.43	0.04	30.70	48.08
Low Flow Channel	8258.66	100-yr FIS	2822.59	2822.47	0.12	2.43	0.03	26.70	47.68
Low Flow Channel	8258.66	50-yr FIS	2822.34	2822.23	0.11	2.39	0.00	15.70	45.99
Low Flow Channel	8258.66	10-yr FIS	2821.99	2821.97	0.02	2.43	0.01	2.40	44.22
Low Flow Channel	8258.66	10-yr SBCFCD	2822.31	2822.21	0.10	2.39	0.00	14.40	45.83
Low Flow Channel	8258.66	5-yr SBCFCD	2822.19	2822.11	0.08	2.39	0.01	9.70	45.17
Low Flow Channel	8258.66	2-yr SBCFCD	2822.13	2822.10	0.03	2.43	0.02	6.00	45.09
Low Flow Channel	8009.9	100-yr SBCFCD	2820.19	2819.94	0.26	13.51	0.05	30.70	46.76
Low Flow Channel	8009.9	100-yr FIS	2820.13	2819.90	0.23	13.59	0.05	26.70	46.46
Low Flow Channel	8009.9	50-yr FIS	2819.94	2819.83	0.11	16.42	0.02	15.70	46.03
Low Flow Channel	8009.9	10-yr FIS	2819.55	2819.50	0.05			2.40	43.69
Low Flow Channel	8009.9	10-yr SBCFCD	2819.91	2819.81	0.10	16.41	0.02	14.40	45.88
Low Flow Channel	8009.9	5-yr SBCFCD	2819.81	2819.74	0.07	16.42	0.02	9.70	45.35
Low Flow Channel	8009.9	2-yr SBCFCD	2819.68	2819.57	0.11			6.00	44.21
Low Flow Channel	6735	100-yr SBCFCD	2803.85	2803.70	0.15	34.51	0.04	31.10	15.81
Low Flow Channel	6735	100-yr FIS	2803.77	2803.64	0.13	34.52	0.04	26.70	15.57
Low Flow Channel	6735	50-yr FIS	2803.50	2803.34	0.16			14.80	14.35
Low Flow Channel	6735	10-yr FIS	2803.13	2803.09	0.04			2.00	13.37
Low Flow Channel	6735	10-yr SBCFCD	2803.49	2803.34	0.16			14.60	14.35
Low Flow Channel	6735	5-yr SBCFCD	2803.38	2803.26	0.13			9.80	14.02
Low Flow Channel	6735	2-yr SBCFCD	2803.28	2803.18	0.09			6.00	13.73

Low Flow Channel	3410	100-yr SBCFCD	2769.31	2769.03	0.28	0.16	0.02	31.10	103.82
Low Flow Channel	3410	100-yr FIS	2769.22	2768.97	0.26	0.16	0.02	26.70	101.74
Low Flow Channel	3410	50-yr FIS	2768.95	2768.75	0.20	0.18	0.02	14.80	94.72
Low Flow Channel	3410	10-yr FIS	2768.39	2768.30	0.09	0.22	0.01	2.00	84.84
Low Flow Channel	3410	10-yr SBCFCD	2768.94	2768.73	0.21	0.18	0.01	14.60	94.38
Low Flow Channel	3410	5-yr SBCFCD	2768.79	2768.63	0.17	0.19	0.01	9.80	92.03
Low Flow Channel	3410	2-yr SBCFCD	2768.64	2768.49	0.15	0.21	0.01	6.00	89.00
Low Flow Channel	3400	100-yr SBCFCD	2767.80	2757.66	10.14	0.52	0.99	31.80	2.76
Low Flow Channel	3400	100-yr FIS	2767.71	2757.60	10.12	0.52	0.99	27.30	2.59
Low Flow Channel	3400	50-yr FIS	2767.39	2757.39	10.00	0.59	0.98	15.20	2.05
Low Flow Channel	3400	10-yr FIS	2761.49	2757.10	4.38	0.80	0.95	2.00	1.28
Low Flow Channel	3400	10-yr SBCFCD	2767.34	2757.39	9.95	0.62	0.97	15.00	2.04
Low Flow Channel	3400	5-yr SBCFCD	2767.20	2757.29	9.92	0.62	0.97	10.00	1.76
Low Flow Channel	3400	2-yr SBCFCD	2768.98	2757.18	11.80	0.77	0.96	6.20	1.48
Low Flow Channel	2900	100-yr SBCFCD	2753.31	2753.21	0.10	2.27	0.02	31.80	33.86
Low Flow Channel	2900	100-yr FIS	2753.18	2753.09	0.09	2.21	0.02	27.30	33.11
Low Flow Channel	2900	50-yr FIS	2752.71	2752.65	0.06	1.99	0.01	15.20	30.34
Low Flow Channel	2900	10-yr FIS	2751.69	2751.67	0.01	1.46	0.01	2.00	24.22
Low Flow Channel	2900	10-yr SBCFCD	2752.69	2752.64	0.06	1.98	0.01	15.00	30.27
Low Flow Channel	2900	5-yr SBCFCD	2752.43	2752.38	0.04	1.86	0.01	10.00	28.70
Low Flow Channel	2900	2-yr SBCFCD	2752.16	2752.13	0.03	1.71	0.01	6.20	27.07
Low Flow Channel	2410	100-yr SBCFCD	2751.03	2750.77	0.25	0.16	0.01	31.80	52.14
Low Flow Channel	2410	100-yr FIS	2750.95	2750.71	0.25	0.17	0.01	27.30	51.03
Low Flow Channel	2410	50-yr FIS	2750.71	2750.52	0.18	0.18	0.01	15.20	48.01
Low Flow Channel	2410	10-yr FIS	2750.23	2750.16	0.07	0.17	0.01	2.00	42.05
Low Flow Channel	2410	10-yr SBCFCD	2750.70	2750.52	0.18	0.18	0.01	15.00	48.01
Low Flow Channel	2410	5-yr SBCFCD	2750.56	2750.41	0.15	0.19	0.01	10.00	46.20
Low Flow Channel	2410	2-yr SBCFCD	2750.43	2750.32	0.12	0.20	0.00	6.20	44.66
Low Flow Channel	2400	100-yr SBCFCD	2750.09	2745.33	4.76	0.49	0.45	31.80	26.50
Low Flow Channel	2400	100-yr FIS	2749.98	2745.29	4.69	0.53	0.44	27.30	26.25
Low Flow Channel	2400	50-yr FIS	2745.88	2745.62	0.26	3.59	0.05	15.20	28.26
Low Flow Channel	2400	10-yr FIS	2745.26	2745.21	0.05	6.05	0.00	2.00	25.78
Low Flow Channel	2400	10-yr SBCFCD	2745.88	2745.60	0.27	3.67	0.06	15.00	28.16
Low Flow Channel	2400	5-yr SBCFCD	2745.69	2745.48	0.21	3.99	0.04	10.00	27.39
Low Flow Channel	2400	2-yr SBCFCD	2745.51	2745.35	0.16	4.79	0.03	6.20	26.64
Low Flow Channel	1900	100-yr SBCFCD	2740.39	2740.26	0.13	0.37	0.02	31.80	35.56
Low Flow Channel	1900	100-yr FIS	2740.27	2740.15	0.11	0.36	0.02	27.30	34.90
Low Flow Channel	1900	50-yr FIS	2739.88	2739.79	0.09	0.34	0.02	15.20	32.75
Low Flow Channel	1900	10-yr FIS	2739.21	2739.17	0.04	0.38	0.01	2.00	29.00
Low Flow Channel	1900	10-yr SBCFCD	2739.87	2739.79	0.08	0.34	0.02	15.00	32.71
Low Flow Channel	1900	5-yr SBCFCD	2739.67	2739.60	0.07	0.33	0.02	10.00	31.58
Low Flow Channel	1900	2-yr SBCFCD	2739.48	2739.42	0.06	0.33	0.01	6.20	30.51
Low Flow Channel	1699.2	100-yr SBCFCD	2739.99	2739.94	0.05	0.54	0.02	31.80	61.53
Low Flow Channel	1699.2	100-yr FIS	2739.88	2739.84	0.05	0.52	0.02	27.30	60.93
Low Flow Channel	1699.2	50-yr FIS	2739.52	2739.49	0.03	0.47	0.02	15.20	58.93
Low Flow Channel	1699.2	10-yr FIS	2738.83	2738.82	0.01	0.39	0.01	2.00	55.02
Low Flow Channel	1699.2	10-yr SBCFCD	2739.51	2739.49	0.03	0.47	0.02	15.00	58.89
Low Flow Channel	1699.2	5-yr SBCFCD	2739.32	2739.30	0.02	0.44	0.02	10.00	57.79
Low Flow Channel	1699.2	2-yr SBCFCD	2739.13	2739.11	0.01	0.41	0.01	6.20	56.73
Low Flow Channel	1510	100-yr SBCFCD	2739.43	2739.13	0.30	0.16	0.02	31.80	42.61

Low Flow Channel	1510	100-yr FIS	2739.34	2739.05	0.29	0.17	0.02	27.30	41.63
Low Flow Channel	1510	50-yr FIS	2739.04	2738.81	0.22	0.18	0.01	15.20	38.63
Low Flow Channel	1510	10-yr FIS	2738.41	2738.31	0.10	0.10	0.02	2.00	32.27
Low Flow Channel	1510	10-yr SBCFCD	2739.03	2738.81	0.22	0.18	0.01	15.00	38.57
Low Flow Channel	1510	5-yr SBCFCD	2738.87	2738.68	0.19	0.18	0.01	10.00	36.86
Low Flow Channel	1510	2-yr SBCFCD	2738.70	2738.54	0.16	0.20	0.01	6.20	35.17
Low Flow Channel	1500	100-yr SBCFCD	2738.51	2733.29	5.21	0.43	0.49	31.80	3.38
Low Flow Channel	1500	100-yr FIS	2738.40	2733.22	5.18	0.46	0.49	27.30	3.16
Low Flow Channel	1500	50-yr FIS	2738.04	2732.99	5.05	0.51	0.48	15.20	2.46
Low Flow Channel	1500	10-yr FIS	2737.16	2732.60	4.56	0.81	0.45	2.00	1.30
Low Flow Channel	1500	10-yr SBCFCD	2738.04	2732.98	5.05	0.51	0.48	15.00	2.45
Low Flow Channel	1500	5-yr SBCFCD	2737.83	2732.86	4.97	0.56	0.48	10.00	2.09
Low Flow Channel	1500	2-yr SBCFCD	2737.61	2732.75	4.86	0.62	0.47	6.20	1.76
Low Flow Channel	957.5	100-yr SBCFCD	2727.38	2727.36	0.01			31.80	94.51
Low Flow Channel	957.5	100-yr FIS	2727.34	2727.33	0.01			27.30	94.06
Low Flow Channel	957.5	50-yr FIS	2727.24	2727.23	0.01			15.20	92.66
Low Flow Channel	957.5	10-yr FIS	2727.04	2727.03	0.01			2.00	89.69
Low Flow Channel	957.5	10-yr SBCFCD	2727.24	2727.23	0.01			15.00	92.64
Low Flow Channel	957.5	5-yr SBCFCD	2727.19	2727.18	0.01			10.00	91.93
Low Flow Channel	957.5	2-yr SBCFCD	2727.14	2727.14	0.00			6.20	91.28
Main	12028.1	100-yr SBCFCD	2859.00	2858.99	0.02	0.01	0.15	1730.00	293.05
Main	12028.1	100-yr FIS	2856.31	2856.29	0.01	0.01	0.05	700.00	284.98
Main	12028.1	50-yr FIS	2854.78	2854.75	0.02	0.05	0.09	500.00	280.36
Main	12028.1	10-yr FIS	2853.54	2853.46	0.08	0.93	0.04	100.00	276.49
Main	12028.1	10-yr SBCFCD	2856.11	2856.09	0.02	0.02	0.11	810.00	284.37
Main	12028.1	5-yr SBCFCD	2855.01	2854.99	0.02	0.04	0.09	550.00	281.06
Main	12028.1	2-yr SBCFCD	2854.04	2853.99	0.05	0.20	0.07	340.00	278.08
Main	11745.2*	100-yr SBCFCD	2858.84	2857.29	1.55	0.09	0.07	1730.00	35.55
Main	11745.2*	100-yr FIS	2856.24	2855.73	0.52	0.04	0.03	700.00	30.86
Main	11745.2*	50-yr FIS	2854.64	2853.74	0.90	0.10	0.07	500.00	24.90
Main	11745.2*	10-yr FIS	2852.10	2851.30	0.80	1.37	0.07	100.00	17.57
Main	11745.2*	10-yr SBCFCD	2855.98	2854.87	1.11	0.09	0.07	810.00	28.30
Main	11745.2*	5-yr SBCFCD	2854.88	2853.94	0.93	0.10	0.07	550.00	25.51
Main	11745.2*	2-yr SBCFCD	2853.77	2853.01	0.77	0.10	0.07	340.00	22.71
Main	11655	100-yr SBCFCD	2858.68	2857.37	1.31	0.00	0.18	1730.00	36.80
Main	11655	100-yr FIS	2856.18	2855.75	0.43	0.00	0.06	700.00	31.94
Main	11655	50-yr FIS	2854.47	2853.80	0.67	0.00	0.13	500.00	26.09
Main	11655	10-yr FIS	2851.78	2851.52	0.26	0.00	0.07	100.00	19.25
Main	11655	10-yr SBCFCD	2855.82	2854.94	0.88	0.00	0.15	810.00	29.53
Main	11655	5-yr SBCFCD	2854.71	2854.00	0.71	0.00	0.14	550.00	26.71
Main	11655	2-yr SBCFCD	2853.60	2853.06	0.54	0.00	0.12	340.00	23.88
Main	11647	100-yr SBCFCD	2858.49	2857.78	0.72	0.00	0.00	1730.00	38.22
Main	11647	100-yr FIS	2856.11	2855.90	0.22	0.00	0.00	700.00	33.66
Main	11647	50-yr FIS	2854.33	2854.11	0.23	0.00	0.00	500.00	29.32
Main	11647	10-yr FIS	2851.71	2851.67	0.03	0.00	0.00	100.00	23.42
Main	11647	10-yr SBCFCD	2855.66	2855.30	0.36	0.00	0.00	810.00	32.21
Main	11647	5-yr SBCFCD	2854.57	2854.32	0.25	0.00	0.00	550.00	29.84
Main	11647	2-yr SBCFCD	2853.48	2853.33	0.15	0.00	0.00	340.00	27.44
Main	11645		Lat Struct						

Main	11643	100-yr SBCFCD	2858.49	2857.78	0.72	0.01	0.15	1730.00	38.21
Main	11643	100-yr FIS	2856.11	2855.90	0.22	0.00	0.02	700.00	33.66
Main	11643	50-yr FIS	2854.33	2854.11	0.23	0.00	0.10	500.00	29.32
Main	11643	10-yr FIS	2851.71	2851.67	0.03	0.00	0.05	100.00	23.42
Main	11643	10-yr SBCFCD	2855.66	2855.30	0.36	0.00	0.12	810.00	32.21
Main	11643	5-yr SBCFCD	2854.57	2854.32	0.25	0.00	0.10	550.00	29.84
Main	11643	2-yr SBCFCD	2853.48	2853.33	0.15	0.00	0.08	340.00	27.44
Main	11635	100-yr SBCFCD	2858.34	2856.15	2.19	0.29	0.01	1730.00	33.16
Main	11635	100-yr FIS	2856.09	2855.63	0.46	0.17	0.17	700.00	31.58
Main	11635	50-yr FIS	2854.23	2853.04	1.20	0.33	0.05	500.00	23.81
Main	11635	10-yr FIS	2851.66	2851.17	0.49	0.42	0.01	100.00	18.22
Main	11635	10-yr SBCFCD	2855.54	2854.02	1.52	0.32	0.01	810.00	26.77
Main	11635	5-yr SBCFCD	2854.47	2853.21	1.25	0.34	0.01	550.00	24.34
Main	11635	2-yr SBCFCD	2853.40	2852.42	0.98	0.37	0.01	340.00	21.95
Main	11462.4*	100-yr SBCFCD	2857.55	2852.42	5.13	0.49	0.29	1960.00	29.53
Main	11462.4*	100-yr FIS	2855.74	2853.58	2.17	0.49	0.00	1700.00	33.00
Main	11462.4*	50-yr FIS	2853.75	2851.66	2.09	0.40	0.09	1000.00	27.24
Main	11462.4*	10-yr FIS	2850.44	2848.39	2.05	1.07	0.16	150.00	17.42
Main	11462.4*	10-yr SBCFCD	2854.67	2850.47	4.20	0.59	0.27	920.00	23.68
Main	11462.4*	5-yr SBCFCD	2853.54	2849.75	3.79	0.66	0.25	620.00	21.52
Main	11462.4*	2-yr SBCFCD	2852.40	2849.09	3.32	0.77	0.23	380.00	19.52
Main	11179.5*	100-yr SBCFCD	2855.71	2849.13	6.58	1.71	0.15	1960.00	28.22
Main	11179.5*	100-yr FIS	2854.54	2848.91	5.63	0.85	0.35	1700.00	27.58
Main	11179.5*	50-yr FIS	2852.34	2847.69	4.65	1.15	0.26	1000.00	23.91
Main	11179.5*	10-yr FIS	2847.08	2845.68	1.40	3.16	0.20	150.00	17.88
Main	11179.5*	10-yr SBCFCD	2852.32	2847.44	4.88	2.28	0.07	920.00	23.16
Main	11179.5*	5-yr SBCFCD	2850.87	2846.84	4.04	2.65	0.02	620.00	21.35
Main	11179.5*	2-yr SBCFCD	2849.24	2846.31	2.93	3.05	0.12	380.00	19.77
Main	10896.7*	100-yr SBCFCD	2853.43	2846.08	7.34	2.21	0.08	1960.00	27.67
Main	10896.7*	100-yr FIS	2852.39	2845.81	6.59	2.05	0.10	1700.00	26.84
Main	10896.7*	50-yr FIS	2849.90	2844.70	5.21	2.39	0.06	1000.00	23.51
Main	10896.7*	10-yr FIS	2844.38	2842.76	1.62	2.68	0.02	150.00	17.70
Main	10896.7*	10-yr SBCFCD	2849.66	2844.52	5.13	2.64	0.03	920.00	22.99
Main	10896.7*	5-yr SBCFCD	2848.06	2843.96	4.09	2.80	0.01	620.00	21.31
Main	10896.7*	2-yr SBCFCD	2846.42	2843.44	2.98	2.82	0.01	380.00	19.74
Main	10720.4	100-yr SBCFCD	2850.50	2850.40	0.09			1960.00	99.21
Main	10720.4	100-yr FIS	2850.59	2850.53	0.07			1700.00	99.58
Main	10720.4	50-yr FIS	2847.38	2847.32	0.06			1000.00	85.23
Main	10720.4	10-yr FIS	2841.67	2841.65	0.03			150.00	58.21
Main	10720.4	10-yr SBCFCD	2846.53	2846.46	0.07			920.00	81.15
Main	10720.4	5-yr SBCFCD	2845.04	2844.98	0.05			620.00	74.11
Main	10720.4	2-yr SBCFCD	2843.57	2843.52	0.04			380.00	67.16
Main	10694.4		Culvert						
Main	10659.4	100-yr SBCFCD	2849.88	2849.77	0.11	0.01	0.60	1960.00	96.89
Main	10659.4	100-yr FIS	2850.12	2850.05	0.08	0.01	0.63	1700.00	98.14
Main	10659.4	50-yr FIS	2847.18	2847.12	0.06	0.01	0.48	1000.00	84.27
Main	10659.4	10-yr FIS	2841.62	2841.59	0.03	0.01	0.21	150.00	57.94
Main	10659.4	10-yr SBCFCD	2846.32	2846.25	0.07	0.01	0.44	920.00	80.12
Main	10659.4	5-yr SBCFCD	2844.89	2844.83	0.06	0.01	0.38	620.00	73.38
Main	10659.4	2-yr SBCFCD	2843.46	2843.42	0.04	0.01	0.32	380.00	66.67

Main	10613.9	100-yr SBCFCD	2849.27	2847.15	2.12	0.27	0.14	2590.00	39.00
Main	10613.9	100-yr FIS	2849.49	2847.32	2.17	0.27	0.14	2700.00	39.00
Main	10613.9	50-yr FIS	2846.69	2845.01	1.68	0.28	0.14	1500.00	33.04
Main	10613.9	10-yr FIS	2841.40	2840.67	0.73	0.38	0.10	200.00	20.01
Main	10613.9	10-yr SBCFCD	2845.87	2844.32	1.54	0.29	0.14	1220.00	30.97
Main	10613.9	5-yr SBCFCD	2844.50	2843.17	1.33	0.31	0.13	820.00	27.52
Main	10613.9	2-yr SBCFCD	2843.14	2842.02	1.11	0.33	0.13	500.00	24.07
Main	10525	100-yr SBCFCD	2848.85	2847.21	1.65	0.00	0.19	2590.00	39.00
Main	10525	100-yr FIS	2849.08	2847.38	1.70	0.00	0.19	2700.00	39.00
Main	10525	50-yr FIS	2846.27	2845.05	1.21	0.00	0.18	1500.00	35.25
Main	10525	10-yr FIS	2840.86	2840.46	0.40	0.00	0.09	200.00	21.49
Main	10525	10-yr SBCFCD	2845.44	2844.35	1.09	0.00	0.17	1220.00	33.15
Main	10525	5-yr SBCFCD	2844.06	2843.18	0.88	0.00	0.16	820.00	29.63
Main	10525	2-yr SBCFCD	2842.67	2842.00	0.67	0.00	0.13	500.00	26.09
Main	10517	100-yr SBCFCD	2848.66	2847.65	1.01	0.00	0.00	2590.00	39.00
Main	10517	100-yr FIS	2848.88	2847.83	1.05	0.00	0.00	2700.00	39.00
Main	10517	50-yr FIS	2846.08	2845.46	0.63	0.00	0.00	1500.00	37.18
Main	10517	10-yr FIS	2840.76	2840.68	0.08	0.00	0.00	200.00	25.49
Main	10517	10-yr SBCFCD	2845.26	2844.74	0.52	0.00	0.00	1220.00	35.43
Main	10517	5-yr SBCFCD	2843.90	2843.54	0.36	0.00	0.00	820.00	32.47
Main	10517	2-yr SBCFCD	2842.53	2842.31	0.23	0.00	0.00	500.00	29.47
Main	10515		Lat Struct						
Main	10513	100-yr SBCFCD	2848.66	2847.64	1.01	0.01	0.16	2590.00	39.00
Main	10513	100-yr FIS	2848.88	2847.82	1.05	0.01	0.16	2700.00	39.00
Main	10513	50-yr FIS	2846.08	2845.45	0.63	0.01	0.14	1500.00	37.17
Main	10513	10-yr FIS	2840.76	2840.68	0.08	0.00	0.07	200.00	25.48
Main	10513	10-yr SBCFCD	2845.26	2844.74	0.52	0.00	0.13	1220.00	35.42
Main	10513	5-yr SBCFCD	2843.90	2843.53	0.36	0.00	0.12	820.00	32.47
Main	10513	2-yr SBCFCD	2842.53	2842.31	0.23	0.00	0.10	500.00	29.46
Main	10505	100-yr SBCFCD	2848.49	2845.86	2.63	0.26	0.00	2590.00	37.67
Main	10505	100-yr FIS	2848.71	2846.04	2.67	0.26	0.00	2700.00	38.22
Main	10505	50-yr FIS	2845.94	2843.90	2.04	0.28	0.00	1500.00	31.79
Main	10505	10-yr FIS	2840.70	2839.96	0.73	0.37	0.00	200.00	19.99
Main	10505	10-yr SBCFCD	2845.13	2843.28	1.84	0.29	0.00	1220.00	29.95
Main	10505	5-yr SBCFCD	2843.78	2842.25	1.52	0.30	0.00	820.00	26.86
Main	10505	2-yr SBCFCD	2842.43	2841.25	1.18	0.32	0.00	500.00	23.84
Main	10344.4*	100-yr SBCFCD	2847.87	2842.99	4.88	0.39	0.23	2590.00	33.19
Main	10344.4*	100-yr FIS	2848.10	2843.15	4.95	0.38	0.23	2700.00	33.65
Main	10344.4*	50-yr FIS	2845.30	2841.25	4.05	0.43	0.20	1500.00	27.97
Main	10344.4*	10-yr FIS	2839.90	2838.02	1.88	0.68	0.11	200.00	18.28
Main	10344.4*	10-yr SBCFCD	2844.49	2840.72	3.77	0.44	0.19	1220.00	26.36
Main	10344.4*	5-yr SBCFCD	2843.12	2839.84	3.28	0.48	0.18	820.00	23.74
Main	10344.4*	2-yr SBCFCD	2841.74	2839.01	2.73	0.54	0.15	500.00	21.24
Main	10075*	100-yr SBCFCD	2846.55	2840.43	6.12	1.20	0.12	2590.00	31.75
Main	10075*	100-yr FIS	2846.79	2840.57	6.21	1.19	0.13	2700.00	32.17
Main	10075*	50-yr FIS	2843.81	2838.85	4.96	1.40	0.09	1500.00	26.99
Main	10075*	10-yr FIS	2837.57	2836.05	1.52	2.22	0.11	200.00	18.61
Main	10075*	10-yr SBCFCD	2842.92	2838.36	4.56	1.49	0.08	1220.00	25.54
Main	10075*	5-yr SBCFCD	2841.39	2837.59	3.80	1.68	0.05	820.00	23.23

Main	10075*	2-yr SBCFCD	2839.80	2836.87	2.93	1.92	0.02	500.00	21.06
Main	9805.55*	100-yr SBCFCD	2844.96	2838.13	6.83	1.52	0.07	2590.00	31.08
Main	9805.55*	100-yr FIS	2845.21	2838.26	6.95	1.51	0.07	2700.00	31.48
Main	9805.55*	50-yr FIS	2842.04	2836.64	5.40	1.73	0.04	1500.00	26.60
Main	9805.55*	10-yr FIS	2835.56	2833.94	1.62	2.00	0.01	200.00	18.50
Main	9805.55*	10-yr SBCFCD	2841.08	2836.18	4.90	1.80	0.03	1220.00	25.24
Main	9805.55*	5-yr SBCFCD	2839.44	2835.46	3.98	1.93	0.02	820.00	23.07
Main	9805.55*	2-yr SBCFCD	2837.75	2834.78	2.97	2.04	0.00	500.00	21.02
Main	9575	100-yr SBCFCD	2842.64	2833.10	9.54	2.06	0.27	2590.00	37.67
Main	9575	100-yr FIS	2842.90	2833.19	9.71	2.03	0.28	2700.00	37.69
Main	9575	50-yr FIS	2839.45	2832.16	7.29	2.39	0.19	1500.00	37.44
Main	9575	10-yr FIS	2832.63	2830.80	1.83	2.91	0.02	200.00	37.12
Main	9575	10-yr SBCFCD	2838.41	2831.90	6.51	2.51	0.16	1220.00	37.38
Main	9575	5-yr SBCFCD	2836.64	2831.52	5.12	2.70	0.11	820.00	37.29
Main	9575	2-yr SBCFCD	2834.85	2831.18	3.67	2.83	0.07	500.00	37.21
Main	9536.1	100-yr SBCFCD	2839.40	2838.73	0.68			2590.00	45.00
Main	9536.1	100-yr FIS	2839.62	2838.92	0.70			2700.00	45.00
Main	9536.1	50-yr FIS	2836.57	2836.11	0.46			1500.00	45.00
Main	9536.1	10-yr FIS	2831.58	2831.43	0.15			200.00	45.00
Main	9536.1	10-yr SBCFCD	2835.72	2835.32	0.40			1220.00	45.00
Main	9536.1	5-yr SBCFCD	2834.29	2833.96	0.33			820.00	45.00
Main	9536.1	2-yr SBCFCD	2833.79	2830.80	2.99	0.85	0.20	500.00	45.00
Main	9525.6		Culvert						
Main	9515.1	100-yr SBCFCD	2838.69	2837.84	0.86	0.11	0.51	2620.00	45.00
Main	9515.1	100-yr FIS	2838.86	2837.99	0.88	0.12	0.53	2700.00	45.00
Main	9515.1	50-yr FIS	2836.05	2835.48	0.57	0.11	0.42	1500.00	45.00
Main	9515.1	10-yr FIS	2831.28	2830.85	0.42	0.40	0.09	200.00	45.00
Main	9515.1	10-yr SBCFCD	2835.27	2834.75	0.51	0.12	0.39	1230.00	45.00
Main	9515.1	5-yr SBCFCD	2833.90	2833.46	0.44	0.14	0.32	830.00	45.00
Main	9515.1	2-yr SBCFCD	2832.35	2831.57	0.78			500.00	45.00
Main	9355.33*	100-yr SBCFCD	2838.06	2835.49	2.57	0.26	0.01	2620.00	39.35
Main	9355.33*	100-yr FIS	2838.22	2835.59	2.63	0.26	0.00	2700.00	39.67
Main	9355.33*	50-yr FIS	2835.52	2833.53	1.98	0.28	0.01	1500.00	32.97
Main	9355.33*	10-yr FIS	2830.50	2829.35	1.15	0.56	0.22	200.00	19.39
Main	9355.33*	10-yr SBCFCD	2834.76	2832.94	1.82	0.09	0.41	1230.00	31.05
Main	9355.33*	5-yr SBCFCD	2833.44	2831.95	1.50	0.30	0.01	830.00	27.83
Main	9355.33*	2-yr SBCFCD	2832.14	2830.96	1.18	0.32	0.01	510.00	24.61
Main	9195.56*	100-yr SBCFCD	2836.97	2832.03	4.94	0.38	0.71	2620.00	33.74
Main	9195.56*	100-yr FIS	2837.13	2832.14	4.99	0.38	0.71	2700.00	34.09
Main	9195.56*	50-yr FIS	2834.42	2830.23	4.19	0.43	0.66	1500.00	28.17
Main	9195.56*	10-yr FIS	2829.11	2827.04	2.07	1.11	0.27	200.00	18.24
Main	9195.56*	10-yr SBCFCD	2833.67	2829.71	3.96	0.45	0.64	1230.00	26.54
Main	9195.56*	5-yr SBCFCD	2832.35	2828.85	3.50	0.50	0.60	830.00	23.85
Main	9195.56*	2-yr SBCFCD	2831.03	2828.02	3.00	0.56	0.55	510.00	21.29
Main	9035.8	100-yr SBCFCD	2833.83	2833.21	0.62			2620.00	45.00
Main	9035.8	100-yr FIS	2834.01	2833.38	0.64			2700.00	45.00
Main	9035.8	50-yr FIS	2830.99	2830.60	0.40			1500.00	45.00
Main	9035.8	10-yr FIS	2826.21	2824.41	1.79	2.77	0.14	200.00	45.00
Main	9035.8	10-yr SBCFCD	2830.16	2829.81	0.34			1230.00	45.00

Main	9035.8	5-yr SBCFCD	2828.73	2828.46	0.27			830.00	45.00
Main	9035.8	2-yr SBCFCD	2827.33	2827.13	0.20			510.00	45.00
Main	9020.399		Culvert						
Main	9005	100-yr SBCFCD	2833.17	2832.43	0.74	0.05	0.15	2620.00	45.00
Main	9005	100-yr FIS	2833.33	2832.57	0.76	0.05	0.15	2700.00	45.00
Main	9005	50-yr FIS	2830.57	2830.10	0.46	0.05	0.13	1500.00	45.00
Main	9005	10-yr FIS	2825.28	2824.85	0.42			200.00	45.00
Main	9005	10-yr SBCFCD	2829.79	2829.39	0.40	0.05	0.12	1230.00	45.00
Main	9005	5-yr SBCFCD	2828.45	2828.14	0.31	0.05	0.10	830.00	45.00
Main	9005	2-yr SBCFCD	2827.10	2826.86	0.24	0.05	0.07	510.00	45.00
Main	8885	100-yr SBCFCD	2832.97	2831.72	1.25	0.00	0.22	2620.00	44.00
Main	8885	100-yr FIS	2833.13	2831.85	1.28	0.00	0.22	2700.00	44.00
Main	8885	50-yr FIS	2830.39	2829.48	0.90	0.00	0.20	1500.00	39.74
Main	8885	10-yr FIS	2825.24	2824.96	0.27	0.00	0.11	200.00	26.18
Main	8885	10-yr SBCFCD	2829.62	2828.81	0.81	0.00	0.20	1230.00	37.72
Main	8885	5-yr SBCFCD	2828.30	2827.66	0.64	0.00	0.18	830.00	34.27
Main	8885	2-yr SBCFCD	2826.98	2826.49	0.49	0.00	0.15	510.00	30.78
Main	8877	100-yr SBCFCD	2832.75	2831.94	0.81	0.00	0.00	2620.00	44.00
Main	8877	100-yr FIS	2832.90	2832.07	0.83	0.00	0.00	2700.00	44.00
Main	8877	50-yr FIS	2830.18	2829.68	0.50	0.00	0.00	1500.00	41.04
Main	8877	10-yr FIS	2825.13	2825.07	0.06	0.00	0.00	200.00	29.86
Main	8877	10-yr SBCFCD	2829.42	2829.00	0.42	0.00	0.00	1230.00	39.39
Main	8877	5-yr SBCFCD	2828.12	2827.83	0.29	0.00	0.00	830.00	36.56
Main	8877	2-yr SBCFCD	2826.82	2826.64	0.18	0.00	0.00	510.00	33.68
Main	8875		Lat Struct						
Main	8873	100-yr SBCFCD	2832.75	2831.93	0.81	0.00	0.51	2620.00	44.00
Main	8873	100-yr FIS	2832.90	2832.07	0.84	0.00	0.52	2700.00	44.00
Main	8873	50-yr FIS	2830.18	2829.68	0.50	0.00	0.43	1500.00	41.04
Main	8873	10-yr FIS	2825.13	2825.07	0.06	0.00	0.18	200.00	29.86
Main	8873	10-yr SBCFCD	2829.42	2829.00	0.42	0.00	0.40	1230.00	39.39
Main	8873	5-yr SBCFCD	2828.12	2827.83	0.29	0.00	0.35	830.00	36.56
Main	8873	2-yr SBCFCD	2826.82	2826.64	0.18	0.00	0.27	510.00	33.68
Main	8865	100-yr SBCFCD	2832.23	2829.70	2.52	0.18	0.03	2620.00	40.41
Main	8865	100-yr FIS	2832.38	2829.82	2.56	0.18	0.03	2700.00	40.77
Main	8865	50-yr FIS	2829.75	2827.82	1.92	0.19	0.03	1500.00	34.77
Main	8865	10-yr FIS	2824.95	2824.30	0.65	0.26	0.02	200.00	24.20
Main	8865	10-yr SBCFCD	2829.01	2827.28	1.74	0.19	0.03	1230.00	33.13
Main	8865	5-yr SBCFCD	2827.77	2826.33	1.44	0.21	0.03	830.00	30.28
Main	8865	2-yr SBCFCD	2826.54	2825.46	1.09	0.22	0.04	510.00	27.68
Main	8756.22*	100-yr SBCFCD	2831.88	2828.85	3.03	0.19	0.15	2620.00	36.74
Main	8756.22*	100-yr FIS	2832.04	2828.96	3.08	0.19	0.16	2700.00	37.09
Main	8756.22*	50-yr FIS	2829.32	2826.71	2.61	0.22	0.21	1500.00	30.32
Main	8756.22*	10-yr FIS	2824.29	2822.82	1.47	0.41	0.25	200.00	18.66
Main	8756.22*	10-yr SBCFCD	2828.56	2826.09	2.47	0.23	0.22	1230.00	28.46
Main	8756.22*	5-yr SBCFCD	2827.27	2825.04	2.23	0.27	0.24	830.00	25.31
Main	8756.22*	2-yr SBCFCD	2825.99	2824.04	1.94	0.30	0.26	510.00	22.33
Main	8507.43*	100-yr SBCFCD	2830.48	2825.10	5.37	0.70	0.70	2620.00	32.71
Main	8507.43*	100-yr FIS	2830.64	2825.21	5.43	0.70	0.70	2700.00	33.04

Main	8507.43*	50-yr FIS	2827.88	2823.34	4.54	0.87	0.58	1500.00	27.41
Main	8507.43*	10-yr FIS	2822.17	2820.29	1.87	1.99	0.12	200.00	18.28
Main	8507.43*	10-yr SBCFCD	2827.09	2822.84	4.25	0.94	0.53	1230.00	25.91
Main	8507.43*	5-yr SBCFCD	2825.71	2822.00	3.72	1.11	0.45	830.00	23.39
Main	8507.43*	2-yr SBCFCD	2824.28	2821.21	3.07	1.36	0.34	510.00	21.04
Main	8258.66*	100-yr SBCFCD	2828.87	2822.28	6.60	1.24	0.37	2620.00	31.43
Main	8258.66*	100-yr FIS	2829.04	2822.38	6.66	1.23	0.37	2700.00	31.74
Main	8258.66*	50-yr FIS	2826.10	2820.65	5.45	1.50	0.27	1500.00	26.56
Main	8258.66*	10-yr FIS	2819.75	2817.90	1.85	2.40	0.01	200.00	18.30
Main	8258.66*	10-yr SBCFCD	2825.24	2820.20	5.04	1.60	0.24	1230.00	25.19
Main	8258.66*	5-yr SBCFCD	2823.72	2819.44	4.28	1.83	0.17	830.00	22.91
Main	8258.66*	2-yr SBCFCD	2822.09	2818.74	3.36	2.10	0.09	510.00	20.81
Main	8009.88*	100-yr SBCFCD	2827.07	2819.64	7.43	1.56	0.25	2620.00	30.72
Main	8009.88*	100-yr FIS	2827.25	2819.74	7.51	1.54	0.25	2700.00	31.01
Main	8009.88*	50-yr FIS	2824.10	2818.11	5.99	1.83	0.16	1500.00	26.14
Main	8009.88*	10-yr FIS	2817.36	2815.50	1.86	2.39	0.00	200.00	18.29
Main	8009.88*	10-yr SBCFCD	2823.17	2817.68	5.49	1.93	0.14	1230.00	24.85
Main	8009.88*	5-yr SBCFCD	2821.52	2816.97	4.55	2.12	0.08	830.00	22.72
Main	8009.88*	2-yr SBCFCD	2819.77	2816.31	3.46	2.29	0.03	510.00	20.74
Main	7800	100-yr SBCFCD	2824.26	2814.27	9.99	2.05	0.77	2620.00	37.62
Main	7800	100-yr FIS	2824.44	2814.34	10.11	2.02	0.78	2700.00	37.63
Main	7800	50-yr FIS	2821.08	2813.30	7.78	2.48	0.54	1500.00	37.40
Main	7800	10-yr FIS	2814.04	2811.97	2.07	3.26	0.06	200.00	37.10
Main	7800	10-yr SBCFCD	2820.08	2813.06	7.02	2.63	0.46	1230.00	37.35
Main	7800	5-yr SBCFCD	2818.30	2812.68	5.62	2.89	0.32	830.00	37.26
Main	7800	2-yr SBCFCD	2816.46	2812.35	4.11	3.12	0.20	510.00	37.19
Main	7761.1	100-yr SBCFCD	2823.53	2813.27	10.26	0.66	0.08	2620.00	45.00
Main	7761.1	100-yr FIS	2823.71	2813.32	10.39	0.65	0.08	2700.00	45.00
Main	7761.1	50-yr FIS	2820.19	2812.50	7.70	0.85	0.04	1500.00	45.00
Main	7761.1	10-yr FIS	2812.79	2811.48	1.31	0.86	0.38	200.00	45.00
Main	7761.1	10-yr SBCFCD	2819.05	2812.31	6.73	0.89	0.15	1230.00	45.00
Main	7761.1	5-yr SBCFCD	2817.02	2812.03	5.00	0.96	0.31	830.00	45.00
Main	7761.1	2-yr SBCFCD	2815.06	2811.78	3.28	0.98	0.42	510.00	45.00
Main	7749.9		Culvert						
Main	7738.6	100-yr SBCFCD	2818.08	2815.75	2.34			2620.00	45.00
Main	7738.6	100-yr FIS	2818.23	2815.81	2.42			2700.00	45.00
Main	7738.6	50-yr FIS	2815.88	2814.28	1.61			1500.00	45.00
Main	7738.6	10-yr FIS	2812.27	2811.85	0.42			200.00	45.00
Main	7738.6	10-yr SBCFCD	2815.28	2813.87	1.41			1230.00	45.00
Main	7738.6	5-yr SBCFCD	2814.29	2813.21	1.09			830.00	45.00
Main	7738.6	2-yr SBCFCD	2813.38	2812.59	0.79			510.00	45.00
Main	7700	100-yr SBCFCD	2819.07	2816.26	2.81	0.37	0.07	2970.00	39.00
Main	7700	100-yr FIS	2818.55	2815.91	2.64	0.38	0.04	2700.00	39.00
Main	7700	50-yr FIS	2815.97	2814.20	1.77	0.40	0.01	1500.00	39.00
Main	7700	10-yr FIS	2812.00	2811.54	0.46	0.53	0.00	200.00	39.00
Main	7700	10-yr SBCFCD	2815.73	2814.04	1.69	0.40	0.01	1400.00	39.00
Main	7700	5-yr SBCFCD	2814.51	2813.22	1.29	0.42	0.01	930.00	39.00
Main	7700	2-yr SBCFCD	2813.42	2812.48	0.94	0.46	0.00	570.00	39.00
Main	7500.*	100-yr SBCFCD	2818.00	2813.44	4.56	0.54	0.52	2970.00	39.00

Main	7500.*	100-yr FIS	2817.49	2813.14	4.35	0.55	0.51	2700.00		39.00
Main	7500.*	50-yr FIS	2814.92	2811.65	3.26	0.61	0.45	1500.00		39.00
Main	7500.*	10-yr FIS	2810.79	2809.58	1.21	0.99	0.22	200.00		39.00
Main	7500.*	10-yr SBCFCD	2814.68	2811.52	3.16	0.62	0.44	1400.00		39.00
Main	7500.*	5-yr SBCFCD	2813.44	2810.85	2.59	0.67	0.39	930.00		39.00
Main	7500.*	2-yr SBCFCD	2812.32	2810.27	2.04	0.77	0.33	570.00		39.00
Main	7305	100-yr SBCFCD	2816.57	2815.08	1.49	0.02	0.16	2970.00		39.00
Main	7305	100-yr FIS	2816.29	2811.08	5.21	0.93	0.26	2700.00		39.00
Main	7305	50-yr FIS	2813.59	2809.74	3.85	1.15	0.18	1500.00		39.00
Main	7305	10-yr FIS	2808.83	2808.00	0.82	1.77	0.19	200.00		39.00
Main	7305	10-yr SBCFCD	2813.33	2809.62	3.70	1.18	0.16	1400.00		39.00
Main	7305	5-yr SBCFCD	2811.97	2809.04	2.93	1.36	0.10	930.00		39.00
Main	7305	2-yr SBCFCD	2810.68	2808.55	2.14	1.60	0.03	570.00		39.00
Main	7266.9	100-yr SBCFCD	2816.38	2815.43	0.95			2970.00		45.00
Main	7266.9	100-yr FIS	2815.64	2814.69	0.94			2700.00		45.00
Main	7266.9	50-yr FIS	2812.76	2812.10	0.66			1500.00		45.00
Main	7266.9	10-yr FIS	2808.46	2808.26	0.19			200.00		45.00
Main	7266.9	10-yr SBCFCD	2812.60	2812.00	0.60			1400.00		45.00
Main	7266.9	5-yr SBCFCD	2811.13	2810.62	0.51			930.00		45.00
Main	7266.9	2-yr SBCFCD	2810.30	2808.05	2.25	0.37	0.01	570.00		45.00
Main	7249.1		Culvert							
Main	7231.3	100-yr SBCFCD	2816.08	2814.85	1.24	0.03	0.18	3150.00		45.00
Main	7231.3	100-yr FIS	2815.19	2814.08	1.12	0.03	0.15	2700.00		45.00
Main	7231.3	50-yr FIS	2812.44	2811.64	0.80	0.03	0.07	1500.00		45.00
Main	7231.3	10-yr FIS	2808.27	2807.85	0.43	0.12	0.01	200.00		45.00
Main	7231.3	10-yr SBCFCD	2812.39	2811.59	0.80	0.03	0.07	1480.00		45.00
Main	7231.3	5-yr SBCFCD	2810.93	2810.20	0.73	0.04	0.05	990.00		45.00
Main	7231.3	2-yr SBCFCD	2809.56	2808.72	0.84			570.00		45.00
Main	7187.1	100-yr SBCFCD	2815.87	2814.04	1.83	0.05	0.03	3150.00		39.00
Main	7187.1	100-yr FIS	2815.01	2813.40	1.61	0.05	0.01	2700.00		39.00
Main	7187.1	50-yr FIS	2812.34	2811.29	1.04	0.05	0.01	1500.00		39.00
Main	7187.1	10-yr FIS	2808.05	2807.39	0.66	0.16	0.07	200.00		39.00
Main	7187.1	10-yr SBCFCD	2812.28	2811.25	1.04	0.05	0.01	1480.00		39.00
Main	7187.1	5-yr SBCFCD	2810.84	2809.95	0.89	0.06	0.00	990.00		39.00
Main	7187.1	2-yr SBCFCD	2809.55	2808.62	0.93	0.08	0.07	610.00		39.00
Main	7125	100-yr SBCFCD	2815.79	2814.05	1.74	0.00	0.20	3149.75	0.25	44.94
Main	7125	100-yr FIS	2814.95	2813.38	1.58	0.00	0.19	2699.99	0.01	44.27
Main	7125	50-yr FIS	2812.27	2811.13	1.14	0.00	0.18	1500.00		38.09
Main	7125	10-yr FIS	2807.57	2806.04	1.53	0.40	0.09	200.00		22.82
Main	7125	10-yr SBCFCD	2812.22	2811.09	1.13	0.00	0.17	1480.00		37.96
Main	7125	5-yr SBCFCD	2810.78	2809.87	0.91	0.00	0.16	990.00		34.32
Main	7125	2-yr SBCFCD	2809.40	2808.71	0.69	0.00	0.14	610.00		30.83
Main	7117	100-yr SBCFCD	2815.58	2814.51	1.07	0.00	0.00	3149.50	0.50	45.38
Main	7117	100-yr FIS	2814.75	2813.82	0.93	0.00	0.00	2699.92	0.08	44.71
Main	7117	50-yr FIS	2812.09	2811.53	0.56	0.00	0.00	1500.00		40.20
Main	7117	10-yr FIS	2807.21	2807.14	0.07	0.00	0.00	200.00		29.56
Main	7117	10-yr SBCFCD	2812.04	2811.49	0.55	0.00	0.00	1480.00		40.09
Main	7117	5-yr SBCFCD	2810.62	2810.24	0.38	0.00	0.00	990.00		37.07
Main	7117	2-yr SBCFCD	2809.26	2809.03	0.23	0.00	0.00	610.00		34.12

Main	7115		Lat Struct							
Main	7113	100-yr SBCFCD	2815.58	2814.51	1.07	0.01	0.17	3149.50	0.50	45.38
Main	7113	100-yr FIS	2814.75	2813.82	0.93	0.01	0.16	2699.92	0.08	44.70
Main	7113	50-yr FIS	2812.09	2811.53	0.56	0.00	0.14	1500.00		40.19
Main	7113	10-yr FIS	2807.21	2807.14	0.07	0.00	0.06	200.00		29.56
Main	7113	10-yr SBCFCD	2812.03	2811.48	0.55	0.00	0.14	1480.00		40.08
Main	7113	5-yr SBCFCD	2810.62	2810.24	0.38	0.00	0.12	990.00		37.06
Main	7113	2-yr SBCFCD	2809.26	2809.03	0.23	0.00	0.10	610.00		34.12
Main	7105	100-yr SBCFCD	2815.41	2812.63	2.78	0.15	0.02	3150.00		42.57
Main	7105	100-yr FIS	2814.58	2812.03	2.56	0.15	0.02	2700.00		40.78
Main	7105	50-yr FIS	2811.95	2810.02	1.92	0.16	0.01	1500.00		34.77
Main	7105	10-yr FIS	2807.15	2806.51	0.64	0.22	0.02	200.00		24.21
Main	7105	10-yr SBCFCD	2811.89	2809.98	1.91	0.16	0.01	1480.00		34.65
Main	7105	5-yr SBCFCD	2810.50	2808.94	1.55	0.17	0.00	990.00		31.52
Main	7105	2-yr SBCFCD	2809.16	2807.96	1.20	0.18	0.01	610.00		28.57
Main	7013.55*	100-yr SBCFCD	2815.18	2811.68	3.49	0.17	0.07	3150.00		36.86
Main	7013.55*	100-yr FIS	2814.33	2810.91	3.41	0.18	0.09	2700.00		35.61
Main	7013.55*	50-yr FIS	2811.65	2808.82	2.83	0.21	0.09	1500.00		32.21
Main	7013.55*	10-yr FIS	2806.84	2806.03	0.81	0.28	0.02	200.00		27.67
Main	7013.55*	10-yr SBCFCD	2811.59	2808.78	2.81	0.21	0.09	1480.00		32.15
Main	7013.55*	5-yr SBCFCD	2810.18	2807.85	2.33	0.23	0.08	990.00		30.64
Main	7013.55*	2-yr SBCFCD	2808.85	2807.05	1.80	0.25	0.06	610.00		29.32
Main	6840	100-yr SBCFCD	2814.22	2807.27	6.95	0.61	0.35	3150.00		37.99
Main	6840	100-yr FIS	2813.35	2806.82	6.53	0.67	0.31	2700.00		37.88
Main	6840	50-yr FIS	2810.55	2805.54	5.01	0.88	0.22	1500.00		37.56
Main	6840	10-yr FIS	2805.42	2803.83	1.59	1.34	0.08	200.00		37.13
Main	6840	10-yr SBCFCD	2810.50	2805.52	4.98	0.88	0.22	1480.00		37.55
Main	6840	5-yr SBCFCD	2809.01	2804.95	4.06	1.01	0.17	990.00		37.41
Main	6840	2-yr SBCFCD	2807.55	2804.46	3.09	1.17	0.13	610.00		37.29
Main	6801.6	100-yr SBCFCD	2812.57	2811.51	1.05			3150.00		45.00
Main	6801.6	100-yr FIS	2811.64	2810.69	0.95			2700.00		45.00
Main	6801.6	50-yr FIS	2810.10	2804.81	5.29	0.43	0.03	1500.00		44.92
Main	6801.6	10-yr FIS	2804.54	2804.38	0.16			200.00		44.92
Main	6801.6	10-yr SBCFCD	2810.04	2804.79	5.25	0.43	0.03	1480.00		44.92
Main	6801.6	5-yr SBCFCD	2808.50	2804.35	4.15	0.50	0.01	990.00		44.92
Main	6801.6	2-yr SBCFCD	2806.96	2803.98	2.98	0.56	0.03	610.00		44.91
Main	6785.6		Culvert							
Main	6769.6	100-yr SBCFCD	2811.02	2808.36	2.66	0.11	0.03	3150.00		44.97
Main	6769.6	100-yr FIS	2810.23	2807.84	2.39	0.11	0.03	2700.00		44.96
Main	6769.6	50-yr FIS	2807.89	2806.27	1.62			1500.00		44.94
Main	6769.6	10-yr FIS	2804.28	2803.85	0.42	0.16	0.03	200.00		44.91
Main	6769.6	10-yr SBCFCD	2807.85	2806.25	1.60			1480.00		44.94
Main	6769.6	5-yr SBCFCD	2806.71	2805.45	1.26			990.00		44.93
Main	6769.6	2-yr SBCFCD	2805.68	2804.80	0.88			610.00		44.92
Main	6707.1	100-yr SBCFCD	2810.51	2804.47	6.04	0.17	0.34	3150.00		34.40
Main	6707.1	100-yr FIS	2809.71	2803.85	5.86	0.18	0.35	2700.00		32.54
Main	6707.1	50-yr FIS	2805.64	2803.60	2.04	0.56	0.00	1500.00		31.78
Main	6707.1	10-yr FIS	2803.42	2798.72	4.71	0.43	0.43	200.00		17.14
Main	6707.1	10-yr SBCFCD	2805.58	2803.56	2.02	0.56	0.00	1480.00		31.68

Main	6707.1	5-yr SBCFCD	2804.09	2802.42	1.67	0.59	0.00	990.00	28.26
Main	6707.1	2-yr SBCFCD	2802.63	2801.32	1.32	0.63	0.00	610.00	24.95
Main	6385	100-yr SBCFCD	2808.97	2802.52	6.45	1.49	0.04	3150.00	33.94
Main	6385	100-yr FIS	2808.09	2801.95	6.14	1.59	0.03	2700.00	32.25
Main	6385	50-yr FIS	2804.57	2800.52	4.05	0.86	0.20	1500.00	27.97
Main	6385	10-yr FIS	2798.76	2797.52	1.24	3.62	1.04	200.00	18.96
Main	6385	10-yr SBCFCD	2804.52	2800.49	4.03	0.86	0.20	1480.00	27.86
Main	6385	5-yr SBCFCD	2802.98	2799.52	3.46	0.92	0.18	990.00	24.96
Main	6385	2-yr SBCFCD	2801.46	2798.62	2.84	1.02	0.15	610.00	22.26
Main	6345	100-yr SBCFCD	2808.78	2802.31	6.47	0.19	0.00	3150.00	33.93
Main	6345	100-yr FIS	2807.88	2801.75	6.13	0.20	0.00	2700.00	32.25
Main	6345	50-yr FIS	2804.39	2800.31	4.08	0.18	0.00	1500.00	27.94
Main	6345	10-yr FIS	2798.56	2797.32	1.24	0.21	0.00	200.00	18.96
Main	6345	10-yr SBCFCD	2804.33	2800.28	4.06	0.18	0.00	1480.00	27.83
Main	6345	5-yr SBCFCD	2802.76	2799.33	3.43	0.20	0.01	990.00	25.00
Main	6345	2-yr SBCFCD	2801.21	2798.45	2.75	0.23	0.03	610.00	22.36
Main	6344.7	100-yr SBCFCD	2806.06	2805.15	0.91			3150.00	45.00
Main	6344.7	100-yr FIS	2807.58	2798.48	9.10	0.00	0.30	2700.00	45.00
Main	6344.7	50-yr FIS	2804.14	2797.63	6.52	0.00	0.24	1500.00	45.00
Main	6344.7	10-yr FIS	2798.47	2796.38	2.09	0.00	0.08	200.00	45.00
Main	6344.7	10-yr SBCFCD	2804.09	2797.61	6.48	0.00	0.24	1480.00	45.00
Main	6344.7	5-yr SBCFCD	2802.56	2797.18	5.38	0.00	0.20	990.00	45.00
Main	6344.7	2-yr SBCFCD	2801.05	2796.82	4.23	0.00	0.15	610.00	45.00
Main	6328.7		Culvert						
Main	6312.6	100-yr SBCFCD	2805.17	2803.98	1.20	0.00	0.50	3150.00	45.00
Main	6312.6	100-yr FIS	2803.23	2800.83	2.40			2700.00	45.00
Main	6312.6	50-yr FIS	2800.88	2799.28	1.61			1500.00	45.00
Main	6312.6	10-yr FIS	2797.28	2796.86	0.42			200.00	45.00
Main	6312.6	10-yr SBCFCD	2800.84	2799.22	1.63			1480.00	45.00
Main	6312.6	5-yr SBCFCD	2799.70	2798.48	1.22			990.00	45.00
Main	6312.6	2-yr SBCFCD	2798.68	2797.79	0.89			610.00	45.00
Main	6312.1	100-yr SBCFCD	2804.67	2801.80	2.88	0.08	0.17	3150.00	39.97
Main	6312.1	100-yr FIS	2803.83	2801.23	2.60	0.08	0.14	2700.00	39.97
Main	6312.1	50-yr FIS	2801.29	2799.55	1.74	0.09	0.06	1500.00	39.94
Main	6312.1	10-yr FIS	2797.38	2796.92	0.46	0.12	0.00	200.00	39.91
Main	6312.1	10-yr SBCFCD	2801.24	2799.51	1.73	0.09	0.06	1480.00	39.94
Main	6312.1	5-yr SBCFCD	2800.01	2798.68	1.34	0.09	0.04	990.00	39.93
Main	6312.1	2-yr SBCFCD	2798.90	2797.95	0.96	0.10	0.02	610.00	39.92
Main	6267.1	100-yr SBCFCD	2803.89	2794.96	8.93	0.18	0.61	3150.00	48.87
Main	6267.1	100-yr FIS	2803.06	2794.64	8.42	0.18	0.58	2700.00	47.91
Main	6267.1	50-yr FIS	2800.58	2793.67	6.90	0.20	0.52	1500.00	45.02
Main	6267.1	10-yr FIS	2796.63	2792.30	4.34	0.36	0.39	200.00	40.89
Main	6267.1	10-yr SBCFCD	2800.53	2793.66	6.87	0.20	0.51	1480.00	44.97
Main	6267.1	5-yr SBCFCD	2799.31	2793.19	6.12	0.23	0.48	990.00	43.58
Main	6267.1	2-yr SBCFCD	2798.20	2792.79	5.41	0.26	0.44	610.00	42.38
Main	6000	100-yr SBCFCD	2800.22	2790.32	9.90	3.57	0.10	3150.00	48.46
Main	6000	100-yr FIS	2799.19	2790.04	9.15	3.80	0.07	2700.00	47.62
Main	6000	50-yr FIS	2795.64	2789.23	6.40	4.79	0.15	1500.00	45.20
Main	6000	10-yr FIS	2789.13	2788.10	1.03	6.51	0.99	200.00	41.80

Main	6000	10-yr SBCFCD	2795.56	2789.22	6.34	4.81	0.16		1480.00		45.16
Main	6000	5-yr SBCFCD	2793.46	2788.87	4.59	5.39	0.46		990.00		44.11
Main	6000	2-yr SBCFCD	2791.53	2788.56	2.97	5.94	0.73		610.00		43.18
Main	5950	100-yr SBCFCD	2799.42	2790.00	9.42	0.66	0.14		3150.00		39.98
Main	5950	100-yr FIS	2798.37	2789.65	8.72	0.69	0.13		2700.00		39.97
Main	5950	50-yr FIS	2794.76	2788.70	6.06	0.78	0.10		1500.00		39.95
Main	5950	10-yr FIS	2788.55	2787.38	1.17	0.57	0.01		200.00		39.91
Main	5950	10-yr SBCFCD	2794.68	2788.69	6.00	0.78	0.10		1480.00		39.95
Main	5950	5-yr SBCFCD	2792.64	2788.28	4.36	0.75	0.07		990.00		39.94
Main	5950	2-yr SBCFCD	2790.82	2787.92	2.90	0.69	0.02		610.00		39.93
Main	5772.1	100-yr SBCFCD	2795.77	2794.89	0.88	0.01	0.15		3150.00		40.00
Main	5772.1	100-yr FIS	2794.36	2793.51	0.86	0.01	0.14		2700.00		39.99
Main	5772.1	50-yr FIS	2792.22	2786.33	5.89	2.49	0.05		1500.00		39.92
Main	5772.1	10-yr FIS	2786.21	2784.96	1.24	2.33	0.01		200.00		39.91
Main	5772.1	10-yr SBCFCD	2792.15	2786.31	5.83	2.49	0.05		1480.00		39.92
Main	5772.1	5-yr SBCFCD	2790.16	2785.90	4.27	2.45	0.03		990.00		39.91
Main	5772.1	2-yr SBCFCD	2788.44	2785.51	2.93	2.37	0.00		610.00		39.91
Main	5742	100-yr SBCFCD	2795.61	2795.24	0.37				3150.00		81.69
Main	5742	100-yr FIS	2794.22	2793.82	0.40				2700.00		73.83
Main	5742	50-yr FIS	2790.79	2790.44	0.35				1500.00		55.39
Main	5742	10-yr FIS	2785.61	2785.48	0.13				200.00		47.00
Main	5742	10-yr SBCFCD	2790.73	2790.38	0.35				1480.00		55.07
Main	5742	5-yr SBCFCD	2789.08	2788.78	0.29				990.00		50.57
Main	5742	2-yr SBCFCD	2787.60	2787.37	0.23				610.00		47.74
Main	5679.8		Culvert								
Main	5609.6	100-yr SBCFCD	2794.81	2794.10	0.71	0.02	0.79		3150.00		46.00
Main	5609.6	100-yr FIS	2793.75	2793.11	0.64	0.02	0.72		2700.00		46.00
Main	5609.6	50-yr FIS	2790.51	2790.06	0.45	0.02	0.50		1500.00		46.00
Main	5609.6	10-yr FIS	2785.41	2785.21	0.20	0.04	0.10		200.00		46.00
Main	5609.6	10-yr SBCFCD	2790.45	2790.01	0.45	0.02	0.50		1480.00		46.00
Main	5609.6	5-yr SBCFCD	2788.84	2788.48	0.36	0.02	0.37		990.00		46.00
Main	5609.6	2-yr SBCFCD	2787.39	2787.11	0.28	0.02	0.26		610.00		46.00
Main	5581.3	100-yr SBCFCD	2794.01	2790.66	3.35	0.09	0.45	16.78	3124.02	9.20	38.89
Main	5581.3	100-yr FIS	2793.02	2789.98	3.04	0.11	0.25	9.51	2686.27	4.22	36.58
Main	5581.3	50-yr FIS	2790.00	2787.88	2.11	0.13	0.15	0.40	1499.61		31.01
Main	5581.3	10-yr FIS	2785.27	2784.72	0.55	0.17	0.01		200.00		30.02
Main	5581.3	10-yr SBCFCD	2789.94	2787.84	2.10	0.13	0.15	0.34	1479.66		30.96
Main	5581.3	5-yr SBCFCD	2788.45	2786.85	1.60	0.13	0.09		990.00		30.03
Main	5581.3	2-yr SBCFCD	2787.11	2785.95	1.16	0.14	0.05		610.00		30.02
Main	5515.3	100-yr SBCFCD	2793.49	2786.94	6.55	0.20	0.32		3150.00		46.28
Main	5515.3	100-yr FIS	2792.53	2786.60	5.92	0.20	0.29		2700.00		45.09
Main	5515.3	50-yr FIS	2789.58	2785.56	4.01	0.23	0.19		1500.00		41.29
Main	5515.3	10-yr FIS	2784.90	2783.69	1.21	0.30	0.07		200.00		34.13
Main	5515.3	10-yr SBCFCD	2789.52	2785.54	3.98	0.23	0.19		1480.00		41.21
Main	5515.3	5-yr SBCFCD	2788.07	2784.99	3.07	0.24	0.15		990.00		39.16
Main	5515.3	2-yr SBCFCD	2786.75	2784.47	2.28	0.25	0.11		610.00		37.15
Main	5135	100-yr SBCFCD	2793.18	2786.58	6.61	0.29	0.01	170.78	2808.44	170.78	43.09
Main	5135	100-yr FIS	2792.22	2786.18	6.04	0.30	0.01	134.32	2431.36	134.32	41.90
Main	5135	50-yr FIS	2789.23	2784.93	4.30	0.32	0.03	52.91	1394.17	52.91	38.17

Main	5135	10-yr FIS	2784.32	2782.89	1.43	0.56	0.02	1.85	196.30	1.85	32.03
Main	5135	10-yr SBCFCD	2789.18	2784.91	4.27	0.32	0.03	51.76	1376.47	51.76	38.10
Main	5135	5-yr SBCFCD	2787.69	2784.28	3.41	0.35	0.03	26.93	936.13	26.93	36.20
Main	5135	2-yr SBCFCD	2786.32	2783.69	2.63	0.39	0.03	12.08	585.84	12.08	34.44
Main	4875	100-yr SBCFCD	2791.62	2783.81	7.81	1.46	0.12	159.93	2830.13	159.93	42.17
Main	4875	100-yr FIS	2790.60	2783.43	7.17	1.51	0.11	125.39	2449.23	125.39	41.02
Main	4875	50-yr FIS	2787.40	2782.26	5.14	1.75	0.08	49.01	1401.97	49.01	37.53
Main	4875	10-yr FIS	2781.65	2780.50	1.15	2.59	0.08	2.06	195.89	2.06	32.26
Main	4875	10-yr SBCFCD	2787.34	2782.24	5.10	1.75	0.08	47.96	1384.08	47.96	37.46
Main	4875	5-yr SBCFCD	2785.67	2781.67	4.00	1.96	0.06	25.09	939.82	25.09	35.75
Main	4875	2-yr SBCFCD	2784.07	2781.16	2.90	2.22	0.03	11.54	586.91	11.54	34.23
Main	4635	100-yr SBCFCD	2789.90	2781.35	8.55	1.65	0.07	154.30	2841.40	154.30	41.69
Main	4635	100-yr FIS	2788.82	2780.98	7.84	1.71	0.07	120.97	2458.05	120.97	40.60
Main	4635	50-yr FIS	2785.40	2779.88	5.52	1.98	0.04	47.54	1404.91	47.54	37.29
Main	4635	10-yr FIS	2779.45	2778.17	1.28	2.19	0.01	1.95	196.09	1.95	32.15
Main	4635	10-yr SBCFCD	2785.33	2779.86	5.47	1.98	0.04	46.56	1386.87	46.56	37.23
Main	4635	5-yr SBCFCD	2783.51	2779.33	4.18	2.14	0.02	24.61	940.78	24.61	35.63
Main	4635	2-yr SBCFCD	2781.80	2778.85	2.95	2.26	0.00	11.46	587.08	11.46	34.20
Main	4385	100-yr SBCFCD	2787.92	2778.85	9.07	1.93	0.05	150.68	2848.64	150.68	41.39
Main	4385	100-yr FIS	2786.78	2778.50	8.28	2.00	0.04	118.28	2463.44	118.28	40.34
Main	4385	50-yr FIS	2783.14	2777.44	5.70	2.23	0.02	46.90	1406.20	46.90	37.18
Main	4385	10-yr FIS	2777.01	2775.78	1.23	2.42	0.01	1.99	196.02	1.99	32.19
Main	4385	10-yr SBCFCD	2783.07	2777.43	5.64	2.23	0.02	45.93	1388.14	45.93	37.13
Main	4385	5-yr SBCFCD	2781.17	2776.91	4.25	2.34	0.01	24.43	941.14	24.43	35.59
Main	4385	2-yr SBCFCD	2779.41	2776.45	2.96	2.39	0.00	11.45	587.10	11.45	34.20
Main	4135	100-yr SBCFCD	2785.80	2776.38	9.42	2.08	0.03	148.42	2853.17	148.42	41.20
Main	4135	100-yr FIS	2784.61	2776.05	8.56	2.14	0.03	116.69	2466.62	116.69	40.19
Main	4135	50-yr FIS	2780.81	2775.03	5.78	2.32	0.01	46.59	1406.82	46.59	37.13
Main	4135	10-yr FIS	2774.63	2773.37	1.26	2.39	0.00	1.97	196.06	1.97	32.16
Main	4135	10-yr SBCFCD	2780.74	2775.01	5.73	2.32	0.01	45.63	1388.75	45.63	37.07
Main	4135	5-yr SBCFCD	2778.79	2774.51	4.28	2.38	0.00	24.36	941.29	24.36	35.57
Main	4135	2-yr SBCFCD	2777.01	2774.05	2.96	2.39	0.00	11.44	587.13	11.44	34.19
Main	3969.6	100-yr SBCFCD	2784.25	2774.82	9.43	1.55	0.00		3380.00		41.80
Main	3969.6	100-yr FIS	2782.95	2774.26	8.70	1.64	0.01		2700.00		40.07
Main	3969.6	50-yr FIS	2779.11	2773.31	5.80	1.69	0.00		1500.00		37.16
Main	3969.6	10-yr FIS	2772.97	2771.71	1.26	1.66	0.00		200.00		32.24
Main	3969.6	10-yr SBCFCD	2779.10	2773.49	5.61	1.60	0.04		1600.00		37.70
Main	3969.6	5-yr SBCFCD	2777.16	2772.97	4.19	1.60	0.03		1070.00		36.12
Main	3969.6	2-yr SBCFCD	2775.40	2772.46	2.94	1.61	0.01		650.00		34.56
Main	3835	100-yr SBCFCD	2782.99	2773.79	9.20	1.18	0.07	170.06	3039.88	170.06	42.05
Main	3835	100-yr FIS	2781.53	2773.21	8.32	1.30	0.11	118.07	2463.85	118.07	40.32
Main	3835	50-yr FIS	2777.70	2772.21	5.49	1.32	0.09	47.66	1404.69	47.66	37.31
Main	3835	10-yr FIS	2771.68	2770.52	1.16	1.26	0.03	2.05	195.91	2.05	32.25
Main	3835	10-yr SBCFCD	2777.86	2772.35	5.51	1.20	0.03	53.63	1492.74	53.63	37.74
Main	3835	5-yr SBCFCD	2775.94	2771.80	4.15	1.21	0.01	28.61	1012.79	28.61	36.08
Main	3835	2-yr SBCFCD	2774.16	2771.28	2.88	1.23	0.02	13.08	623.84	13.08	34.51
Main	3740	100-yr SBCFCD	2782.18	2772.42	9.76	0.75	0.06		3380.00		32.15
Main	3740	100-yr FIS	2780.66	2771.70	8.96	0.81	0.06		2700.00		29.99
Main	3740	50-yr FIS	2776.77	2770.30	6.47	0.83	0.10		1500.00		25.81
Main	3740	10-yr FIS	2770.39	2767.61	2.77	1.13	0.16		200.00		17.74

Main	3740	10-yr SBCFCD	2776.98	2770.49	6.49	0.78	0.10	1600.00	26.35
Main	3740	5-yr SBCFCD	2775.01	2769.67	5.34	0.82	0.12	1070.00	23.90
Main	3740	2-yr SBCFCD	2773.13	2768.85	4.29	0.88	0.14	650.00	21.44
Main	3732	100-yr SBCFCD	2781.96	2770.69	11.26	0.07	0.15	3380.00	29.09
Main	3732	100-yr FIS	2780.43	2769.92	10.51	0.07	0.15	2700.00	27.18
Main	3732	50-yr FIS	2774.48	2773.80	0.67	0.00	0.00	1500.00	36.78
Main	3732	10-yr FIS	2769.16	2769.07	0.09	0.00	0.00	200.00	25.07
Main	3732	10-yr SBCFCD	2776.73	2768.60	8.13	0.08	0.16	1600.00	23.89
Main	3732	5-yr SBCFCD	2773.18	2772.68	0.50	0.00	0.00	1070.00	34.00
Main	3732	2-yr SBCFCD	2771.61	2771.29	0.32	0.00	0.00	650.00	30.57
Main	3730		Lat Struct						
Main	3728	100-yr SBCFCD	2781.91	2770.71	11.20	0.04	0.02	3380.00	29.12
Main	3728	100-yr FIS	2780.38	2769.93	10.44	0.04	0.02	2700.00	27.21
Main	3728	50-yr FIS	2774.48	2773.80	0.67	0.01	0.14	1500.00	36.78
Main	3728	10-yr FIS	2769.16	2769.07	0.09	0.00	0.06	200.00	25.07
Main	3728	10-yr SBCFCD	2774.75	2774.04	0.71	0.01	0.14	1600.00	37.36
Main	3728	5-yr SBCFCD	2773.18	2772.68	0.50	0.00	0.12	1070.00	33.99
Main	3728	2-yr SBCFCD	2771.61	2771.29	0.32	0.00	0.10	650.00	30.57
Main	3720	100-yr SBCFCD	2780.92	2772.82	8.09	0.06	0.93	3380.00	33.37
Main	3720	100-yr FIS	2779.36	2772.11	7.25	0.06	0.96	2700.00	31.22
Main	3720	50-yr FIS	2774.33	2772.30	2.04	0.35	0.00	1500.00	31.79
Main	3720	10-yr FIS	2769.10	2768.36	0.73	0.46	0.00	200.00	19.99
Main	3720	10-yr SBCFCD	2774.60	2772.51	2.10	0.35	0.00	1600.00	32.43
Main	3720	5-yr SBCFCD	2773.05	2771.32	1.73	0.36	0.00	1070.00	28.86
Main	3720	2-yr SBCFCD	2771.50	2770.16	1.35	0.38	0.00	650.00	25.37
Main	3520.3	100-yr SBCFCD	2778.85	2766.55	12.30	1.65	0.42	3380.00	30.75
Main	3520.3	100-yr FIS	2777.23	2765.87	11.37	1.71	0.41	2700.00	28.70
Main	3520.3	50-yr FIS	2772.96	2764.54	8.42	0.74	0.64	1500.00	24.73
Main	3520.3	10-yr FIS	2767.36	2761.97	5.39	1.27	0.47	200.00	17.01
Main	3520.3	10-yr SBCFCD	2773.24	2764.70	8.54	0.73	0.64	1600.00	25.19
Main	3520.3	5-yr SBCFCD	2771.64	2763.84	7.80	0.80	0.61	1070.00	22.62
Main	3520.3	2-yr SBCFCD	2770.03	2763.04	6.99	0.90	0.56	650.00	20.22
Main	3422	100-yr SBCFCD	2777.45	2763.30	14.14	1.21	0.18	3380.00	29.77
Main	3422	100-yr FIS	2775.76	2762.64	13.12	1.30	0.18	2700.00	27.81
Main	3422	50-yr FIS	2771.38	2761.33	10.05	1.42	0.16	1500.00	23.94
Main	3422	10-yr FIS	2763.07	2759.07	4.00	3.88	0.42	200.00	17.28
Main	3422	10-yr SBCFCD	2771.69	2761.47	10.23	1.38	0.17	1600.00	24.36
Main	3422	5-yr SBCFCD	2769.81	2760.68	9.12	1.70	0.13	1070.00	22.04
Main	3422	2-yr SBCFCD	2767.71	2759.97	7.75	2.24	0.08	650.00	19.92
Main	3410	100-yr SBCFCD	2777.27	2762.96	14.30	0.16	0.02	3380.00	29.89
Main	3410	100-yr FIS	2775.56	2762.31	13.25	0.18	0.01	2700.00	27.92
Main	3410	50-yr FIS	2771.16	2761.01	10.16	0.20	0.01	1500.00	24.02
Main	3410	10-yr FIS	2762.66	2758.78	3.88	0.37	0.03	200.00	17.35
Main	3410	10-yr SBCFCD	2771.49	2761.14	10.35	0.19	0.01	1600.00	24.43
Main	3410	5-yr SBCFCD	2769.56	2760.37	9.19	0.23	0.01	1070.00	22.11
Main	3410	2-yr SBCFCD	2767.42	2759.66	7.76	0.30	0.00	650.00	19.99
Main	3400.*	100-yr SBCFCD	2777.06	2762.99	14.06	0.14	0.07	3380.00	29.98
Main	3400.*	100-yr FIS	2775.34	2762.34	13.00	0.15	0.08	2700.00	28.02
Main	3400.*	50-yr FIS	2770.92	2761.04	9.88	0.16	0.08	1500.00	24.12

Main	3400.*	10-yr FIS	2762.25	2758.83	3.42	0.27	0.14	200.00	17.49
Main	3400.*	10-yr SBCFCD	2771.25	2761.18	10.08	0.16	0.08	1600.00	24.53
Main	3400.*	5-yr SBCFCD	2769.27	2760.41	8.86	0.19	0.10	1070.00	22.22
Main	3400.*	2-yr SBCFCD	2767.07	2759.70	7.37	0.24	0.12	650.00	20.10
Main	3266.4	100-yr SBCFCD	2774.95	2759.30	15.65	1.95	0.16	3380.00	29.39
Main	3266.4	100-yr FIS	2773.10	2758.67	14.44	2.08	0.14	2700.00	27.50
Main	3266.4	50-yr FIS	2768.48	2757.40	11.07	2.34	0.12	1500.00	23.71
Main	3266.4	10-yr FIS	2758.85	2755.32	3.53	3.39	0.01	200.00	17.45
Main	3266.4	10-yr SBCFCD	2768.85	2757.53	11.32	2.27	0.12	1600.00	24.09
Main	3266.4	5-yr SBCFCD	2766.53	2756.82	9.71	2.66	0.08	1070.00	21.95
Main	3266.4	2-yr SBCFCD	2763.87	2756.17	7.70	3.16	0.03	650.00	20.00
Main	3220	100-yr SBCFCD	2774.20	2758.38	15.82	0.74	0.02	3380.00	29.33
Main	3220	100-yr FIS	2772.31	2757.75	14.55	0.79	0.01	2700.00	27.46
Main	3220	50-yr FIS	2767.59	2756.50	11.09	0.88	0.00	1500.00	23.70
Main	3220	10-yr FIS	2757.63	2754.46	3.17	1.11	0.11	200.00	17.58
Main	3220	10-yr SBCFCD	2767.98	2756.63	11.35	0.86	0.00	1600.00	24.08
Main	3220	5-yr SBCFCD	2765.50	2755.93	9.57	0.98	0.04	1070.00	21.99
Main	3220	2-yr SBCFCD	2762.66	2755.30	7.36	1.10	0.10	650.00	20.10
Main	3212	100-yr SBCFCD	2773.91	2756.54	17.37	0.13	0.15	3380.00	26.74
Main	3212	100-yr FIS	2772.00	2755.88	16.13	0.14	0.16	2700.00	25.12
Main	3212	50-yr FIS	2767.27	2754.54	12.72	0.16	0.16	1500.00	21.89
Main	3212	10-yr FIS	2756.06	2755.98	0.08	0.00	0.00	200.00	25.38
Main	3212	10-yr SBCFCD	2767.66	2754.67	12.99	0.16	0.16	1600.00	22.21
Main	3212	5-yr SBCFCD	2765.15	2753.95	11.21	0.18	0.16	1070.00	20.45
Main	3212	2-yr SBCFCD	2758.52	2758.23	0.29	0.00	0.00	650.00	30.83
Main	3210		Lat Struct						
Main	3208	100-yr SBCFCD	2773.81	2756.56	17.25	0.07	0.03	3380.00	26.77
Main	3208	100-yr FIS	2771.89	2755.89	16.00	0.07	0.04	2700.00	25.16
Main	3208	50-yr FIS	2767.14	2754.56	12.58	0.09	0.04	1500.00	21.92
Main	3208	10-yr FIS	2756.06	2755.98	0.08	0.00	0.06	200.00	25.38
Main	3208	10-yr SBCFCD	2767.54	2754.69	12.85	0.09	0.04	1600.00	22.24
Main	3208	5-yr SBCFCD	2765.01	2753.96	11.04	0.10	0.05	1070.00	20.48
Main	3208	2-yr SBCFCD	2758.52	2758.23	0.29	0.00	0.11	650.00	30.83
Main	3200	100-yr SBCFCD	2772.76	2758.58	14.18	0.12	0.92	3380.00	29.93
Main	3200	100-yr FIS	2770.82	2757.96	12.86	0.13	0.94	2700.00	28.07
Main	3200	50-yr FIS	2766.01	2756.72	9.29	0.14	0.99	1500.00	24.35
Main	3200	10-yr FIS	2756.00	2755.27	0.73	0.43	0.07	200.00	20.01
Main	3200	10-yr SBCFCD	2766.42	2756.84	9.57	0.14	0.98	1600.00	24.73
Main	3200	5-yr SBCFCD	2763.86	2756.15	7.71	0.15	1.00	1070.00	22.65
Main	3200	2-yr SBCFCD	2758.41	2756.99	1.42	0.40	0.13	650.00	25.17
Main	2942.6	100-yr SBCFCD	2769.22	2754.97	14.25	3.54	0.01	3380.00	29.91
Main	2942.6	100-yr FIS	2767.13	2754.37	12.76	3.66	0.03	2700.00	28.11
Main	2942.6	50-yr FIS	2762.20	2753.15	9.05	3.73	0.07	1500.00	24.45
Main	2942.6	10-yr FIS	2754.31	2750.82	3.49	1.41	0.28	200.00	17.46
Main	2942.6	10-yr SBCFCD	2762.66	2753.27	9.39	3.70	0.05	1600.00	24.81
Main	2942.6	5-yr SBCFCD	2759.96	2752.60	7.35	3.79	0.11	1070.00	22.80
Main	2942.6	2-yr SBCFCD	2756.98	2752.02	4.96	1.08	0.35	650.00	21.05
Main	2910	100-yr SBCFCD	2768.56	2755.07	13.48	0.43	0.23	3380.00	30.22
Main	2910	100-yr FIS	2766.46	2754.48	11.98	0.44	0.23	2700.00	28.43

Main	2910	50-yr FIS	2761.54	2753.27	8.28	0.43	0.23	1500.00	24.80
Main	2910	10-yr FIS	2753.38	2750.98	2.40	0.61	0.33	200.00	17.93
Main	2910	10-yr SBCFCD	2762.00	2753.38	8.62	0.43	0.23	1600.00	25.15
Main	2910	5-yr SBCFCD	2759.29	2752.73	6.57	0.43	0.24	1070.00	23.18
Main	2910	2-yr SBCFCD	2756.39	2752.16	4.23	0.37	0.22	650.00	21.48
Main	2900	100-yr SBCFCD	2768.37	2755.11	13.26	0.13	0.07	3380.00	30.31
Main	2900	100-yr FIS	2766.26	2754.51	11.75	0.13	0.07	2700.00	28.53
Main	2900	50-yr FIS	2761.35	2753.30	8.05	0.12	0.07	1500.00	24.91
Main	2900	10-yr FIS	2753.17	2751.03	2.15	0.13	0.08	200.00	18.09
Main	2900	10-yr SBCFCD	2761.81	2753.42	8.39	0.12	0.07	1600.00	25.26
Main	2900	5-yr SBCFCD	2759.11	2752.77	6.34	0.12	0.07	1070.00	23.29
Main	2900	2-yr SBCFCD	2756.24	2752.20	4.03	0.10	0.06	650.00	21.61
Main	2770	100-yr SBCFCD	2766.66	2752.94	13.72	1.66	0.05	3380.00	30.12
Main	2770	100-yr FIS	2764.53	2752.35	12.19	1.68	0.04	2700.00	28.34
Main	2770	50-yr FIS	2759.67	2751.12	8.55	1.63	0.05	1500.00	24.67
Main	2770	10-yr FIS	2751.38	2748.86	2.52	1.76	0.04	200.00	17.87
Main	2770	10-yr SBCFCD	2760.13	2751.24	8.89	1.63	0.05	1600.00	25.03
Main	2770	5-yr SBCFCD	2757.47	2750.57	6.90	1.58	0.06	1070.00	23.01
Main	2770	2-yr SBCFCD	2754.77	2749.94	4.83	1.38	0.08	650.00	21.12
Main	2762	100-yr SBCFCD	2766.38	2751.09	15.29	0.11	0.16	3380.00	27.33
Main	2762	100-yr FIS	2764.26	2750.44	13.82	0.11	0.16	2700.00	25.77
Main	2762	50-yr FIS	2759.38	2749.11	10.28	0.12	0.17	1500.00	22.53
Main	2762	10-yr FIS	2750.37	2750.28	0.08	0.00	0.00	200.00	25.38
Main	2762	10-yr SBCFCD	2759.85	2749.24	10.61	0.12	0.17	1600.00	22.84
Main	2762	5-yr SBCFCD	2754.39	2753.92	0.47	0.00	0.00	1070.00	34.19
Main	2762	2-yr SBCFCD	2752.81	2752.52	0.29	0.00	0.00	650.00	30.81
Main	2760		Lat Struct						
Main	2758	100-yr SBCFCD	2766.31	2751.10	15.21	0.06	0.03	3380.00	27.36
Main	2758	100-yr FIS	2764.17	2750.45	13.71	0.06	0.03	2700.00	25.80
Main	2758	50-yr FIS	2759.29	2749.12	10.16	0.06	0.03	1500.00	22.57
Main	2758	10-yr FIS	2750.36	2750.28	0.08	0.00	0.07	200.00	25.38
Main	2758	10-yr SBCFCD	2759.75	2749.25	10.50	0.06	0.03	1600.00	22.88
Main	2758	5-yr SBCFCD	2754.39	2753.92	0.47	0.00	0.13	1070.00	34.19
Main	2758	2-yr SBCFCD	2752.81	2752.52	0.29	0.00	0.11	650.00	30.80
Main	2750	100-yr SBCFCD	2765.27	2753.18	12.09	0.10	0.94	3380.00	30.85
Main	2750	100-yr FIS	2763.10	2752.61	10.50	0.10	0.97	2700.00	29.12
Main	2750	50-yr FIS	2758.16	2751.45	6.71	0.10	1.04	1500.00	25.65
Main	2750	10-yr FIS	2750.30	2749.56	0.74	0.04	0.00	200.00	19.98
Main	2750	10-yr SBCFCD	2758.63	2751.56	7.07	0.10	1.03	1600.00	25.98
Main	2750	5-yr SBCFCD	2754.25	2752.49	1.76	0.04	0.01	1070.00	28.77
Main	2750	2-yr SBCFCD	2752.70	2751.36	1.35	0.04	0.01	650.00	25.37
Main	2730.8	100-yr SBCFCD	2765.05	2752.87	12.18	0.21	0.01	3380.00	30.81
Main	2730.8	100-yr FIS	2762.88	2752.29	10.59	0.21	0.01	2700.00	29.07
Main	2730.8	50-yr FIS	2757.97	2751.12	6.84	0.18	0.01	1500.00	25.57
Main	2730.8	10-yr FIS	2750.17	2748.91	1.26	0.07	0.05	200.00	18.93
Main	2730.8	10-yr SBCFCD	2758.43	2751.23	7.20	0.18	0.01	1600.00	25.90
Main	2730.8	5-yr SBCFCD	2754.12	2751.59	2.53	0.05	0.08	1070.00	26.98
Main	2730.8	2-yr SBCFCD	2752.58	2750.51	2.07	0.05	0.07	650.00	23.72
Main	2513.9	100-yr SBCFCD	2762.58	2750.13	12.45	2.44	0.03	3380.00	30.68

Main	2513.9	100-yr FIS	2760.44	2749.54	10.90	2.41	0.03	2700.00	28.92
Main	2513.9	50-yr FIS	2755.72	2748.31	7.41	2.19	0.06	1500.00	25.24
Main	2513.9	10-yr FIS	2748.28	2745.88	2.40	1.78	0.11	200.00	17.93
Main	2513.9	10-yr SBCFCD	2756.17	2748.43	7.74	2.21	0.05	1600.00	25.59
Main	2513.9	5-yr SBCFCD	2752.87	2747.97	4.90	1.01	0.24	1070.00	24.22
Main	2513.9	2-yr SBCFCD	2751.18	2747.09	4.09	1.19	0.20	650.00	21.57
Main	2410	100-yr SBCFCD	2761.36	2748.69	12.66	1.20	0.02	3380.00	30.58
Main	2410	100-yr FIS	2759.22	2748.11	11.12	1.19	0.02	2700.00	28.82
Main	2410	50-yr FIS	2754.55	2746.86	7.69	1.14	0.03	1500.00	25.09
Main	2410	10-yr FIS	2746.82	2744.49	2.32	1.45	0.02	200.00	17.97
Main	2410	10-yr SBCFCD	2755.00	2746.98	8.01	1.15	0.03	1600.00	25.45
Main	2410	5-yr SBCFCD	2751.92	2746.43	5.49	0.89	0.06	1070.00	23.80
Main	2410	2-yr SBCFCD	2750.09	2745.61	4.48	1.06	0.04	650.00	21.32
Main	2400	100-yr SBCFCD	2761.18	2748.73	12.45	0.12	0.06	3380.00	30.68
Main	2400	100-yr FIS	2759.04	2748.14	10.90	0.11	0.06	2700.00	28.92
Main	2400	50-yr FIS	2754.38	2746.90	7.47	0.11	0.06	1500.00	25.20
Main	2400	10-yr FIS	2746.62	2744.54	2.07	0.12	0.07	200.00	18.13
Main	2400	10-yr SBCFCD	2754.82	2747.02	7.80	0.11	0.06	1600.00	25.56
Main	2400	5-yr SBCFCD	2751.78	2746.48	5.30	0.09	0.06	1070.00	23.93
Main	2400	2-yr SBCFCD	2749.92	2745.65	4.26	0.11	0.06	650.00	21.46
Main	2320	100-yr SBCFCD	2760.20	2747.37	12.83	0.93	0.04	3380.00	30.50
Main	2320	100-yr FIS	2758.07	2746.78	11.29	0.93	0.04	2700.00	28.74
Main	2320	50-yr FIS	2753.43	2745.53	7.91	0.90	0.04	1500.00	24.98
Main	2320	10-yr FIS	2745.57	2743.18	2.39	1.02	0.03	200.00	17.93
Main	2320	10-yr SBCFCD	2753.88	2745.65	8.23	0.90	0.04	1600.00	25.34
Main	2320	5-yr SBCFCD	2750.94	2745.05	5.89	0.76	0.06	1070.00	23.55
Main	2320	2-yr SBCFCD	2748.99	2744.26	4.73	0.88	0.05	650.00	21.18
Main	2312	100-yr SBCFCD	2759.94	2745.50	14.43	0.10	0.16	3380.00	27.61
Main	2312	100-yr FIS	2757.81	2744.86	12.95	0.10	0.17	2700.00	26.04
Main	2312	50-yr FIS	2753.15	2743.49	9.66	0.10	0.18	1500.00	22.73
Main	2312	10-yr FIS	2744.67	2744.58	0.08	0.00	0.00	200.00	25.38
Main	2312	10-yr SBCFCD	2753.59	2743.62	9.97	0.10	0.17	1600.00	23.05
Main	2312	5-yr SBCFCD	2748.68	2748.21	0.47	0.00	0.00	1070.00	34.19
Main	2312	2-yr SBCFCD	2747.11	2746.82	0.29	0.00	0.00	650.00	30.81
Main	2310		Lat Struct						
Main	2308	100-yr SBCFCD	2759.87	2745.51	14.36	0.05	0.02	3380.00	27.64
Main	2308	100-yr FIS	2757.74	2744.87	12.87	0.05	0.02	2700.00	26.07
Main	2308	50-yr FIS	2753.06	2743.50	9.56	0.06	0.03	1500.00	22.76
Main	2308	10-yr FIS	2744.67	2744.58	0.08	0.00	0.07	200.00	25.38
Main	2308	10-yr SBCFCD	2753.51	2743.63	9.87	0.06	0.03	1600.00	23.08
Main	2308	5-yr SBCFCD	2748.68	2748.21	0.47	0.00	0.13	1070.00	34.18
Main	2308	2-yr SBCFCD	2747.11	2746.82	0.29	0.00	0.11	650.00	30.80
Main	2300	100-yr SBCFCD	2758.84	2747.64	11.20	0.09	0.95	3380.00	31.30
Main	2300	100-yr FIS	2756.67	2747.07	9.60	0.09	0.98	2700.00	29.61
Main	2300	50-yr FIS	2751.92	2745.91	6.02	0.08	1.06	1500.00	26.12
Main	2300	10-yr FIS	2744.60	2743.85	0.74	0.09	0.00	200.00	19.96
Main	2300	10-yr SBCFCD	2752.37	2746.02	6.36	0.08	1.06	1600.00	26.45
Main	2300	5-yr SBCFCD	2748.55	2746.82	1.74	0.07	0.00	1070.00	28.85
Main	2300	2-yr SBCFCD	2747.00	2745.66	1.35	0.08	0.00	650.00	25.36

Main	2260.4	100-yr SBCFCD	2758.41	2746.88	11.53	0.40	0.03	3380.00	31.13
Main	2260.4	100-yr FIS	2756.25	2746.31	9.94	0.39	0.03	2700.00	29.41
Main	2260.4	50-yr FIS	2751.55	2745.11	6.44	0.33	0.04	1500.00	25.82
Main	2260.4	10-yr FIS	2744.34	2742.65	1.69	0.16	0.09	200.00	18.44
Main	2260.4	10-yr SBCFCD	2751.99	2745.22	6.77	0.34	0.04	1600.00	26.17
Main	2260.4	5-yr SBCFCD	2748.30	2745.18	3.13	0.10	0.14	1070.00	26.03
Main	2260.4	2-yr SBCFCD	2746.76	2744.14	2.61	0.12	0.13	650.00	22.93
Main	1986.6	100-yr SBCFCD	2755.46	2743.29	12.17	2.89	0.06	3480.00	31.16
Main	1986.6	100-yr FIS	2753.29	2742.57	10.72	2.88	0.08	2700.00	29.01
Main	1986.6	50-yr FIS	2748.79	2741.30	7.49	2.66	0.10	1500.00	25.20
Main	1986.6	10-yr FIS	2741.31	2738.87	2.43	2.96	0.07	200.00	17.91
Main	1986.6	10-yr SBCFCD	2749.26	2741.52	7.74	2.64	0.10	1650.00	25.85
Main	1986.6	5-yr SBCFCD	2746.44	2740.94	5.50	1.63	0.24	1120.00	24.13
Main	1986.6	2-yr SBCFCD	2744.62	2740.08	4.54	1.94	0.19	680.00	21.53
Main	1910	100-yr SBCFCD	2754.62	2742.49	12.12	0.83	0.01	3480.00	31.18
Main	1910	100-yr FIS	2752.43	2741.78	10.64	0.84	0.02	2700.00	29.05
Main	1910	50-yr FIS	2747.94	2740.51	7.43	0.83	0.02	1500.00	25.23
Main	1910	10-yr FIS	2740.21	2738.15	2.06	0.98	0.11	200.00	18.14
Main	1910	10-yr SBCFCD	2748.45	2740.72	7.73	0.80	0.00	1650.00	25.86
Main	1910	5-yr SBCFCD	2745.73	2740.12	5.62	0.70	0.01	1120.00	24.05
Main	1910	2-yr SBCFCD	2743.79	2739.28	4.51	0.82	0.01	680.00	21.55
Main	1900	100-yr SBCFCD	2754.52	2742.39	12.12	0.11	0.00	3480.00	31.18
Main	1900	100-yr FIS	2752.33	2741.68	10.64	0.11	0.00	2700.00	29.05
Main	1900	50-yr FIS	2747.84	2740.41	7.43	0.11	0.00	1500.00	25.23
Main	1900	10-yr FIS	2740.10	2738.05	2.05	0.11	0.00	200.00	18.15
Main	1900	10-yr SBCFCD	2748.35	2740.62	7.73	0.10	0.00	1650.00	25.86
Main	1900	5-yr SBCFCD	2745.65	2740.01	5.63	0.09	0.00	1120.00	24.04
Main	1900	2-yr SBCFCD	2743.69	2739.18	4.51	0.11	0.00	680.00	21.55
Main	1720	100-yr SBCFCD	2752.49	2740.88	11.61	1.88	0.16	3480.00	31.44
Main	1720	100-yr FIS	2750.26	2740.18	10.08	1.90	0.17	2700.00	29.34
Main	1720	50-yr FIS	2745.87	2738.90	6.97	1.84	0.14	1500.00	25.49
Main	1720	10-yr FIS	2738.25	2736.54	1.71	1.74	0.10	200.00	18.42
Main	1720	10-yr SBCFCD	2746.42	2739.10	7.32	1.81	0.12	1650.00	26.09
Main	1720	5-yr SBCFCD	2743.97	2738.44	5.53	1.65	0.03	1120.00	24.11
Main	1720	2-yr SBCFCD	2741.80	2737.67	4.13	1.78	0.11	680.00	21.80
Main	1712	100-yr SBCFCD	2752.23	2738.87	13.37	0.09	0.18	3480.00	28.39
Main	1712	100-yr FIS	2749.98	2738.10	11.88	0.09	0.18	2700.00	26.52
Main	1712	50-yr FIS	2745.57	2736.70	8.88	0.09	0.19	1500.00	23.07
Main	1712	10-yr FIS	2737.76	2737.68	0.08	0.00	0.00	200.00	25.47
Main	1712	10-yr SBCFCD	2746.14	2736.91	9.23	0.09	0.19	1650.00	23.59
Main	1712	5-yr SBCFCD	2741.91	2741.42	0.49	0.00	0.00	1120.00	34.64
Main	1712	2-yr SBCFCD	2740.32	2740.01	0.31	0.00	0.00	680.00	31.19
Main	1710		Lat Struct						
Main	1708	100-yr SBCFCD	2752.17	2738.88	13.30	0.05	0.02	3480.00	28.42
Main	1708	100-yr FIS	2749.92	2738.11	11.81	0.05	0.02	2700.00	26.54
Main	1708	50-yr FIS	2745.51	2736.71	8.80	0.05	0.02	1500.00	23.10
Main	1708	10-yr FIS	2737.76	2737.68	0.08	0.00	0.07	200.00	25.47
Main	1708	10-yr SBCFCD	2746.08	2736.92	9.16	0.05	0.02	1650.00	23.62
Main	1708	5-yr SBCFCD	2741.91	2741.42	0.49	0.01	0.13	1120.00	34.63
Main	1708	2-yr SBCFCD	2740.32	2740.01	0.31	0.00	0.11	680.00	31.19

Main	1699.2	100-yr SBCFCD	2751.13	2741.02	10.11	0.09	0.95	3480.00	32.69
Main	1699.2	100-yr FIS	2748.84	2740.36	8.47	0.09	1.00	2700.00	30.66
Main	1699.2	50-yr FIS	2744.32	2739.23	5.08	0.08	1.11	1500.00	27.16
Main	1699.2	10-yr FIS	2737.69	2736.95	0.75	0.47	0.00	200.00	20.09
Main	1699.2	10-yr SBCFCD	2744.91	2739.40	5.51	0.08	1.09	1650.00	27.69
Main	1699.2	5-yr SBCFCD	2741.78	2740.03	1.75	0.36	0.00	1120.00	29.62
Main	1699.2	2-yr SBCFCD	2740.21	2738.82	1.39	0.38	0.00	680.00	25.89
Main	1500	100-yr SBCFCD	2749.32	2739.92	9.40	1.59	0.21	3480.00	32.77
Main	1500	100-yr FIS	2747.15	2739.24	7.91	1.52	0.17	2700.00	30.70
Main	1500	50-yr FIS	2743.06	2737.95	5.11	1.26	0.00	1500.00	26.86
Main	1500	10-yr FIS	2736.80	2735.16	1.64	0.80	0.09	200.00	18.49
Main	1500	10-yr SBCFCD	2743.62	2738.14	5.48	1.29	0.01	1650.00	27.43
Main	1500	5-yr SBCFCD	2741.08	2737.70	3.38	0.54	0.16	1120.00	26.08
Main	1500	2-yr SBCFCD	2739.47	2736.67	2.80	0.60	0.14	680.00	23.00
Main	1200.*	100-yr SBCFCD	2744.85	2731.90	12.96	4.11	0.36	3480.00	74.96
Main	1200.*	100-yr FIS	2742.76	2731.61	11.15	4.05	0.32	2700.00	71.51
Main	1200.*	50-yr FIS	2738.97	2731.10	7.87	3.81	0.28	1500.00	65.26
Main	1200.*	10-yr FIS	2732.15	2730.32	1.83	4.63	0.02	200.00	58.57
Main	1200.*	10-yr SBCFCD	2739.50	2731.17	8.32	3.84	0.28	1650.00	66.14
Main	1200.*	5-yr SBCFCD	2737.69	2730.90	6.79	3.05	0.34	1120.00	63.19
Main	1200.*	2-yr SBCFCD	2735.68	2730.65	5.04	3.56	0.22	680.00	61.16
Main	957.5	100-yr SBCFCD	2732.86	2729.14	3.72	9.22	2.77	3480.00	127.54
Main	957.5	100-yr FIS	2731.78	2728.93	2.84	8.49	2.49	2700.00	117.01
Main	957.5	50-yr FIS	2729.97	2728.57	1.40	7.06	1.94	1500.00	111.82
Main	957.5	10-yr FIS	2727.79	2727.55	0.24			200.00	97.13
Main	957.5	10-yr SBCFCD	2730.19	2728.63	1.57	7.28	2.03	1650.00	112.61
Main	957.5	5-yr SBCFCD	2729.40	2728.41	0.99	6.55	1.74	1120.00	109.49
Main	957.5	2-yr SBCFCD	2728.72	2728.15	0.57	5.62	1.34	680.00	105.85

Profile Output Table - Standard Table 3

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Froude # XS	Shear Chan (lb/sq ft)
Low Flow Channel	11179.5	100-yr SBCFCD	30.70	2848.40	2849.26	0.003718	2.52	2.52	12.17	43.99	0.50	0.50	0.18
Low Flow Channel	11179.5	100-yr FIS	26.70	2848.40	2849.19	0.003727	2.40	2.40	11.12	43.60	0.49	0.49	0.16
Low Flow Channel	11179.5	50-yr FIS	15.70	2848.40	2848.98	0.003607	1.96	1.96	8.01	42.39	0.47	0.47	0.12
Low Flow Channel	11179.5	10-yr FIS	2.40	2848.40	2848.60	0.002918	0.90	0.90	2.67	40.20	0.36	0.36	0.04
Low Flow Channel	11179.5	10-yr SBCFCD	14.40	2848.40	2848.96	0.003469	1.87	1.87	7.68	42.26	0.45	0.45	0.11
Low Flow Channel	11179.5	5-yr SBCFCD	9.70	2848.40	2848.85	0.003335	1.60	1.60	6.07	41.61	0.43	0.43	0.09
Low Flow Channel	11179.5	2-yr SBCFCD	6.00	2848.40	2848.75	0.002994	1.29	1.29	4.65	41.03	0.39	0.39	0.06
Low Flow Channel	10613.9	100-yr SBCFCD	30.70	2844.00	2844.67	0.008246	3.20	3.20	9.60	47.68	0.72	0.72	0.31
Low Flow Channel	10613.9	100-yr FIS	26.70	2844.00	2844.62	0.008229	3.04	3.04	8.78	47.32	0.71	0.71	0.29
Low Flow Channel	10613.9	50-yr FIS	15.70	2844.00	2844.45	0.008470	2.53	2.53	6.20	46.13	0.69	0.69	0.22
Low Flow Channel	10613.9	10-yr FIS	2.40	2844.00	2844.13	0.012118	1.38	1.38	1.74	43.92	0.68	0.68	0.10
Low Flow Channel	10613.9	10-yr SBCFCD	14.40	2844.00	2844.42	0.009026	2.50	2.50	5.76	45.91	0.70	0.70	0.22
Low Flow Channel	10613.9	5-yr SBCFCD	9.70	2844.00	2844.32	0.009585	2.20	2.20	4.41	45.26	0.70	0.70	0.18
Low Flow Channel	10613.9	2-yr SBCFCD	6.00	2844.00	2844.23	0.011733	1.95	1.95	3.08	44.60	0.73	0.73	0.16
Low Flow Channel	9536.1	100-yr SBCFCD	30.70	2835.70	2836.40	0.007180	3.06	3.06	10.03	47.88	0.68	0.68	0.28
Low Flow Channel	9536.1	100-yr FIS	26.70	2835.70	2836.34	0.007186	2.91	2.91	9.17	47.49	0.67	0.67	0.26
Low Flow Channel	9536.1	50-yr FIS	15.70	2835.70	2836.17	0.007005	2.38	2.38	6.59	46.31	0.63	0.63	0.19
Low Flow Channel	9536.1	10-yr FIS	2.40	2835.70	2835.87	0.005285	1.07	1.07	2.24	44.17	0.47	0.47	0.05
Low Flow Channel	9536.1	10-yr SBCFCD	14.40	2835.70	2836.16	0.006612	2.27	2.27	6.35	46.20	0.61	0.61	0.17
Low Flow Channel	9536.1	5-yr SBCFCD	9.70	2835.70	2836.07	0.006288	1.93	1.93	5.03	45.57	0.58	0.58	0.13
Low Flow Channel	9536.1	2-yr SBCFCD	6.00	2835.70	2835.99	0.005398	1.53	1.53	3.91	45.02	0.51	0.51	0.09

Low Flow Channel	9035.8	100-yr SBCFCD	30.70	2830.40	2830.94	0.017365	4.06	4.06	7.56	46.76	1.01	1.01	0.53
Low Flow Channel	9035.8	100-yr FIS	26.70	2830.40	2830.90	0.017349	3.86	3.86	6.92	46.46	1.00	1.00	0.49
Low Flow Channel	9035.8	50-yr FIS	15.70	2830.40	2830.76	0.018081	3.21	3.21	4.89	45.50	0.97	0.97	0.38
Low Flow Channel	9035.8	10-yr FIS	2.40	2830.40	2830.50	0.031417	1.85	1.85	1.30	43.69	1.05	1.05	0.19
Low Flow Channel	9035.8	10-yr SBCFCD	14.40	2830.40	2830.73	0.019839	3.20	3.20	4.50	45.31	1.01	1.01	0.38
Low Flow Channel	9035.8	5-yr SBCFCD	9.70	2830.40	2830.65	0.021825	2.84	2.84	3.42	44.77	1.01	1.01	0.33
Low Flow Channel	9035.8	2-yr SBCFCD	6.00	2830.40	2830.57	0.030152	2.61	2.61	2.30	44.21	1.12	1.12	0.31
Low Flow Channel	9005	100-yr SBCFCD	30.70	2829.00	2830.42	0.000628	1.37	1.37	22.41	52.91	0.22	0.22	0.05
Low Flow Channel	9005	100-yr FIS	26.70	2829.00	2830.32	0.000600	1.29	1.29	20.71	52.27	0.21	0.21	0.04
Low Flow Channel	9005	50-yr FIS	15.70	2829.00	2830.03	0.000499	1.02	1.02	15.46	50.19	0.19	0.19	0.03
Low Flow Channel	9005	10-yr FIS	2.40	2829.00	2829.42	0.000239	0.41	0.41	5.85	45.96	0.11	0.11	0.01
Low Flow Channel	9005	10-yr SBCFCD	14.40	2829.00	2829.99	0.000484	0.98	0.98	14.76	49.90	0.18	0.18	0.03
Low Flow Channel	9005	5-yr SBCFCD	9.70	2829.00	2829.82	0.000411	0.81	0.81	12.01	48.74	0.17	0.17	0.02
Low Flow Channel	9005	2-yr SBCFCD	6.00	2829.00	2829.66	0.000330	0.63	0.63	9.45	47.62	0.14	0.14	0.01
Low Flow Channel	8674.9	100-yr SBCFCD	30.70	2829.00	2829.54	0.017365	4.06	4.06	7.56	46.76	1.01	1.01	0.53
Low Flow Channel	8674.9	100-yr FIS	26.70	2829.00	2829.50	0.017349	3.86	3.86	6.92	46.46	1.00	1.00	0.49
Low Flow Channel	8674.9	50-yr FIS	15.70	2829.00	2829.36	0.018081	3.21	3.21	4.89	45.50	0.97	0.97	0.38
Low Flow Channel	8674.9	10-yr FIS	2.40	2829.00	2829.10	0.026101	1.75	1.75	1.37	43.73	0.96	0.96	0.17
Low Flow Channel	8674.9	10-yr SBCFCD	14.40	2829.00	2829.33	0.019839	3.20	3.20	4.50	45.31	1.01	1.01	0.38
Low Flow Channel	8674.9	5-yr SBCFCD	9.70	2829.00	2829.25	0.021825	2.84	2.84	3.42	44.77	1.01	1.01	0.33
Low Flow Channel	8674.9	2-yr SBCFCD	6.00	2829.00	2829.17	0.030152	2.61	2.61	2.30	44.21	1.12	1.12	0.31
Low Flow Channel	8507.43	100-yr SBCFCD	30.70	2824.20	2824.59	0.050493	5.69	5.69	5.39	45.74	1.65	1.65	1.15
Low Flow Channel	8507.43	100-yr FIS	26.70	2824.20	2824.56	0.051106	5.42	5.42	4.92	45.51	1.64	1.64	1.08
Low Flow Channel	8507.43	50-yr FIS	15.70	2824.20	2824.63	0.009495	2.62	2.62	5.98	46.02	0.73	0.73	0.24
Low Flow Channel	8507.43	10-yr FIS	2.40	2824.20	2824.30	0.031679	1.85	1.85	1.30	43.69	1.05	1.05	0.19
Low Flow Channel	8507.43	10-yr SBCFCD	14.40	2824.20	2824.46	0.043711	4.09	4.09	3.52	44.82	1.44	1.44	0.68
Low Flow Channel	8507.43	5-yr SBCFCD	9.70	2824.20	2824.53	0.008589	2.12	2.12	4.56	45.34	0.66	0.66	0.17
Low Flow Channel	8507.43	2-yr SBCFCD	6.00	2824.20	2824.37	0.030010	2.60	2.60	2.30	44.21	1.12	1.12	0.31
Low Flow Channel	8258.66	100-yr SBCFCD	30.70	2821.80	2822.53	0.006250	2.93	2.93	10.49	48.08	0.63	0.63	0.25
Low Flow Channel	8258.66	100-yr FIS	26.70	2821.80	2822.47	0.006245	2.78	2.78	9.59	47.68	0.63	0.63	0.23
Low Flow Channel	8258.66	50-yr FIS	15.70	2821.80	2822.23	0.009866	2.66	2.66	5.91	45.99	0.74	0.74	0.24
Low Flow Channel	8258.66	10-yr FIS	2.40	2821.80	2821.97	0.004690	1.03	1.03	2.32	44.22	0.44	0.44	0.05
Low Flow Channel	8258.66	10-yr SBCFCD	14.40	2821.80	2822.21	0.009917	2.58	2.58	5.59	45.83	0.73	0.73	0.23
Low Flow Channel	8258.66	5-yr SBCFCD	9.70	2821.80	2822.11	0.010995	2.30	2.30	4.23	45.17	0.74	0.74	0.20
Low Flow Channel	8258.66	2-yr SBCFCD	6.00	2821.80	2822.10	0.004787	1.48	1.48	4.06	45.09	0.49	0.49	0.08
Low Flow Channel	8009.9	100-yr SBCFCD	30.70	2819.40	2819.94	0.017365	4.06	4.06	7.56	46.76	1.01	1.01	0.53
Low Flow Channel	8009.9	100-yr FIS	26.70	2819.40	2819.90	0.017349	3.86	3.86	6.92	46.46	1.00	1.00	0.49
Low Flow Channel	8009.9	50-yr FIS	15.70	2819.40	2819.83	0.009388	2.61	2.61	6.01	46.03	0.72	0.72	0.24
Low Flow Channel	8009.9	10-yr FIS	2.40	2819.40	2819.50	0.031417	1.85	1.85	1.30	43.69	1.05	1.05	0.19
Low Flow Channel	8009.9	10-yr SBCFCD	14.40	2819.40	2819.81	0.009355	2.53	2.53	5.69	45.88	0.71	0.71	0.22
Low Flow Channel	8009.9	5-yr SBCFCD	9.70	2819.40	2819.74	0.008463	2.12	2.12	4.59	45.35	0.66	0.66	0.17
Low Flow Channel	8009.9	2-yr SBCFCD	6.00	2819.40	2819.57	0.030152	2.61	2.61	2.30	44.21	1.12	1.12	0.31
Low Flow Channel	6735	100-yr SBCFCD	31.10	2803.00	2803.70	0.007171	3.07	3.07	10.12	15.81	0.68	0.68	0.28
Low Flow Channel	6735	100-yr FIS	26.70	2803.00	2803.64	0.007205	2.91	2.91	9.16	15.57	0.67	0.67	0.26
Low Flow Channel	6735	50-yr FIS	14.80	2803.00	2803.34	0.019229	3.20	3.20	4.62	14.35	0.99	0.99	0.38
Low Flow Channel	6735	10-yr FIS	2.00	2803.00	2803.09	0.026086	1.63	1.63	1.23	13.37	0.95	0.95	0.15
Low Flow Channel	6735	10-yr SBCFCD	14.60	2803.00	2803.34	0.018712	3.16	3.16	4.62	14.35	0.98	0.98	0.37
Low Flow Channel	6735	5-yr SBCFCD	9.80	2803.00	2803.26	0.021780	2.85	2.85	3.44	14.02	1.01	1.01	0.33
Low Flow Channel	6735	2-yr SBCFCD	6.00	2803.00	2803.18	0.024852	2.46	2.46	2.44	13.73	1.03	1.03	0.27
Low Flow Channel	3410	100-yr SBCFCD	31.10	2768.00	2769.03	0.016339	4.23	4.23	7.36	103.82	1.00	1.00	0.56
Low Flow Channel	3410	100-yr FIS	26.70	2768.00	2768.97	0.016234	4.06	4.06	6.58	101.74	0.99	0.99	0.52
Low Flow Channel	3410	50-yr FIS	14.80	2768.00	2768.75	0.017482	3.60	3.60	4.12	94.72	0.99	0.99	0.44
Low Flow Channel	3410	10-yr FIS	2.00	2768.00	2768.30	0.021890	2.35	2.35	0.85	84.84	0.97	0.97	0.25
Low Flow Channel	3410	10-yr SBCFCD	14.60	2768.00	2768.73	0.018785	3.68	3.68	3.97	94.38	1.02	1.02	0.47
Low Flow Channel	3410	5-yr SBCFCD	9.80	2768.00	2768.63	0.018148	3.29	3.29	2.98	92.03	0.98	0.98	0.39
Low Flow Channel	3410	2-yr SBCFCD	6.00	2768.00	2768.49	0.021923	3.12	3.12	1.93	89.00	1.04	1.04	0.38
Low Flow Channel	3400	100-yr SBCFCD	31.80	2757.00	2757.66	0.939075	25.55	25.55	1.24	2.76	6.71	6.71	22.77
Low Flow Channel	3400	100-yr FIS	27.30	2757.00	2757.60	1.044419	25.53	25.53	1.07	2.59	7.00	7.00	23.35
Low Flow Channel	3400	50-yr FIS	15.20	2757.00	2757.39	1.586917	25.37	25.37	0.60	2.05	8.27	8.27	25.69
Low Flow Channel	3400	10-yr FIS	2.00	2757.00	2757.10	2.925896	16.80	16.80	0.12	1.28	9.70	9.70	16.13
Low Flow Channel	3400	10-yr SBCFCD	15.00	2757.00	2757.39	1.592792	25.31	25.31	0.59	2.04	8.28	8.28	25.62
Low Flow Channel	3400	5-yr SBCFCD	10.00	2757.00	2757.29	2.189498	25.27	25.27	0.40	1.76	9.40	9.40	27.67

Low Flow Channel	3400	2-yr SBCFCD	6.20	2757.00	2757.18	4.251826	27.57	27.57	0.22	1.48	12.48	12.48	37.22
Low Flow Channel	2900	100-yr SBCFCD	31.80	2751.00	2753.21	0.002145	2.57	2.57	12.40	33.86	0.39	0.39	0.16
Low Flow Channel	2900	100-yr FIS	27.30	2751.00	2753.09	0.002020	2.41	2.41	11.31	33.11	0.38	0.38	0.14
Low Flow Channel	2900	50-yr FIS	15.20	2751.00	2752.65	0.001739	1.97	1.97	7.73	30.34	0.34	0.34	0.10
Low Flow Channel	2900	10-yr FIS	2.00	2751.00	2751.67	0.001072	0.96	0.96	2.09	24.22	0.24	0.24	0.03
Low Flow Channel	2900	10-yr SBCFCD	15.00	2751.00	2752.64	0.001738	1.96	1.96	7.66	30.27	0.34	0.34	0.10
Low Flow Channel	2900	5-yr SBCFCD	10.00	2751.00	2752.38	0.001549	1.69	1.69	5.92	28.70	0.31	0.31	0.08
Low Flow Channel	2900	2-yr SBCFCD	6.20	2751.00	2752.13	0.001384	1.43	1.43	4.33	27.07	0.29	0.29	0.06
Low Flow Channel	2410	100-yr SBCFCD	31.80	2750.00	2750.77	0.016367	4.04	4.04	7.87	52.14	0.99	0.99	0.52
Low Flow Channel	2410	100-yr FIS	27.30	2750.00	2750.71	0.017596	3.98	3.98	6.85	51.03	1.02	1.02	0.52
Low Flow Channel	2410	50-yr FIS	15.20	2750.00	2750.52	0.018382	3.44	3.44	4.41	48.01	1.00	1.00	0.42
Low Flow Channel	2410	10-yr FIS	2.00	2750.00	2750.16	0.026994	2.12	2.12	0.94	42.05	1.02	1.02	0.22
Low Flow Channel	2410	10-yr SBCFCD	15.00	2750.00	2750.52	0.017902	3.40	3.40	4.41	48.01	0.99	0.99	0.41
Low Flow Channel	2410	5-yr SBCFCD	10.00	2750.00	2750.41	0.020101	3.15	3.15	3.17	46.20	1.01	1.01	0.38
Low Flow Channel	2410	2-yr SBCFCD	6.20	2750.00	2750.32	0.020565	2.76	2.76	2.24	44.66	0.99	0.99	0.31
Low Flow Channel	2400	100-yr SBCFCD	31.80	2745.00	2745.33	0.643355	17.51	17.51	1.82	26.50	5.61	5.61	11.75
Low Flow Channel	2400	100-yr FIS	27.30	2745.00	2745.29	0.744510	17.38	17.38	1.57	26.25	5.93	5.93	12.05
Low Flow Channel	2400	50-yr FIS	15.20	2745.00	2745.62	0.017137	4.12	4.12	3.69	28.26	0.99	0.99	0.54
Low Flow Channel	2400	10-yr FIS	2.00	2745.00	2745.21	0.011424	1.78	1.78	1.12	25.78	0.70	0.70	0.14
Low Flow Channel	2400	10-yr SBCFCD	15.00	2745.00	2745.60	0.018302	4.20	4.20	3.57	28.16	1.02	1.02	0.57
Low Flow Channel	2400	5-yr SBCFCD	10.00	2745.00	2745.48	0.018264	3.66	3.66	2.73	27.39	0.99	0.99	0.46
Low Flow Channel	2400	2-yr SBCFCD	6.20	2745.00	2745.35	0.019570	3.18	3.18	1.95	26.64	0.99	0.99	0.38
Low Flow Channel	1900	100-yr SBCFCD	31.80	2739.00	2740.26	0.003417	2.84	2.84	11.20	35.56	0.49	0.49	0.21
Low Flow Channel	1900	100-yr FIS	27.30	2739.00	2740.15	0.003465	2.72	2.72	10.04	34.90	0.49	0.49	0.19
Low Flow Channel	1900	50-yr FIS	15.20	2739.00	2739.79	0.003917	2.34	2.34	6.48	32.75	0.50	0.50	0.16
Low Flow Channel	1900	10-yr FIS	2.00	2739.00	2739.17	0.012820	1.65	1.65	1.21	29.00	0.72	0.72	0.13
Low Flow Channel	1900	10-yr SBCFCD	15.00	2739.00	2739.79	0.003934	2.34	2.34	6.42	32.71	0.50	0.50	0.16
Low Flow Channel	1900	5-yr SBCFCD	10.00	2739.00	2739.60	0.004459	2.12	2.12	4.71	31.58	0.51	0.51	0.14
Low Flow Channel	1900	2-yr SBCFCD	6.20	2739.00	2739.42	0.005662	1.94	1.94	3.20	30.51	0.55	0.55	0.13
Low Flow Channel	1699.2	100-yr SBCFCD	31.80	2738.50	2739.94	0.001151	1.85	1.85	17.15	61.53	0.29	0.29	0.08
Low Flow Channel	1699.2	100-yr FIS	27.30	2738.50	2739.84	0.001095	1.73	1.73	15.74	60.93	0.28	0.28	0.07
Low Flow Channel	1699.2	50-yr FIS	15.20	2738.50	2739.49	0.000937	1.35	1.35	11.23	58.93	0.25	0.25	0.05
Low Flow Channel	1699.2	10-yr FIS	2.00	2738.50	2738.82	0.000715	0.60	0.60	3.35	55.02	0.19	0.19	0.01
Low Flow Channel	1699.2	10-yr SBCFCD	15.00	2738.50	2739.49	0.000934	1.35	1.35	11.14	58.89	0.25	0.25	0.05
Low Flow Channel	1699.2	5-yr SBCFCD	10.00	2738.50	2739.30	0.000851	1.13	1.13	8.81	57.79	0.23	0.23	0.04
Low Flow Channel	1699.2	2-yr SBCFCD	6.20	2738.50	2739.11	0.000785	0.93	0.93	6.64	56.73	0.22	0.22	0.03
Low Flow Channel	1510	100-yr SBCFCD	31.80	2738.00	2739.13	0.015567	4.40	4.40	7.23	42.61	0.99	0.99	0.58
Low Flow Channel	1510	100-yr FIS	27.30	2738.00	2739.05	0.016212	4.30	4.30	6.36	41.63	1.00	1.00	0.57
Low Flow Channel	1510	50-yr FIS	15.20	2738.00	2738.81	0.017342	3.80	3.80	4.00	38.63	0.99	0.99	0.48
Low Flow Channel	1510	10-yr FIS	2.00	2738.00	2738.31	0.024000	2.56	2.56	0.78	32.27	1.02	1.02	0.29
Low Flow Channel	1510	10-yr SBCFCD	15.00	2738.00	2738.81	0.017383	3.79	3.79	3.96	38.57	1.00	1.00	0.48
Low Flow Channel	1510	5-yr SBCFCD	10.00	2738.00	2738.68	0.018418	3.50	3.50	2.86	36.86	1.00	1.00	0.43
Low Flow Channel	1510	2-yr SBCFCD	6.20	2738.00	2738.54	0.019839	3.19	3.19	1.95	35.17	1.00	1.00	0.38
Low Flow Channel	1500	100-yr SBCFCD	31.80	2732.50	2733.29	0.397194	18.32	18.32	1.74	3.38	4.51	4.51	11.15
Low Flow Channel	1500	100-yr FIS	27.30	2732.50	2733.22	0.437424	18.26	18.26	1.50	3.16	4.68	4.68	11.36
Low Flow Channel	1500	50-yr FIS	15.20	2732.50	2732.99	0.643299	18.03	18.03	0.84	2.46	5.43	5.43	12.28
Low Flow Channel	1500	10-yr FIS	2.00	2732.50	2732.60	3.178187	17.14	17.14	0.12	1.30	10.09	10.09	16.96
Low Flow Channel	1500	10-yr SBCFCD	15.00	2732.50	2732.98	0.650233	18.04	18.04	0.83	2.45	5.45	5.45	12.32
Low Flow Channel	1500	5-yr SBCFCD	10.00	2732.50	2732.86	0.862145	17.88	17.88	0.56	2.09	6.09	6.09	13.05
Low Flow Channel	1500	2-yr SBCFCD	6.20	2732.50	2732.75	1.226480	17.68	17.68	0.35	1.76	6.99	6.99	14.02
Low Flow Channel	957.5	100-yr SBCFCD	31.80	2727.00	2727.36	0.001501	0.96	0.96	33.26	94.51	0.28	0.28	0.03
Low Flow Channel	957.5	100-yr FIS	27.30	2727.00	2727.33	0.001501	0.90	0.90	30.29	94.06	0.28	0.28	0.03
Low Flow Channel	957.5	50-yr FIS	15.20	2727.00	2727.23	0.001500	0.72	0.72	21.19	92.66	0.26	0.26	0.02
Low Flow Channel	957.5	10-yr FIS	2.00	2727.00	2727.03	0.042414	0.88	0.88	2.27	89.69	0.97	0.97	0.07
Low Flow Channel	957.5	10-yr SBCFCD	15.00	2727.00	2727.23	0.001502	0.71	0.71	21.01	92.64	0.26	0.26	0.02
Low Flow Channel	957.5	5-yr SBCFCD	10.00	2727.00	2727.18	0.001498	0.61	0.61	16.44	91.93	0.25	0.25	0.02
Low Flow Channel	957.5	2-yr SBCFCD	6.20	2727.00	2727.14	0.001499	0.50	0.50	12.30	91.28	0.24	0.24	0.01
Main	12028.1	100-yr SBCFCD	1730.00	2853.30	2858.99	0.000009	1.07	1.07	1617.41	293.05	0.08	0.08	0.00
Main	12028.1	100-yr FIS	700.00	2853.30	2856.29	0.000013	0.83	0.83	839.83	284.98	0.09	0.09	0.00
Main	12028.1	50-yr FIS	500.00	2853.30	2854.75	0.000072	1.24	1.24	404.16	280.36	0.18	0.18	0.01
Main	12028.1	10-yr FIS	100.00	2853.30	2853.46	0.004239	2.22	2.22	45.05	276.49	0.97	0.97	0.04
Main	12028.1	10-yr SBCFCD	810.00	2853.30	2856.09	0.000021	1.04	1.04	781.94	284.37	0.11	0.11	0.00

Main	12028.1	5-yr SBCFCD	550.00	2853.30	2854.99	0.000053	1.17	1.17	469.95	281.06	0.16	0.16	0.01
Main	12028.1	2-yr SBCFCD	340.00	2853.30	2853.99	0.000396	1.77	1.77	191.68	278.08	0.38	0.38	0.02
Main	11745.2*	100-yr SBCFCD	1730.00	2850.44	2857.29	0.001072	9.99	9.99	173.16	35.55	0.80	0.80	0.29
Main	11745.2*	100-yr FIS	700.00	2850.44	2855.73	0.000470	5.78	5.78	121.19	30.86	0.51	0.51	0.10
Main	11745.2*	50-yr FIS	500.00	2850.44	2853.74	0.001341	7.60	7.60	65.79	24.90	0.82	0.82	0.20
Main	11745.2*	10-yr FIS	100.00	2850.44	2851.30	0.005592	7.18	7.18	13.93	17.57	1.42	1.42	0.27
Main	11745.2*	10-yr SBCFCD	810.00	2850.44	2854.87	0.001206	8.44	8.44	96.00	28.30	0.81	0.81	0.23
Main	11745.2*	5-yr SBCFCD	550.00	2850.44	2853.94	0.001310	7.76	7.76	70.92	25.51	0.82	0.82	0.21
Main	11745.2*	2-yr SBCFCD	340.00	2850.44	2853.01	0.001501	7.02	7.02	48.43	22.71	0.85	0.85	0.19
Main	11655	100-yr SBCFCD	1730.00	2850.10	2857.37	0.000853	9.19	9.19	188.24	36.80	0.72	0.72	0.24
Main	11655	100-yr FIS	700.00	2850.10	2855.75	0.000367	5.28	5.28	132.54	31.94	0.46	0.46	0.09
Main	11655	50-yr FIS	500.00	2850.10	2853.80	0.000890	6.58	6.58	75.96	26.09	0.68	0.68	0.15
Main	11655	10-yr FIS	100.00	2850.10	2851.52	0.001013	4.12	4.12	24.26	19.25	0.65	0.65	0.08
Main	11655	10-yr SBCFCD	810.00	2850.10	2854.94	0.000872	7.51	7.51	107.79	29.53	0.69	0.69	0.18
Main	11655	5-yr SBCFCD	550.00	2850.10	2854.00	0.000886	6.76	6.76	81.37	26.71	0.68	0.68	0.15
Main	11655	2-yr SBCFCD	340.00	2850.10	2853.06	0.000910	5.91	5.91	57.56	23.88	0.67	0.67	0.13
Main	11647	100-yr SBCFCD	1730.00	2848.20	2857.78	0.000350	6.79	6.79	254.86	38.22	0.46	0.46	0.12
Main	11647	100-yr FIS	700.00	2848.20	2855.90	0.000133	3.74	3.74	187.26	33.66	0.28	0.28	0.04
Main	11647	50-yr FIS	500.00	2848.20	2854.11	0.000182	3.82	3.82	130.89	29.32	0.32	0.32	0.04
Main	11647	10-yr FIS	100.00	2848.20	2851.67	0.000049	1.50	1.50	66.74	23.42	0.16	0.16	0.01
Main	11647	10-yr SBCFCD	810.00	2848.20	2855.30	0.000241	4.83	4.83	167.55	32.21	0.37	0.37	0.07
Main	11647	5-yr SBCFCD	550.00	2848.20	2854.32	0.000193	4.01	4.01	137.23	29.84	0.33	0.33	0.05
Main	11647	2-yr SBCFCD	340.00	2848.20	2853.33	0.000141	3.12	3.12	108.89	27.44	0.28	0.28	0.03
Main	11645		Lat Struct										
Main	11643	100-yr SBCFCD	1730.00	2848.20	2857.78	0.000351	6.79	6.79	254.78	38.21	0.46	0.46	0.12
Main	11643	100-yr FIS	700.00	2848.20	2855.90	0.000133	3.74	3.74	187.24	33.66	0.28	0.28	0.04
Main	11643	50-yr FIS	500.00	2848.20	2854.11	0.000182	3.82	3.82	130.86	29.32	0.32	0.32	0.04
Main	11643	10-yr FIS	100.00	2848.20	2851.67	0.000049	1.50	1.50	66.74	23.42	0.16	0.16	0.01
Main	11643	10-yr SBCFCD	810.00	2848.20	2855.30	0.000242	4.84	4.84	167.51	32.21	0.37	0.37	0.07
Main	11643	5-yr SBCFCD	550.00	2848.20	2854.32	0.000193	4.01	4.01	137.20	29.84	0.33	0.33	0.05
Main	11643	2-yr SBCFCD	340.00	2848.20	2853.33	0.000141	3.12	3.12	108.88	27.44	0.28	0.28	0.03
Main	11635	100-yr SBCFCD	1730.00	2850.10	2856.15	0.001723	11.87	11.87	145.72	33.16	1.00	1.00	0.43
Main	11635	100-yr FIS	700.00	2850.10	2855.63	0.000397	5.44	5.44	128.77	31.58	0.47	0.47	0.09
Main	11635	50-yr FIS	500.00	2850.10	2853.04	0.002029	8.78	8.78	56.95	23.81	1.00	1.00	0.28
Main	11635	10-yr FIS	100.00	2850.10	2851.17	0.002596	5.61	5.61	17.83	18.22	1.00	1.00	0.15
Main	11635	10-yr SBCFCD	810.00	2850.10	2854.02	0.001885	9.89	9.89	81.94	26.77	1.00	1.00	0.33
Main	11635	5-yr SBCFCD	550.00	2850.10	2853.21	0.001995	8.98	8.98	61.21	24.34	1.00	1.00	0.29
Main	11635	2-yr SBCFCD	340.00	2850.10	2852.42	0.002156	7.95	7.95	42.78	21.95	1.00	1.00	0.25
Main	11462.4*	100-yr SBCFCD	1960.00	2847.58	2852.42	0.005104	18.18	18.18	107.82	29.53	1.68	1.68	1.06
Main	11462.4*	100-yr FIS	1700.00	2847.58	2853.58	0.001721	11.81	11.81	143.96	33.00	1.00	1.00	0.42
Main	11462.4*	50-yr FIS	1000.00	2847.58	2851.66	0.002489	11.60	11.60	86.21	27.24	1.15	1.15	0.45
Main	11462.4*	10-yr FIS	150.00	2847.58	2848.39	0.015383	11.49	11.49	13.06	17.42	2.34	2.34	0.70
Main	11462.4*	10-yr SBCFCD	920.00	2847.58	2850.47	0.007241	16.45	16.45	55.93	23.68	1.89	1.89	0.99
Main	11462.4*	5-yr SBCFCD	620.00	2847.58	2849.75	0.008938	15.62	15.62	39.69	21.52	2.03	2.03	0.97
Main	11462.4*	2-yr SBCFCD	380.00	2847.58	2849.09	0.011851	14.61	14.61	26.00	19.52	2.23	2.23	0.94
Main	11179.5*	100-yr SBCFCD	1960.00	2844.72	2849.13	0.007235	20.59	20.59	95.19	28.22	1.98	1.98	1.39
Main	11179.5*	100-yr FIS	1700.00	2844.72	2848.91	0.006517	19.04	19.04	89.28	27.58	1.86	1.86	1.21
Main	11179.5*	50-yr FIS	1000.00	2844.72	2847.69	0.007794	17.31	17.31	57.76	23.91	1.96	1.96	1.09
Main	11179.5*	10-yr FIS	150.00	2844.72	2845.68	0.008479	9.49	9.49	15.81	17.88	1.78	1.78	0.45
Main	11179.5*	10-yr SBCFCD	920.00	2844.72	2847.44	0.008996	17.73	17.73	51.89	23.16	2.09	2.09	1.17
Main	11179.5*	5-yr SBCFCD	620.00	2844.72	2846.84	0.009807	16.12	16.12	38.46	21.35	2.12	2.12	1.04
Main	11179.5*	2-yr SBCFCD	380.00	2844.72	2846.31	0.009830	13.73	13.73	27.67	19.77	2.05	2.05	0.82
Main	10896.7*	100-yr SBCFCD	1960.00	2841.86	2846.08	0.008435	21.75	21.75	90.13	27.67	2.12	2.12	1.57
Main	10896.7*	100-yr FIS	1700.00	2841.86	2845.81	0.008137	20.60	20.60	82.53	26.84	2.07	2.07	1.43
Main	10896.7*	50-yr FIS	1000.00	2841.86	2844.70	0.009166	18.31	18.31	54.61	23.51	2.12	2.12	1.24
Main	10896.7*	10-yr FIS	150.00	2841.86	2842.76	0.010618	10.20	10.20	14.70	17.70	1.97	1.97	0.53
Main	10896.7*	10-yr SBCFCD	920.00	2841.86	2844.52	0.009678	18.18	18.18	50.60	22.99	2.16	2.16	1.24
Main	10896.7*	5-yr SBCFCD	620.00	2841.86	2843.96	0.010018	16.24	16.24	38.18	21.31	2.14	2.14	1.06
Main	10896.7*	2-yr SBCFCD	380.00	2841.86	2843.44	0.010087	13.85	13.85	27.43	19.74	2.07	2.07	0.83
Main	10720.4	100-yr SBCFCD	1960.00	2839.50	2850.40	0.000029	2.43	2.43	806.37	99.21	0.15	0.15	0.01
Main	10720.4	100-yr FIS	1700.00	2839.50	2850.53	0.000021	2.08	2.08	818.62	99.58	0.13	0.13	0.01

Main	10720.4	50-yr FIS	1000.00	2839.50	2847.32	0.000027	1.92	1.92	520.86	85.23	0.14	0.14	0.01
Main	10720.4	10-yr FIS	150.00	2839.50	2841.65	0.000055	1.32	1.32	113.90	58.21	0.17	0.17	0.01
Main	10720.4	10-yr SBCFCD	920.00	2839.50	2846.46	0.000034	2.05	2.05	449.53	81.15	0.15	0.15	0.01
Main	10720.4	5-yr SBCFCD	620.00	2839.50	2844.98	0.000037	1.85	1.85	334.76	74.11	0.15	0.15	0.01
Main	10720.4	2-yr SBCFCD	380.00	2839.50	2843.52	0.000041	1.64	1.64	231.67	67.16	0.16	0.16	0.01
Main	10694.4		Culvert										
Main	10659.4	100-yr SBCFCD	1960.00	2839.50	2849.77	0.000037	2.64	2.64	743.78	96.89	0.17	0.17	0.02
Main	10659.4	100-yr FIS	1700.00	2839.50	2850.05	0.000025	2.20	2.20	771.00	98.14	0.14	0.14	0.01
Main	10659.4	50-yr FIS	1000.00	2839.50	2847.12	0.000029	1.99	1.99	503.71	84.27	0.14	0.14	0.01
Main	10659.4	10-yr FIS	150.00	2839.50	2841.59	0.000061	1.36	1.36	110.58	57.94	0.17	0.17	0.01
Main	10659.4	10-yr SBCFCD	920.00	2839.50	2846.25	0.000038	2.13	2.13	432.09	80.12	0.16	0.16	0.01
Main	10659.4	5-yr SBCFCD	620.00	2839.50	2844.83	0.000040	1.92	1.92	323.49	73.38	0.16	0.16	0.01
Main	10659.4	2-yr SBCFCD	380.00	2839.50	2843.42	0.000045	1.69	1.69	224.74	66.67	0.16	0.16	0.01
Main	10613.9	100-yr SBCFCD	2590.00	2839.00	2847.15	0.001214	11.68	11.68	221.71	39.00	0.86	0.86	0.38
Main	10613.9	100-yr FIS	2700.00	2839.00	2847.32	0.001205	11.81	11.81	228.54	39.00	0.86	0.86	0.39
Main	10613.9	50-yr FIS	1500.00	2839.00	2845.01	0.001329	10.39	10.39	144.40	33.04	0.88	0.88	0.33
Main	10613.9	10-yr FIS	200.00	2839.00	2840.67	0.002306	6.84	6.84	29.24	20.01	1.00	1.00	0.20
Main	10613.9	10-yr SBCFCD	1220.00	2839.00	2844.32	0.001389	9.97	9.97	122.39	30.97	0.88	0.88	0.31
Main	10613.9	5-yr SBCFCD	820.00	2839.00	2843.17	0.001545	9.24	9.24	88.70	27.52	0.91	0.91	0.28
Main	10613.9	2-yr SBCFCD	500.00	2839.00	2842.02	0.001826	8.46	8.46	59.08	24.07	0.95	0.95	0.26
Main	10525	100-yr SBCFCD	2590.00	2838.30	2847.21	0.000837	10.31	10.31	251.29	39.00	0.72	0.72	0.29
Main	10525	100-yr FIS	2700.00	2838.30	2847.38	0.000840	10.46	10.46	258.09	39.00	0.72	0.72	0.29
Main	10525	50-yr FIS	1500.00	2838.30	2845.05	0.000853	8.84	8.84	169.59	35.25	0.71	0.71	0.23
Main	10525	10-yr FIS	200.00	2838.30	2840.46	0.000948	5.07	5.07	39.44	21.49	0.66	0.66	0.10
Main	10525	10-yr SBCFCD	1220.00	2838.30	2844.35	0.000858	8.37	8.37	145.69	33.15	0.70	0.70	0.21
Main	10525	5-yr SBCFCD	820.00	2838.30	2843.18	0.000871	7.54	7.54	108.81	29.63	0.69	0.69	0.18
Main	10525	2-yr SBCFCD	500.00	2838.30	2842.00	0.000891	6.58	6.58	75.93	26.09	0.68	0.68	0.15
Main	10517	100-yr SBCFCD	2590.00	2836.40	2847.65	0.000405	8.07	8.07	320.97	39.00	0.50	0.50	0.17
Main	10517	100-yr FIS	2700.00	2836.40	2847.83	0.000414	8.23	8.23	328.00	39.00	0.50	0.50	0.17
Main	10517	50-yr FIS	1500.00	2836.40	2845.46	0.000325	6.35	6.35	236.24	37.18	0.44	0.44	0.11
Main	10517	10-yr FIS	200.00	2836.40	2840.68	0.000093	2.31	2.31	86.67	25.49	0.22	0.22	0.02
Main	10517	10-yr SBCFCD	1220.00	2836.40	2844.74	0.000295	5.80	5.80	210.29	35.43	0.42	0.42	0.09
Main	10517	5-yr SBCFCD	820.00	2836.40	2843.54	0.000241	4.84	4.84	169.38	32.47	0.37	0.37	0.07
Main	10517	2-yr SBCFCD	500.00	2836.40	2842.31	0.000181	3.81	3.81	131.33	29.47	0.32	0.32	0.04
Main	10515		Lat Struct										
Main	10513	100-yr SBCFCD	2590.00	2836.40	2847.64	0.000406	8.07	8.07	320.87	39.00	0.50	0.50	0.17
Main	10513	100-yr FIS	2700.00	2836.40	2847.82	0.000414	8.23	8.23	327.90	39.00	0.50	0.50	0.17
Main	10513	50-yr FIS	1500.00	2836.40	2845.45	0.000325	6.35	6.35	236.17	37.17	0.44	0.44	0.11
Main	10513	10-yr FIS	200.00	2836.40	2840.68	0.000093	2.31	2.31	86.66	25.48	0.22	0.22	0.02
Main	10513	10-yr SBCFCD	1220.00	2836.40	2844.74	0.000295	5.80	5.80	210.23	35.42	0.42	0.42	0.09
Main	10513	5-yr SBCFCD	820.00	2836.40	2843.53	0.000241	4.84	4.84	169.33	32.47	0.37	0.37	0.07
Main	10513	2-yr SBCFCD	500.00	2836.40	2842.31	0.000181	3.81	3.81	131.31	29.46	0.32	0.32	0.04
Main	10505	100-yr SBCFCD	2590.00	2838.30	2845.86	0.001642	13.02	13.02	198.98	37.67	1.00	1.00	0.48
Main	10505	100-yr FIS	2700.00	2838.30	2846.04	0.001624	13.11	13.11	205.96	38.22	1.00	1.00	0.49
Main	10505	50-yr FIS	1500.00	2838.30	2843.90	0.001742	11.46	11.46	130.91	31.79	1.00	1.00	0.40
Main	10505	10-yr FIS	200.00	2838.30	2839.96	0.002342	6.88	6.88	29.09	19.99	1.00	1.00	0.20
Main	10505	10-yr SBCFCD	1220.00	2838.30	2843.28	0.001779	10.89	10.89	111.99	29.95	0.99	0.99	0.38
Main	10505	5-yr SBCFCD	820.00	2838.30	2842.25	0.001878	9.91	9.91	82.76	26.86	0.99	0.99	0.33
Main	10505	2-yr SBCFCD	500.00	2838.30	2841.25	0.001999	8.73	8.73	57.26	23.84	0.99	0.99	0.28
Main	10344.4*	100-yr SBCFCD	2590.00	2836.93	2842.99	0.003837	17.73	17.73	146.08	33.19	1.49	1.49	0.95
Main	10344.4*	100-yr FIS	2700.00	2836.93	2843.15	0.003791	17.86	17.86	151.20	33.65	1.48	1.48	0.96
Main	10344.4*	50-yr FIS	1500.00	2836.93	2841.25	0.004542	16.15	16.15	92.86	27.97	1.56	1.56	0.86
Main	10344.4*	10-yr FIS	200.00	2836.93	2838.02	0.009771	11.00	11.00	18.19	18.28	1.94	1.94	0.59
Main	10344.4*	10-yr SBCFCD	1220.00	2836.93	2840.72	0.004862	15.58	15.58	78.31	26.36	1.59	1.59	0.83
Main	10344.4*	5-yr SBCFCD	820.00	2836.93	2839.84	0.005602	14.53	14.53	56.44	23.74	1.66	1.66	0.77
Main	10344.4*	2-yr SBCFCD	500.00	2836.93	2839.01	0.006754	13.25	13.25	37.72	21.24	1.75	1.75	0.71
Main	10075*	100-yr SBCFCD	2590.00	2834.85	2840.43	0.005244	19.85	19.85	130.47	31.75	1.73	1.73	1.22
Main	10075*	100-yr FIS	2700.00	2834.85	2840.57	0.005189	20.01	20.01	134.96	32.17	1.72	1.72	1.23
Main	10075*	50-yr FIS	1500.00	2834.85	2838.85	0.006041	17.87	17.87	83.93	26.99	1.79	1.79	1.08
Main	10075*	10-yr FIS	200.00	2834.85	2836.05	0.007044	9.89	9.89	20.23	18.61	1.67	1.67	0.46
Main	10075*	10-yr SBCFCD	1220.00	2834.85	2838.36	0.006364	17.13	17.13	71.23	25.54	1.81	1.81	1.02

Main	10075*	5-yr SBCFCD	820.00	2834.85	2837.59	0.006943	15.65	15.65	52.41	23.23	1.84	1.84	0.91
Main	10075*	2-yr SBCFCD	500.00	2834.85	2836.87	0.007502	13.73	13.73	36.41	21.06	1.84	1.84	0.77
Main	9805.55*	100-yr SBCFCD	2590.00	2832.77	2838.13	0.006111	20.98	20.98	123.47	31.08	1.85	1.85	1.37
Main	9805.55*	100-yr FIS	2700.00	2832.77	2838.26	0.006056	21.15	21.15	127.64	31.48	1.85	1.85	1.39
Main	9805.55*	50-yr FIS	1500.00	2832.77	2836.64	0.006811	18.65	18.65	80.44	26.60	1.89	1.89	1.18
Main	9805.55*	10-yr FIS	200.00	2832.77	2833.94	0.007816	10.23	10.23	19.56	18.50	1.75	1.75	0.50
Main	9805.55*	10-yr SBCFCD	1220.00	2832.77	2836.18	0.007055	17.76	17.76	68.70	25.24	1.90	1.90	1.11
Main	9805.55*	5-yr SBCFCD	820.00	2832.77	2835.46	0.007426	16.01	16.01	51.20	23.07	1.89	1.89	0.96
Main	9805.55*	2-yr SBCFCD	500.00	2832.77	2834.78	0.007664	13.83	13.83	36.14	21.02	1.86	1.86	0.78
Main	9575	100-yr SBCFCD	2590.00	2830.30	2833.10	0.014222	24.78	24.78	104.52	37.67	2.62	2.62	2.18
Main	9575	100-yr FIS	2700.00	2830.30	2833.19	0.013954	25.01	25.01	107.96	37.69	2.60	2.60	2.20
Main	9575	50-yr FIS	1500.00	2830.30	2832.16	0.017734	21.67	21.67	69.22	37.44	2.81	2.81	1.88
Main	9575	10-yr FIS	200.00	2830.30	2830.80	0.023771	10.87	10.87	18.40	37.12	2.72	2.72	0.72
Main	9575	10-yr SBCFCD	1220.00	2830.30	2831.90	0.019008	20.48	20.48	59.58	37.38	2.86	2.86	1.76
Main	9575	5-yr SBCFCD	820.00	2830.30	2831.52	0.021071	18.16	18.16	45.16	37.29	2.91	2.91	1.51
Main	9575	2-yr SBCFCD	500.00	2830.30	2831.18	0.022847	15.37	15.37	32.53	37.21	2.90	2.90	1.20
Main	9536.1	100-yr SBCFCD	2590.00	2830.00	2838.73	0.000287	6.60	6.60	392.71	45.00	0.39	0.39	0.11
Main	9536.1	100-yr FIS	2700.00	2830.00	2838.92	0.000292	6.73	6.73	401.41	45.00	0.40	0.40	0.12
Main	9536.1	50-yr FIS	1500.00	2830.00	2836.11	0.000281	5.45	5.45	274.99	45.00	0.39	0.39	0.08
Main	9536.1	10-yr FIS	200.00	2830.00	2831.43	0.000497	3.10	3.10	64.41	45.00	0.46	0.46	0.04
Main	9536.1	10-yr SBCFCD	1220.00	2830.00	2835.32	0.000285	5.10	5.10	239.16	45.00	0.39	0.39	0.08
Main	9536.1	5-yr SBCFCD	820.00	2830.00	2833.96	0.000321	4.60	4.60	178.17	45.00	0.41	0.41	0.07
Main	9536.1	2-yr SBCFCD	500.00	2830.00	2830.80	0.020742	13.87	13.87	36.05	45.00	2.73	2.73	1.00
Main	9525.6		Culvert										
Main	9515.1	100-yr SBCFCD	2620.00	2830.00	2837.84	0.000404	7.43	7.43	352.63	45.00	0.47	0.47	0.15
Main	9515.1	100-yr FIS	2700.00	2830.00	2837.99	0.000406	7.51	7.51	359.34	45.00	0.47	0.47	0.15
Main	9515.1	50-yr FIS	1500.00	2830.00	2835.48	0.000392	6.08	6.08	246.56	45.00	0.46	0.46	0.11
Main	9515.1	10-yr FIS	200.00	2830.00	2830.85	0.002694	5.21	5.21	38.41	45.00	0.99	0.99	0.14
Main	9515.1	10-yr SBCFCD	1230.00	2830.00	2834.75	0.000409	5.75	5.75	213.84	45.00	0.47	0.47	0.10
Main	9515.1	5-yr SBCFCD	830.00	2830.00	2833.46	0.000502	5.33	5.33	155.78	45.00	0.50	0.50	0.09
Main	9515.1	2-yr SBCFCD	510.00	2830.00	2831.57	0.002386	7.07	7.07	70.70	45.00	0.99	0.99	0.22
Main	9355.33*	100-yr SBCFCD	2620.00	2828.00	2835.49	0.001623	12.87	12.87	203.64	39.35	1.00	1.00	0.47
Main	9355.33*	100-yr FIS	2700.00	2828.00	2835.59	0.001636	13.01	13.01	207.53	39.67	1.00	1.00	0.48
Main	9355.33*	50-yr FIS	1500.00	2828.00	2833.53	0.001726	11.31	11.31	132.67	32.97	0.99	0.99	0.40
Main	9355.33*	10-yr FIS	200.00	2828.00	2829.35	0.004699	8.61	8.61	23.22	19.39	1.39	1.39	0.34
Main	9355.33*	10-yr SBCFCD	1230.00	2828.00	2832.94	0.001778	10.81	10.81	113.75	31.05	1.00	1.00	0.37
Main	9355.33*	5-yr SBCFCD	830.00	2828.00	2831.95	0.001860	9.82	9.82	84.51	27.83	0.99	0.99	0.33
Main	9355.33*	2-yr SBCFCD	510.00	2828.00	2830.96	0.001998	8.71	8.71	58.53	24.61	1.00	1.00	0.28
Main	9195.56*	100-yr SBCFCD	2620.00	2826.00	2832.03	0.003918	17.84	17.84	146.84	33.74	1.51	1.51	0.96
Main	9195.56*	100-yr FIS	2700.00	2826.00	2832.14	0.003881	17.93	17.93	150.60	34.09	1.50	1.50	0.97
Main	9195.56*	50-yr FIS	1500.00	2826.00	2830.23	0.004814	16.42	16.42	91.34	28.17	1.61	1.61	0.90
Main	9195.56*	10-yr FIS	200.00	2826.00	2827.04	0.011404	11.54	11.54	17.33	18.24	2.09	2.09	0.65
Main	9195.56*	10-yr SBCFCD	1230.00	2826.00	2829.71	0.005229	15.96	15.96	77.07	26.54	1.65	1.65	0.88
Main	9195.56*	5-yr SBCFCD	830.00	2826.00	2828.85	0.006163	15.02	15.02	55.27	23.85	1.74	1.74	0.83
Main	9195.56*	2-yr SBCFCD	510.00	2826.00	2828.02	0.007709	13.91	13.91	36.67	21.29	1.87	1.87	0.79
Main	9035.8	100-yr SBCFCD	2620.00	2824.00	2833.21	0.000250	6.32	6.32	414.55	45.00	0.37	0.37	0.10
Main	9035.8	100-yr FIS	2700.00	2824.00	2833.38	0.000252	6.40	6.40	421.86	45.00	0.37	0.37	0.10
Main	9035.8	50-yr FIS	1500.00	2824.00	2830.60	0.000223	5.05	5.05	296.83	45.00	0.35	0.35	0.07
Main	9035.8	10-yr FIS	200.00	2824.00	2824.41	0.029392	10.75	10.75	18.61	45.00	2.94	2.94	0.75
Main	9035.8	10-yr SBCFCD	1230.00	2824.00	2829.81	0.000220	4.70	4.70	261.60	45.00	0.34	0.34	0.06
Main	9035.8	5-yr SBCFCD	830.00	2824.00	2828.46	0.000226	4.13	4.13	200.84	45.00	0.34	0.34	0.05
Main	9035.8	2-yr SBCFCD	510.00	2824.00	2827.13	0.000262	3.63	3.63	140.68	45.00	0.36	0.36	0.04
Main	9020.399		Culvert										
Main	9005	100-yr SBCFCD	2620.00	2824.00	2832.43	0.000325	6.90	6.90	379.49	45.00	0.42	0.42	0.12
Main	9005	100-yr FIS	2700.00	2824.00	2832.57	0.000329	7.00	7.00	385.80	45.00	0.42	0.42	0.13
Main	9005	50-yr FIS	1500.00	2824.00	2830.10	0.000282	5.46	5.46	274.61	45.00	0.39	0.39	0.08
Main	9005	10-yr FIS	200.00	2824.00	2824.85	0.002694	5.21	5.21	38.41	45.00	0.99	0.99	0.14
Main	9005	10-yr SBCFCD	1230.00	2824.00	2829.39	0.000278	5.08	5.08	242.34	45.00	0.39	0.39	0.08
Main	9005	5-yr SBCFCD	830.00	2824.00	2828.14	0.000286	4.46	4.46	186.27	45.00	0.39	0.39	0.06
Main	9005	2-yr SBCFCD	510.00	2824.00	2826.86	0.000347	3.96	3.96	128.74	45.00	0.41	0.41	0.05

Main	8885	100-yr SBCFCD	2620.00	2822.90	2831.72	0.000593	8.97	8.97	292.00	44.00	0.61	0.61	0.21
Main	8885	100-yr FIS	2700.00	2822.90	2831.85	0.000594	9.06	9.06	297.85	44.00	0.61	0.61	0.22
Main	8885	50-yr FIS	1500.00	2822.90	2829.48	0.000601	7.63	7.63	196.60	39.74	0.60	0.60	0.17
Main	8885	10-yr FIS	200.00	2822.90	2824.96	0.000648	4.20	4.20	47.60	26.18	0.55	0.55	0.07
Main	8885	10-yr SBCFCD	1230.00	2822.90	2828.81	0.000602	7.22	7.22	170.45	37.72	0.60	0.60	0.16
Main	8885	5-yr SBCFCD	830.00	2822.90	2827.66	0.000602	6.43	6.43	129.04	34.27	0.58	0.58	0.13
Main	8885	2-yr SBCFCD	510.00	2822.90	2826.49	0.000616	5.59	5.59	91.19	30.78	0.57	0.57	0.11
Main	8877	100-yr SBCFCD	2620.00	2821.00	2831.94	0.000310	7.23	7.23	362.34	44.00	0.44	0.44	0.13
Main	8877	100-yr FIS	2700.00	2821.00	2832.07	0.000314	7.33	7.33	368.26	44.00	0.45	0.45	0.13
Main	8877	50-yr FIS	1500.00	2821.00	2829.68	0.000247	5.66	5.66	264.91	41.04	0.39	0.39	0.09
Main	8877	10-yr FIS	200.00	2821.00	2825.07	0.000066	1.97	1.97	101.36	29.86	0.19	0.19	0.01
Main	8877	10-yr SBCFCD	1230.00	2821.00	2829.00	0.000224	5.18	5.18	237.56	39.39	0.37	0.37	0.07
Main	8877	5-yr SBCFCD	830.00	2821.00	2827.83	0.000182	4.30	4.30	193.18	36.56	0.33	0.33	0.05
Main	8877	2-yr SBCFCD	510.00	2821.00	2826.64	0.000136	3.37	3.37	151.49	33.68	0.28	0.28	0.03
Main	8875		Lat Struct										
Main	8873	100-yr SBCFCD	2620.00	2821.00	2831.93	0.000310	7.23	7.23	362.26	44.00	0.44	0.44	0.13
Main	8873	100-yr FIS	2700.00	2821.00	2832.07	0.000314	7.33	7.33	368.18	44.00	0.45	0.45	0.14
Main	8873	50-yr FIS	1500.00	2821.00	2829.68	0.000247	5.66	5.66	264.86	41.04	0.39	0.39	0.09
Main	8873	10-yr FIS	200.00	2821.00	2825.07	0.000066	1.97	1.97	101.36	29.86	0.19	0.19	0.01
Main	8873	10-yr SBCFCD	1230.00	2821.00	2829.00	0.000224	5.18	5.18	237.51	39.39	0.37	0.37	0.07
Main	8873	5-yr SBCFCD	830.00	2821.00	2827.83	0.000182	4.30	4.30	193.16	36.56	0.33	0.33	0.05
Main	8873	2-yr SBCFCD	510.00	2821.00	2826.64	0.000136	3.37	3.37	151.48	33.68	0.28	0.28	0.03
Main	8865	100-yr SBCFCD	2620.00	2822.90	2829.70	0.001620	12.75	12.75	205.49	40.41	1.00	1.00	0.47
Main	8865	100-yr FIS	2700.00	2822.90	2829.82	0.001612	12.84	12.84	210.35	40.77	1.00	1.00	0.47
Main	8865	50-yr FIS	1500.00	2822.90	2827.82	0.001735	11.13	11.13	134.83	34.77	1.00	1.00	0.39
Main	8865	10-yr FIS	200.00	2822.90	2824.30	0.002405	6.46	6.46	30.97	24.20	1.01	1.01	0.19
Main	8865	10-yr SBCFCD	1230.00	2822.90	2827.28	0.001780	10.58	10.58	116.26	33.13	1.00	1.00	0.36
Main	8865	5-yr SBCFCD	830.00	2822.90	2826.33	0.001925	9.63	9.63	86.15	30.28	1.01	1.01	0.32
Main	8865	2-yr SBCFCD	510.00	2822.90	2825.46	0.002006	8.36	8.36	61.00	27.68	0.99	0.99	0.26
Main	8756.22*	100-yr SBCFCD	2620.00	2821.60	2828.85	0.001977	13.97	13.97	187.50	36.74	1.09	1.09	0.56
Main	8756.22*	100-yr FIS	2700.00	2821.60	2828.96	0.001973	14.08	14.08	191.80	37.09	1.09	1.09	0.57
Main	8756.22*	50-yr FIS	1500.00	2821.60	2826.71	0.002454	12.96	12.96	115.72	30.32	1.17	1.17	0.53
Main	8756.22*	10-yr FIS	200.00	2821.60	2822.82	0.006715	9.73	9.73	20.55	18.66	1.63	1.63	0.44
Main	8756.22*	10-yr SBCFCD	1230.00	2821.60	2826.09	0.002667	12.62	12.62	97.46	28.46	1.20	1.20	0.52
Main	8756.22*	5-yr SBCFCD	830.00	2821.60	2825.04	0.003185	11.98	11.98	69.31	25.31	1.28	1.28	0.50
Main	8756.22*	2-yr SBCFCD	510.00	2821.60	2824.04	0.004030	11.19	11.19	45.58	22.33	1.38	1.38	0.48
Main	8507.43*	100-yr SBCFCD	2620.00	2819.20	2825.10	0.004343	18.60	18.60	140.84	32.71	1.58	1.58	1.05
Main	8507.43*	100-yr FIS	2700.00	2819.20	2825.21	0.004302	18.69	18.69	144.43	33.04	1.58	1.58	1.06
Main	8507.43*	50-yr FIS	1500.00	2819.20	2823.34	0.005336	17.10	17.10	87.70	27.41	1.69	1.69	0.98
Main	8507.43*	10-yr FIS	200.00	2819.20	2820.29	0.009741	10.99	10.99	18.21	18.28	1.94	1.94	0.58
Main	8507.43*	10-yr SBCFCD	1230.00	2819.20	2822.84	0.005726	16.54	16.54	74.35	25.91	1.72	1.72	0.95
Main	8507.43*	5-yr SBCFCD	830.00	2819.20	2822.00	0.006645	15.47	15.47	53.65	23.39	1.80	1.80	0.89
Main	8507.43*	2-yr SBCFCD	510.00	2819.20	2821.21	0.007894	14.06	14.06	36.27	21.04	1.89	1.89	0.80
Main	8258.66*	100-yr SBCFCD	2620.00	2816.80	2822.28	0.005766	20.61	20.61	127.13	31.43	1.81	1.81	1.32
Main	8258.66*	100-yr FIS	2700.00	2816.80	2822.38	0.005713	20.71	20.71	130.35	31.74	1.80	1.80	1.32
Main	8258.66*	50-yr FIS	1500.00	2816.80	2820.65	0.006899	18.73	18.73	80.08	26.56	1.90	1.90	1.19
Main	8258.66*	10-yr FIS	200.00	2816.80	2817.90	0.009567	10.92	10.92	18.31	18.30	1.92	1.92	0.58
Main	8258.66*	10-yr SBCFCD	1230.00	2816.80	2820.20	0.007300	18.02	18.02	68.28	25.19	1.93	1.93	1.14
Main	8258.66*	5-yr SBCFCD	830.00	2816.80	2819.44	0.008152	16.60	16.60	50.00	22.91	1.98	1.98	1.04
Main	8258.66*	2-yr SBCFCD	510.00	2816.80	2818.74	0.009011	14.70	14.70	34.68	20.81	2.01	2.01	0.89
Main	8009.88*	100-yr SBCFCD	2620.00	2814.40	2819.64	0.006803	21.87	21.87	119.78	30.72	1.95	1.95	1.50
Main	8009.88*	100-yr FIS	2700.00	2814.40	2819.74	0.006743	21.99	21.99	122.79	31.01	1.95	1.95	1.51
Main	8009.88*	50-yr FIS	1500.00	2814.40	2818.11	0.007891	19.64	19.64	76.37	26.14	2.02	2.02	1.33
Main	8009.88*	10-yr FIS	200.00	2814.40	2815.50	0.009654	10.95	10.95	18.26	18.29	1.93	1.93	0.58
Main	8009.88*	10-yr SBCFCD	1230.00	2814.40	2817.68	0.008249	18.80	18.80	65.42	24.85	2.04	2.04	1.26
Main	8009.88*	5-yr SBCFCD	830.00	2814.40	2816.97	0.008903	17.11	17.11	48.51	22.72	2.06	2.06	1.11
Main	8009.88*	2-yr SBCFCD	510.00	2814.40	2816.31	0.009418	14.92	14.92	34.17	20.74	2.05	2.05	0.92
Main	7800	100-yr SBCFCD	2620.00	2811.50	2814.27	0.015110	25.37	25.37	103.28	37.62	2.70	2.70	2.29
Main	7800	100-yr FIS	2700.00	2811.50	2814.34	0.014860	25.51	25.51	105.82	37.63	2.68	2.68	2.30
Main	7800	50-yr FIS	1500.00	2811.50	2813.30	0.019681	22.39	22.39	67.01	37.40	2.95	2.95	2.03
Main	7800	10-yr FIS	200.00	2811.50	2811.97	0.029020	11.55	11.55	17.32	37.10	2.98	2.98	0.83
Main	7800	10-yr SBCFCD	1230.00	2811.50	2813.06	0.021275	21.27	21.27	57.83	37.35	3.01	3.01	1.91

Main	7800	5-yr SBCFCD	830.00	2811.50	2812.68	0.024182	19.03	19.03	43.61	37.26	3.10	3.10	1.67
Main	7800	2-yr SBCFCD	510.00	2811.50	2812.35	0.026844	16.27	16.27	31.34	37.19	3.12	3.12	1.36
Main	7761.1	100-yr SBCFCD	2620.00	2811.00	2813.27	0.019325	25.71	25.71	101.92	45.00	3.01	3.01	2.48
Main	7761.1	100-yr FIS	2700.00	2811.00	2813.32	0.019004	25.86	25.86	104.39	45.00	2.99	2.99	2.49
Main	7761.1	50-yr FIS	1500.00	2811.00	2812.50	0.024131	22.26	22.26	67.38	45.00	3.21	3.21	2.12
Main	7761.1	10-yr FIS	200.00	2811.00	2811.48	0.017458	9.18	9.18	21.79	45.00	2.33	2.33	0.52
Main	7761.1	10-yr SBCFCD	1230.00	2811.00	2812.31	0.024914	20.83	20.83	59.06	45.00	3.20	3.20	1.93
Main	7761.1	5-yr SBCFCD	830.00	2811.00	2812.03	0.025181	17.94	17.94	46.27	45.00	3.12	3.12	1.55
Main	7761.1	2-yr SBCFCD	510.00	2811.00	2811.78	0.023573	14.53	14.53	35.09	45.00	2.90	2.90	1.11
Main	7749.9		Culvert										
Main	7738.6	100-yr SBCFCD	2970.00	2811.00	2815.75	0.002396	12.27	12.27	213.55	45.00	0.99	0.99	0.59
Main	7738.6	100-yr FIS	2700.00	2811.00	2815.81	0.001899	12.47	12.47	216.44	45.00	1.00	1.00	0.47
Main	7738.6	50-yr FIS	1500.00	2811.00	2814.28	0.001951	10.17	10.17	147.46	45.00	0.99	0.99	0.35
Main	7738.6	10-yr FIS	200.00	2811.00	2811.85	0.002719	5.22	5.22	38.30	45.00	1.00	1.00	0.14
Main	7738.6	10-yr SBCFCD	1400.00	2811.00	2813.87	0.002589	9.53	9.53	129.13	45.00	0.99	0.99	0.41
Main	7738.6	5-yr SBCFCD	930.00	2811.00	2813.21	0.002650	8.36	8.36	99.27	45.00	0.99	0.99	0.33
Main	7738.6	2-yr SBCFCD	570.00	2811.00	2812.59	0.002847	7.11	7.11	71.71	45.00	0.99	0.99	0.26
Main	7700	100-yr SBCFCD	2970.00	2810.60	2816.26	0.001932	13.46	13.46	220.65	39.00	1.00	1.00	0.53
Main	7700	100-yr FIS	2700.00	2810.60	2815.91	0.001932	13.03	13.03	207.24	39.00	1.00	1.00	0.50
Main	7700	50-yr FIS	1500.00	2810.60	2814.20	0.001986	10.69	10.69	140.37	39.00	0.99	0.99	0.38
Main	7700	10-yr FIS	200.00	2810.60	2811.54	0.002613	5.44	5.44	36.75	39.00	0.99	0.99	0.15
Main	7700	10-yr SBCFCD	1400.00	2810.60	2814.04	0.001996	10.44	10.44	134.10	39.00	0.99	0.99	0.36
Main	7700	5-yr SBCFCD	930.00	2810.60	2813.22	0.002078	9.10	9.10	102.17	39.00	0.99	0.99	0.30
Main	7700	2-yr SBCFCD	570.00	2810.60	2812.48	0.002272	7.79	7.79	73.13	39.00	1.00	1.00	0.24
Main	7500.*	100-yr SBCFCD	2970.00	2809.00	2813.44	0.004047	17.14	17.14	173.29	39.00	1.43	1.43	0.91
Main	7500.*	100-yr FIS	2700.00	2809.00	2813.14	0.004174	16.74	16.74	161.31	39.00	1.45	1.45	0.89
Main	7500.*	50-yr FIS	1500.00	2809.00	2811.65	0.005193	14.50	14.50	103.46	39.00	1.57	1.57	0.76
Main	7500.*	10-yr FIS	200.00	2809.00	2809.58	0.012717	8.81	8.81	22.70	39.00	2.04	2.04	0.45
Main	7500.*	10-yr SBCFCD	1400.00	2809.00	2811.52	0.005344	14.26	14.26	98.18	39.00	1.58	1.58	0.74
Main	7500.*	5-yr SBCFCD	930.00	2809.00	2810.85	0.006350	12.91	12.91	72.04	39.00	1.67	1.67	0.67
Main	7500.*	2-yr SBCFCD	570.00	2809.00	2810.27	0.007933	11.47	11.47	49.69	39.00	1.79	1.79	0.59
Main	7305	100-yr SBCFCD	2970.00	2807.30	2815.08	0.000745	9.79	9.79	303.31	39.00	0.62	0.62	0.26
Main	7305	100-yr FIS	2700.00	2807.30	2811.08	0.005526	18.32	18.32	147.39	39.00	1.66	1.66	1.09
Main	7305	50-yr FIS	1500.00	2807.30	2809.74	0.006746	15.74	15.74	95.29	39.00	1.77	1.77	0.91
Main	7305	10-yr FIS	200.00	2807.30	2808.00	0.006811	7.29	7.29	27.44	39.00	1.53	1.53	0.29
Main	7305	10-yr SBCFCD	1400.00	2807.30	2809.62	0.006891	15.44	15.44	90.64	39.00	1.79	1.79	0.89
Main	7305	5-yr SBCFCD	930.00	2807.30	2809.04	0.007754	13.74	13.74	67.71	39.00	1.84	1.84	0.77
Main	7305	2-yr SBCFCD	570.00	2807.30	2808.55	0.008523	11.73	11.73	48.61	39.00	1.85	1.85	0.62
Main	7266.9	100-yr SBCFCD	2970.00	2807.00	2815.43	0.000418	7.83	7.83	379.35	45.00	0.48	0.48	0.16
Main	7266.9	100-yr FIS	2700.00	2807.00	2814.69	0.000454	7.80	7.80	346.12	45.00	0.50	0.50	0.16
Main	7266.9	50-yr FIS	1500.00	2807.00	2812.10	0.000489	6.54	6.54	229.53	45.00	0.51	0.51	0.13
Main	7266.9	10-yr FIS	200.00	2807.00	2808.26	0.000748	3.52	3.52	56.81	45.00	0.55	0.55	0.06
Main	7266.9	10-yr SBCFCD	1400.00	2807.00	2812.00	0.000454	6.23	6.23	224.81	45.00	0.49	0.49	0.12
Main	7266.9	5-yr SBCFCD	930.00	2807.00	2810.62	0.000546	5.71	5.71	163.00	45.00	0.53	0.53	0.11
Main	7266.9	2-yr SBCFCD	570.00	2807.00	2808.05	0.011023	12.04	12.04	47.34	45.00	2.07	2.07	0.69
Main	7249.1		Culvert										
Main	7231.3	100-yr SBCFCD	3150.00	2807.00	2814.85	0.000582	8.92	8.92	353.13	45.00	0.56	0.56	0.21
Main	7231.3	100-yr FIS	2700.00	2807.00	2814.08	0.000583	8.48	8.48	318.44	45.00	0.56	0.56	0.20
Main	7231.3	50-yr FIS	1500.00	2807.00	2811.64	0.000655	7.18	7.18	208.83	45.00	0.59	0.59	0.16
Main	7231.3	10-yr FIS	200.00	2807.00	2807.85	0.002740	5.23	5.23	38.21	45.00	1.00	1.00	0.14
Main	7231.3	10-yr SBCFCD	1480.00	2807.00	2811.59	0.000659	7.16	7.16	206.59	45.00	0.59	0.59	0.16
Main	7231.3	5-yr SBCFCD	990.00	2807.00	2810.20	0.000915	6.87	6.87	144.03	45.00	0.68	0.68	0.16
Main	7231.3	2-yr SBCFCD	610.00	2807.00	2808.72	0.002556	7.37	7.37	77.30	45.00	0.99	0.99	0.25
Main	7187.1	100-yr SBCFCD	3150.00	2806.60	2814.04	0.000958	10.86	10.86	289.95	39.00	0.70	0.70	0.32
Main	7187.1	100-yr FIS	2700.00	2806.60	2813.40	0.000916	10.18	10.18	265.34	39.00	0.69	0.69	0.29
Main	7187.1	50-yr FIS	1500.00	2806.60	2811.29	0.000873	8.20	8.20	182.99	39.00	0.67	0.67	0.21
Main	7187.1	10-yr FIS	200.00	2806.60	2807.39	0.004761	6.54	6.54	30.60	39.00	1.30	1.30	0.22
Main	7187.1	10-yr SBCFCD	1480.00	2806.60	2811.25	0.000875	8.17	8.17	181.24	39.00	0.67	0.67	0.21
Main	7187.1	5-yr SBCFCD	990.00	2806.60	2809.95	0.001085	7.58	7.58	130.57	39.00	0.73	0.73	0.19
Main	7187.1	2-yr SBCFCD	610.00	2806.60	2808.62	0.002045	7.74	7.74	78.84	39.00	0.96	0.96	0.23

Main	7125	100-yr SBCFCD	3150.00	2805.10	2814.05	0.000788	10.56	10.57	298.31	44.94	0.72	0.72	0.29
Main	7125	100-yr FIS	2700.00	2805.10	2813.38	0.000808	10.07	10.07	268.12	44.27	0.72	0.72	0.28
Main	7125	50-yr FIS	1500.00	2805.10	2811.13	0.000830	8.56	8.56	175.13	38.09	0.70	0.70	0.22
Main	7125	10-yr FIS	200.00	2805.10	2806.04	0.009182	9.92	9.92	20.16	22.82	1.86	1.86	0.49
Main	7125	10-yr SBCFCD	1480.00	2805.10	2811.09	0.000830	8.53	8.53	173.43	37.96	0.70	0.70	0.22
Main	7125	5-yr SBCFCD	990.00	2805.10	2809.87	0.000845	7.63	7.63	129.67	34.32	0.69	0.69	0.18
Main	7125	2-yr SBCFCD	610.00	2805.10	2808.71	0.000865	6.65	6.65	91.77	30.83	0.68	0.68	0.15
Main	7117	100-yr SBCFCD	3150.00	2803.20	2814.51	0.000380	8.29	8.31	379.78	45.38	0.50	0.51	0.17
Main	7117	100-yr FIS	2700.00	2803.20	2813.82	0.000362	7.74	7.75	348.64	44.71	0.49	0.49	0.15
Main	7117	50-yr FIS	1500.00	2803.20	2811.53	0.000287	5.98	5.98	250.78	40.20	0.42	0.42	0.10
Main	7117	10-yr FIS	200.00	2803.20	2807.14	0.000074	2.05	2.05	97.74	29.56	0.20	0.20	0.01
Main	7117	10-yr SBCFCD	1480.00	2803.20	2811.49	0.000285	5.95	5.95	248.94	40.09	0.42	0.42	0.10
Main	7117	5-yr SBCFCD	990.00	2803.20	2810.24	0.000232	4.93	4.93	200.89	37.07	0.37	0.37	0.07
Main	7117	2-yr SBCFCD	610.00	2803.20	2809.03	0.000174	3.87	3.87	157.65	34.12	0.32	0.32	0.04
Main	7115		Lat Struct										
Main	7113	100-yr SBCFCD	3150.00	2803.20	2814.51	0.000380	8.30	8.32	379.68	45.38	0.50	0.51	0.17
Main	7113	100-yr FIS	2700.00	2803.20	2813.82	0.000363	7.75	7.75	348.54	44.70	0.49	0.49	0.15
Main	7113	50-yr FIS	1500.00	2803.20	2811.53	0.000287	5.98	5.98	250.71	40.19	0.42	0.42	0.10
Main	7113	10-yr FIS	200.00	2803.20	2807.14	0.000074	2.05	2.05	97.73	29.56	0.20	0.20	0.01
Main	7113	10-yr SBCFCD	1480.00	2803.20	2811.48	0.000285	5.95	5.95	248.88	40.08	0.42	0.42	0.10
Main	7113	5-yr SBCFCD	990.00	2803.20	2810.24	0.000232	4.93	4.93	200.85	37.06	0.37	0.37	0.07
Main	7113	2-yr SBCFCD	610.00	2803.20	2809.03	0.000174	3.87	3.87	157.62	34.12	0.32	0.32	0.04
Main	7105	100-yr SBCFCD	3150.00	2805.10	2812.63	0.001605	13.38	13.38	235.43	42.57	1.00	1.00	0.50
Main	7105	100-yr FIS	2700.00	2805.10	2812.03	0.001609	12.83	12.83	210.47	40.78	1.00	1.00	0.47
Main	7105	50-yr FIS	1500.00	2805.10	2810.02	0.001737	11.13	11.13	134.79	34.77	1.00	1.00	0.39
Main	7105	10-yr FIS	200.00	2805.10	2806.51	0.002385	6.44	6.44	31.06	24.21	1.00	1.00	0.18
Main	7105	10-yr SBCFCD	1480.00	2805.10	2809.98	0.001740	11.09	11.09	133.44	34.65	1.00	1.00	0.39
Main	7105	5-yr SBCFCD	990.00	2805.10	2808.94	0.001833	10.00	10.00	98.96	31.52	1.00	1.00	0.33
Main	7105	2-yr SBCFCD	610.00	2805.10	2807.96	0.001959	8.79	8.79	69.40	28.57	0.99	0.99	0.28
Main	7013.55*	100-yr SBCFCD	3150.00	2805.00	2811.68	0.002092	15.00	15.00	210.03	36.86	1.11	1.11	0.63
Main	7013.55*	100-yr FIS	2700.00	2805.00	2810.91	0.002323	14.83	14.83	182.10	35.61	1.16	1.16	0.64
Main	7013.55*	50-yr FIS	1500.00	2805.00	2808.82	0.003082	13.49	13.49	111.17	32.21	1.28	1.28	0.60
Main	7013.55*	10-yr FIS	200.00	2805.00	2806.03	0.004194	7.23	7.23	27.66	27.67	1.27	1.27	0.25
Main	7013.55*	10-yr SBCFCD	1480.00	2805.00	2808.78	0.003097	13.46	13.46	109.99	32.15	1.28	1.28	0.59
Main	7013.55*	5-yr SBCFCD	990.00	2805.00	2807.85	0.003530	12.25	12.25	80.81	30.64	1.33	1.33	0.53
Main	7013.55*	2-yr SBCFCD	610.00	2805.00	2807.05	0.004033	10.78	10.78	56.59	29.32	1.37	1.37	0.46
Main	6840	100-yr SBCFCD	3150.00	2803.30	2807.27	0.006953	21.16	21.16	148.87	37.99	1.88	1.88	1.44
Main	6840	100-yr FIS	2700.00	2803.30	2806.82	0.007487	20.51	20.51	131.65	37.88	1.94	1.94	1.40
Main	6840	50-yr FIS	1500.00	2803.30	2805.54	0.009736	17.97	17.97	83.48	37.56	2.12	2.12	1.22
Main	6840	10-yr FIS	200.00	2803.30	2803.83	0.018760	10.11	10.11	19.77	37.13	2.44	2.44	0.61
Main	6840	10-yr SBCFCD	1480.00	2803.30	2805.52	0.009791	17.91	17.91	82.64	37.55	2.13	2.13	1.22
Main	6840	5-yr SBCFCD	990.00	2803.30	2804.95	0.011461	16.17	16.17	61.23	37.41	2.23	2.23	1.09
Main	6840	2-yr SBCFCD	610.00	2803.30	2804.46	0.013423	14.10	14.10	43.25	37.29	2.31	2.31	0.92
Main	6801.6	100-yr SBCFCD	3150.00	2803.00	2811.51	0.000457	8.23	8.23	382.70	45.00	0.50	0.50	0.18
Main	6801.6	100-yr FIS	2700.00	2803.00	2810.69	0.000455	7.81	7.81	345.68	45.00	0.50	0.50	0.16
Main	6801.6	50-yr FIS	1500.00	2803.00	2804.81	0.013091	18.45	18.45	81.30	44.92	2.42	2.42	1.37
Main	6801.6	10-yr FIS	200.00	2803.00	2804.38	0.000569	3.24	3.24	61.73	44.92	0.49	0.49	0.05
Main	6801.6	10-yr SBCFCD	1480.00	2803.00	2804.79	0.013153	18.38	18.38	80.51	44.92	2.42	2.42	1.36
Main	6801.6	5-yr SBCFCD	990.00	2803.00	2804.35	0.014823	16.34	16.34	60.58	44.92	2.48	2.48	1.18
Main	6801.6	2-yr SBCFCD	610.00	2803.00	2803.98	0.015965	13.85	13.85	44.03	44.91	2.47	2.47	0.94
Main	6785.6		Culvert										
Main	6769.6	100-yr SBCFCD	3150.00	2803.00	2808.36	0.001855	13.08	13.08	240.86	44.97	1.00	1.00	0.50
Main	6769.6	100-yr FIS	2700.00	2803.00	2807.84	0.001867	12.41	12.41	217.50	44.96	0.99	0.99	0.46
Main	6769.6	50-yr FIS	1500.00	2803.00	2806.27	0.001973	10.22	10.22	146.81	44.94	1.00	1.00	0.35
Main	6769.6	10-yr FIS	200.00	2803.00	2803.85	0.002705	5.22	5.22	38.33	44.91	1.00	1.00	0.14
Main	6769.6	10-yr SBCFCD	1480.00	2803.00	2806.25	0.001963	10.15	10.15	145.83	44.94	0.99	0.99	0.35
Main	6769.6	5-yr SBCFCD	990.00	2803.00	2805.45	0.002164	9.01	9.01	109.85	44.93	1.02	1.02	0.30
Main	6769.6	2-yr SBCFCD	610.00	2803.00	2804.80	0.002202	7.54	7.54	80.88	44.92	0.99	0.99	0.23
Main	6707.1	100-yr SBCFCD	3150.00	2798.00	2804.47	0.004437	19.72	19.72	159.73	34.40	1.61	1.61	1.15
Main	6707.1	100-yr FIS	2700.00	2798.00	2803.85	0.004788	19.43	19.43	138.94	32.54	1.66	1.66	1.15
Main	6707.1	50-yr FIS	1500.00	2798.00	2803.60	0.001744	11.46	11.46	130.87	31.78	1.00	1.00	0.41

Main	6707.1	10-yr FIS	200.00	2798.00	2798.72	0.040889	17.41	17.41	11.49	17.14	3.75	3.75	1.67
Main	6707.1	10-yr SBCFCD	1480.00	2798.00	2803.56	0.001738	11.41	11.41	129.76	31.68	0.99	0.99	0.40
Main	6707.1	5-yr SBCFCD	990.00	2798.00	2802.42	0.001824	10.36	10.36	95.59	28.26	0.99	0.99	0.35
Main	6707.1	2-yr SBCFCD	610.00	2798.00	2801.32	0.001956	9.21	9.21	66.26	24.95	1.00	1.00	0.30
Main	6385	100-yr SBCFCD	3150.00	2796.20	2802.52	0.004860	20.38	20.38	154.53	33.94	1.68	1.68	1.24
Main	6385	100-yr FIS	2700.00	2796.20	2801.95	0.005101	19.88	19.88	135.80	32.25	1.71	1.71	1.21
Main	6385	50-yr FIS	1500.00	2796.20	2800.52	0.004543	16.15	16.15	92.86	27.97	1.56	1.56	0.86
Main	6385	10-yr FIS	200.00	2796.20	2797.52	0.005170	8.93	8.93	22.39	18.96	1.45	1.45	0.37
Main	6385	10-yr SBCFCD	1480.00	2796.20	2800.49	0.004565	16.12	16.12	91.82	27.86	1.56	1.56	0.86
Main	6385	5-yr SBCFCD	990.00	2796.20	2799.52	0.005140	14.93	14.93	66.31	24.96	1.61	1.61	0.79
Main	6385	2-yr SBCFCD	610.00	2796.20	2798.62	0.005948	13.53	13.53	45.10	22.26	1.67	1.67	0.71
Main	6345	100-yr SBCFCD	3150.00	2796.00	2802.31	0.004875	20.41	20.41	154.36	33.93	1.69	1.69	1.24
Main	6345	100-yr FIS	2700.00	2796.00	2801.75	0.005093	19.87	19.87	135.88	32.25	1.71	1.71	1.21
Main	6345	50-yr FIS	1500.00	2796.00	2800.31	0.004583	16.20	16.20	92.57	27.94	1.57	1.57	0.87
Main	6345	10-yr FIS	200.00	2796.00	2797.32	0.005170	8.93	8.93	22.39	18.96	1.45	1.45	0.37
Main	6345	10-yr SBCFCD	1480.00	2796.00	2800.28	0.004603	16.17	16.17	91.55	27.83	1.57	1.57	0.86
Main	6345	5-yr SBCFCD	990.00	2796.00	2799.33	0.005064	14.85	14.85	66.66	25.00	1.60	1.60	0.78
Main	6345	2-yr SBCFCD	610.00	2796.00	2798.45	0.005687	13.32	13.32	45.80	22.36	1.64	1.64	0.68
Main	6344.7	100-yr SBCFCD	3150.00	2796.00	2805.15	0.000369	7.65	7.65	411.54	45.00	0.45	0.45	0.15
Main	6344.7	100-yr FIS	2700.00	2796.00	2798.48	0.015382	24.21	24.21	111.51	45.00	2.71	2.71	2.14
Main	6344.7	50-yr FIS	1500.00	2796.00	2797.63	0.018420	20.49	20.49	73.22	45.00	2.83	2.83	1.74
Main	6344.7	10-yr FIS	200.00	2796.00	2796.38	0.037722	11.59	11.59	17.26	45.00	3.30	3.30	0.89
Main	6344.7	10-yr SBCFCD	1480.00	2796.00	2797.61	0.018557	20.43	20.43	72.45	45.00	2.84	2.84	1.74
Main	6344.7	5-yr SBCFCD	990.00	2796.00	2797.18	0.022708	18.61	18.61	53.20	45.00	3.02	3.02	1.59
Main	6344.7	2-yr SBCFCD	610.00	2796.00	2796.82	0.028466	16.51	16.51	36.95	45.00	3.21	3.21	1.41
Main	6328.7		Culvert										
Main	6312.6	100-yr SBCFCD	3150.00	2796.00	2803.98	0.000554	8.78	8.78	358.97	45.00	0.55	0.55	0.20
Main	6312.6	100-yr FIS	2700.00	2796.00	2800.83	0.001878	12.43	12.43	217.24	45.00	1.00	1.00	0.47
Main	6312.6	50-yr FIS	1500.00	2796.00	2799.28	0.001953	10.18	10.18	147.39	45.00	0.99	0.99	0.35
Main	6312.6	10-yr FIS	200.00	2796.00	2796.86	0.002676	5.20	5.20	38.49	45.00	0.99	0.99	0.14
Main	6312.6	10-yr SBCFCD	1480.00	2796.00	2799.22	0.002017	10.23	10.23	144.67	45.00	1.01	1.01	0.35
Main	6312.6	5-yr SBCFCD	990.00	2796.00	2798.48	0.002060	8.87	8.87	111.64	45.00	0.99	0.99	0.29
Main	6312.6	2-yr SBCFCD	610.00	2796.00	2797.79	0.002246	7.58	7.58	80.44	45.00	1.00	1.00	0.23
Main	6312.1	100-yr SBCFCD	3150.00	2796.00	2801.80	0.001911	13.61	13.61	231.45	39.97	1.00	1.00	0.54
Main	6312.1	100-yr FIS	2700.00	2796.00	2801.23	0.001921	12.93	12.93	208.81	39.97	1.00	1.00	0.50
Main	6312.1	50-yr FIS	1500.00	2796.00	2799.55	0.001971	10.59	10.59	141.66	39.94	0.99	0.99	0.37
Main	6312.1	10-yr FIS	200.00	2796.00	2796.92	0.002664	5.43	5.43	36.85	39.91	1.00	1.00	0.15
Main	6312.1	10-yr SBCFCD	1480.00	2796.00	2799.51	0.001981	10.56	10.56	140.21	39.94	0.99	0.99	0.37
Main	6312.1	5-yr SBCFCD	990.00	2796.00	2798.68	0.002095	9.27	9.27	106.77	39.93	1.00	1.00	0.31
Main	6312.1	2-yr SBCFCD	610.00	2796.00	2797.95	0.002196	7.85	7.85	77.70	39.92	0.99	0.99	0.24
Main	6267.1	100-yr SBCFCD	3150.00	2792.00	2794.96	0.012358	23.98	23.98	131.35	48.87	2.58	2.58	2.00
Main	6267.1	100-yr FIS	2700.00	2792.00	2794.64	0.013351	23.29	23.29	115.93	47.91	2.64	2.64	1.95
Main	6267.1	50-yr FIS	1500.00	2792.00	2793.67	0.019051	21.09	21.09	71.13	45.02	2.96	2.96	1.84
Main	6267.1	10-yr FIS	200.00	2792.00	2792.30	0.110653	16.71	16.71	11.97	40.89	5.44	5.44	2.01
Main	6267.1	10-yr SBCFCD	1480.00	2792.00	2793.66	0.019216	21.04	21.04	70.34	44.97	2.96	2.96	1.84
Main	6267.1	5-yr SBCFCD	990.00	2792.00	2793.19	0.025741	19.85	19.85	49.88	43.58	3.27	3.27	1.81
Main	6267.1	2-yr SBCFCD	610.00	2792.00	2792.79	0.038236	18.66	18.66	32.69	42.38	3.74	3.74	1.82
Main	6000	100-yr SBCFCD	3150.00	2787.50	2790.32	0.014489	25.25	25.25	124.74	48.46	2.77	2.77	2.25
Main	6000	100-yr FIS	2700.00	2787.50	2790.04	0.015180	24.27	24.27	111.23	47.62	2.80	2.80	2.14
Main	6000	50-yr FIS	1500.00	2787.50	2789.23	0.016909	20.31	20.31	73.87	45.20	2.80	2.80	1.69
Main	6000	10-yr FIS	200.00	2787.50	2788.10	0.010400	8.14	8.14	24.58	41.80	1.87	1.87	0.38
Main	6000	10-yr SBCFCD	1480.00	2787.50	2789.22	0.016904	20.21	20.21	73.25	45.16	2.80	2.80	1.67
Main	6000	5-yr SBCFCD	990.00	2787.50	2788.87	0.016260	17.19	17.19	57.58	44.11	2.65	2.65	1.30
Main	6000	2-yr SBCFCD	610.00	2787.50	2788.56	0.014524	13.83	13.83	44.10	43.18	2.41	2.41	0.91
Main	5950	100-yr SBCFCD	3150.00	2786.80	2790.00	0.011987	24.63	24.63	127.87	39.98	2.43	2.43	2.07
Main	5950	100-yr FIS	2700.00	2786.80	2789.65	0.012673	23.69	23.69	113.96	39.97	2.47	2.47	1.98
Main	5950	50-yr FIS	1500.00	2786.80	2788.70	0.014290	19.75	19.75	75.95	39.95	2.52	2.52	1.55
Main	5950	10-yr FIS	200.00	2786.80	2787.38	0.012404	8.67	8.67	23.07	39.91	2.01	2.01	0.44
Main	5950	10-yr SBCFCD	1480.00	2786.80	2788.69	0.014293	19.65	19.65	75.31	39.95	2.52	2.52	1.54
Main	5950	5-yr SBCFCD	990.00	2786.80	2788.28	0.013989	16.75	16.75	59.11	39.94	2.43	2.43	1.20
Main	5950	2-yr SBCFCD	610.00	2786.80	2787.92	0.013215	13.66	13.66	44.66	39.93	2.28	2.28	0.87

Main	5772.1	100-yr SBCFCD	3150.00	2784.40	2794.89	0.000330	7.52	7.52	418.98	40.00	0.41	0.41	0.14
Main	5772.1	100-yr FIS	2700.00	2784.40	2793.51	0.000366	7.42	7.42	363.77	39.99	0.43	0.43	0.14
Main	5772.1	50-yr FIS	1500.00	2784.40	2786.33	0.013672	19.48	19.48	77.00	39.92	2.47	2.47	1.50
Main	5772.1	10-yr FIS	200.00	2784.40	2784.96	0.013797	8.95	8.95	22.34	39.91	2.11	2.11	0.47
Main	5772.1	10-yr SBCFCD	1480.00	2784.40	2786.31	0.013668	19.38	19.38	76.37	39.92	2.47	2.47	1.49
Main	5772.1	5-yr SBCFCD	990.00	2784.40	2785.90	0.013526	16.58	16.58	59.72	39.91	2.39	2.39	1.18
Main	5772.1	2-yr SBCFCD	610.00	2784.40	2785.51	0.013453	13.73	13.73	44.42	39.91	2.29	2.29	0.89
Main	5742	100-yr SBCFCD	3150.00	2784.00	2795.24	0.000141	4.90	4.90	643.18	81.69	0.31	0.31	0.06
Main	5742	100-yr FIS	2700.00	2784.00	2793.82	0.000170	5.06	5.06	533.21	73.83	0.33	0.33	0.07
Main	5742	50-yr FIS	1500.00	2784.00	2790.44	0.000214	4.77	4.77	314.71	55.39	0.35	0.35	0.06
Main	5742	10-yr FIS	200.00	2784.00	2785.48	0.000409	2.88	2.88	69.47	47.00	0.42	0.42	0.04
Main	5742	10-yr SBCFCD	1480.00	2784.00	2790.38	0.000214	4.75	4.75	311.47	55.07	0.35	0.35	0.06
Main	5742	5-yr SBCFCD	990.00	2784.00	2788.78	0.000237	4.34	4.34	228.02	50.57	0.36	0.36	0.06
Main	5742	2-yr SBCFCD	610.00	2784.00	2787.37	0.000271	3.85	3.85	158.50	47.74	0.37	0.37	0.05
Main	5679.8		Culvert										
Main	5609.6	100-yr SBCFCD	3150.00	2784.00	2794.10	0.000262	6.78	6.78	464.46	46.00	0.38	0.38	0.11
Main	5609.6	100-yr FIS	2700.00	2784.00	2793.11	0.000261	6.44	6.44	418.98	46.00	0.38	0.38	0.11
Main	5609.6	50-yr FIS	1500.00	2784.00	2790.06	0.000274	5.38	5.38	278.77	46.00	0.39	0.39	0.08
Main	5609.6	10-yr FIS	200.00	2784.00	2785.21	0.000813	3.58	3.58	55.83	46.00	0.57	0.57	0.06
Main	5609.6	10-yr SBCFCD	1480.00	2784.00	2790.01	0.000274	5.36	5.36	276.24	46.00	0.39	0.39	0.08
Main	5609.6	5-yr SBCFCD	990.00	2784.00	2788.48	0.000303	4.80	4.80	206.14	46.00	0.40	0.40	0.07
Main	5609.6	2-yr SBCFCD	610.00	2784.00	2787.11	0.000362	4.26	4.26	143.14	46.00	0.43	0.43	0.06
Main	5581.3	100-yr SBCFCD	3150.00	2783.60	2790.66	0.001674	14.00	14.75	224.93	38.89	0.98	1.08	0.59
Main	5581.3	100-yr FIS	2700.00	2783.60	2789.98	0.001735	13.55	14.03	199.29	36.58	0.98	1.06	0.55
Main	5581.3	50-yr FIS	1500.00	2783.60	2787.88	0.002028	11.63	11.66	128.99	31.01	0.99	1.01	0.43
Main	5581.3	10-yr FIS	200.00	2783.60	2784.72	0.002549	5.94	5.94	33.68	30.02	0.99	0.99	0.17
Main	5581.3	10-yr SBCFCD	1480.00	2783.60	2787.84	0.002043	11.60	11.63	127.58	30.96	1.00	1.01	0.43
Main	5581.3	5-yr SBCFCD	990.00	2783.60	2786.85	0.002126	10.15	10.15	97.56	30.03	0.99	0.99	0.35
Main	5581.3	2-yr SBCFCD	610.00	2783.60	2785.95	0.002217	8.64	8.64	70.61	30.02	0.99	0.99	0.28
Main	5515.3	100-yr SBCFCD	3150.00	2783.00	2786.94	0.006906	20.54	20.54	153.37	46.28	1.99	1.99	1.37
Main	5515.3	100-yr FIS	2700.00	2783.00	2786.60	0.006902	19.53	19.53	138.26	45.09	1.97	1.97	1.27
Main	5515.3	50-yr FIS	1500.00	2783.00	2785.56	0.006946	16.08	16.08	93.29	41.29	1.89	1.89	0.95
Main	5515.3	10-yr FIS	200.00	2783.00	2783.69	0.010387	8.82	8.82	22.69	34.13	1.91	1.91	0.43
Main	5515.3	10-yr SBCFCD	1480.00	2783.00	2785.54	0.006949	16.01	16.01	92.45	41.21	1.88	1.88	0.94
Main	5515.3	5-yr SBCFCD	990.00	2783.00	2784.99	0.007160	14.07	14.07	70.38	39.16	1.85	1.85	0.78
Main	5515.3	2-yr SBCFCD	610.00	2783.00	2784.47	0.007705	12.13	12.13	50.31	37.15	1.84	1.84	0.64
Main	5135	100-yr SBCFCD	3150.00	2782.21	2786.58	0.004936	19.75	21.45	159.52	43.09	1.81	1.89	1.35
Main	5135	100-yr FIS	2700.00	2782.21	2786.18	0.005094	18.94	20.44	142.55	41.90	1.81	1.88	1.26
Main	5135	50-yr FIS	1500.00	2782.21	2784.93	0.005855	16.15	17.06	92.85	38.17	1.82	1.88	1.00
Main	5135	10-yr FIS	200.00	2782.21	2782.89	0.012013	9.52	9.66	21.01	32.03	2.07	2.09	0.51
Main	5135	10-yr SBCFCD	1480.00	2782.21	2784.91	0.005885	16.10	17.00	91.91	38.10	1.82	1.88	0.99
Main	5135	5-yr SBCFCD	990.00	2782.21	2784.28	0.006645	14.48	15.11	68.35	36.20	1.85	1.90	0.86
Main	5135	2-yr SBCFCD	610.00	2782.21	2783.69	0.007906	12.79	13.20	47.68	34.44	1.91	1.95	0.73
Main	4875	100-yr SBCFCD	3150.00	2779.75	2783.81	0.006401	21.52	23.26	146.36	42.17	2.04	2.12	1.62
Main	4875	100-yr FIS	2700.00	2779.75	2783.43	0.006663	20.69	22.22	130.49	41.02	2.04	2.12	1.53
Main	4875	50-yr FIS	1500.00	2779.75	2782.26	0.007786	17.70	18.62	84.72	37.53	2.07	2.13	1.22
Main	4875	10-yr FIS	200.00	2779.75	2780.50	0.008368	8.52	8.66	23.47	32.26	1.76	1.78	0.39
Main	4875	10-yr SBCFCD	1480.00	2779.75	2782.24	0.007817	17.64	18.55	83.89	37.46	2.07	2.14	1.21
Main	4875	5-yr SBCFCD	990.00	2779.75	2781.67	0.008595	15.72	16.35	63.00	35.75	2.08	2.13	1.03
Main	4875	2-yr SBCFCD	610.00	2779.75	2781.16	0.009284	13.45	13.86	45.34	34.23	2.06	2.09	0.82
Main	4635	100-yr SBCFCD	3150.00	2777.45	2781.35	0.007368	22.55	24.30	139.72	41.69	2.17	2.26	1.79
Main	4635	100-yr FIS	2700.00	2777.45	2780.98	0.007654	21.65	23.19	124.69	40.60	2.17	2.26	1.69
Main	4635	50-yr FIS	1500.00	2777.45	2779.88	0.008714	18.36	19.28	81.72	37.29	2.18	2.24	1.32
Main	4635	10-yr FIS	200.00	2777.45	2778.17	0.010001	9.00	9.14	22.22	32.15	1.90	1.92	0.45
Main	4635	10-yr SBCFCD	1480.00	2777.45	2779.86	0.008717	18.27	19.18	81.01	37.23	2.18	2.24	1.31
Main	4635	5-yr SBCFCD	990.00	2777.45	2779.33	0.009220	16.07	16.70	61.61	35.63	2.15	2.20	1.08
Main	4635	2-yr SBCFCD	610.00	2777.45	2778.85	0.009529	13.56	13.97	44.97	34.20	2.08	2.12	0.83
Main	4385	100-yr SBCFCD	3150.00	2775.05	2778.85	0.008084	23.24	25.01	135.52	41.39	2.26	2.35	1.92
Main	4385	100-yr FIS	2700.00	2775.05	2778.50	0.008348	22.28	23.83	121.20	40.34	2.26	2.35	1.80
Main	4385	50-yr FIS	1500.00	2775.05	2777.44	0.009165	18.65	19.58	80.41	37.18	2.23	2.30	1.37
Main	4385	10-yr FIS	200.00	2775.05	2775.78	0.009382	8.83	8.97	22.66	32.19	1.85	1.87	0.43
Main	4385	10-yr SBCFCD	1480.00	2775.05	2777.43	0.009169	18.57	19.48	79.71	37.13	2.23	2.29	1.36

Main	4385	5-yr SBCFCD	990.00	2775.05	2776.91	0.009467	16.20	16.84	61.10	35.59	2.17	2.23	1.10
Main	4385	2-yr SBCFCD	610.00	2775.05	2776.45	0.009557	13.58	13.98	44.93	34.20	2.08	2.12	0.84
Main	4135	100-yr SBCFCD	3150.00	2772.65	2776.38	0.008574	23.70	25.47	132.92	41.20	2.32	2.42	2.00
Main	4135	100-yr FIS	2700.00	2772.65	2776.05	0.008794	22.66	24.21	119.16	40.19	2.32	2.40	1.86
Main	4135	50-yr FIS	1500.00	2772.65	2775.03	0.009391	18.80	19.73	79.78	37.13	2.26	2.32	1.39
Main	4135	10-yr FIS	200.00	2772.65	2773.37	0.009707	8.92	9.06	22.42	32.16	1.88	1.90	0.44
Main	4135	10-yr SBCFCD	1480.00	2772.65	2775.01	0.009397	18.71	19.63	79.09	37.07	2.25	2.32	1.38
Main	4135	5-yr SBCFCD	990.00	2772.65	2774.51	0.009570	16.26	16.89	60.89	35.57	2.18	2.24	1.11
Main	4135	2-yr SBCFCD	610.00	2772.65	2774.05	0.009597	13.59	14.00	44.87	34.19	2.09	2.13	0.84
Main	3969.6	100-yr SBCFCD	3380.00	2771.00	2774.82	0.010223	24.64	24.64	137.17	41.80	2.40	2.40	1.99
Main	3969.6	100-yr FIS	2700.00	2771.00	2774.26	0.011306	23.67	23.67	114.09	40.07	2.47	2.47	1.92
Main	3969.6	50-yr FIS	1500.00	2771.00	2773.31	0.011227	19.32	19.32	77.63	37.16	2.36	2.36	1.41
Main	3969.6	10-yr FIS	200.00	2771.00	2771.71	0.010357	9.00	9.00	22.22	32.24	1.91	1.91	0.44
Main	3969.6	10-yr SBCFCD	1600.00	2771.00	2773.49	0.009974	19.01	19.01	84.17	37.70	2.24	2.24	1.34
Main	3969.6	5-yr SBCFCD	1070.00	2771.00	2772.97	0.009813	16.43	16.43	65.14	36.12	2.16	2.16	1.07
Main	3969.6	2-yr SBCFCD	650.00	2771.00	2772.46	0.009851	13.75	13.75	47.27	34.56	2.07	2.07	0.82
Main	3835	100-yr SBCFCD	3380.00	2769.77	2773.79	0.007637	23.37	25.24	144.65	42.05	2.22	2.31	1.91
Main	3835	100-yr FIS	2700.00	2769.77	2773.21	0.008404	22.33	23.88	120.94	40.32	2.27	2.36	1.80
Main	3835	50-yr FIS	1500.00	2769.77	2772.21	0.008639	18.30	19.23	81.95	37.31	2.17	2.24	1.31
Main	3835	10-yr FIS	200.00	2769.77	2770.52	0.008525	8.57	8.71	23.34	32.25	1.77	1.79	0.40
Main	3835	10-yr SBCFCD	1600.00	2769.77	2772.35	0.008060	18.32	19.30	87.33	37.74	2.12	2.18	1.30
Main	3835	5-yr SBCFCD	1070.00	2769.77	2771.80	0.008272	15.97	16.65	66.99	36.08	2.06	2.11	1.05
Main	3835	2-yr SBCFCD	650.00	2769.77	2771.28	0.008475	13.39	13.82	48.54	34.51	1.99	2.02	0.80
Main	3740	100-yr SBCFCD	3380.00	2766.70	2772.42	0.008156	25.07	25.07	134.81	32.15	2.16	2.16	1.93
Main	3740	100-yr FIS	2700.00	2766.70	2771.70	0.008623	24.02	24.02	112.40	29.99	2.19	2.19	1.83
Main	3740	50-yr FIS	1500.00	2766.70	2770.30	0.008797	20.41	20.41	73.51	25.81	2.13	2.13	1.44
Main	3740	10-yr FIS	200.00	2766.70	2767.61	0.017875	13.37	13.37	14.96	17.74	2.56	2.56	0.91
Main	3740	10-yr SBCFCD	1600.00	2766.70	2770.49	0.008379	20.45	20.45	78.26	26.35	2.09	2.09	1.43
Main	3740	5-yr SBCFCD	1070.00	2766.70	2769.67	0.008955	18.55	18.55	57.69	23.90	2.10	2.10	1.26
Main	3740	2-yr SBCFCD	650.00	2766.70	2768.85	0.010253	16.62	16.62	39.12	21.44	2.17	2.17	1.10
Main	3732	100-yr SBCFCD	3380.00	2765.00	2770.69	0.009397	26.93	26.93	125.49	29.09	2.29	2.29	2.22
Main	3732	100-yr FIS	2700.00	2765.00	2769.92	0.010190	26.01	26.01	103.79	27.18	2.35	2.35	2.15
Main	3732	50-yr FIS	1500.00	2765.00	2773.80	0.000359	6.58	6.58	227.96	36.78	0.47	0.47	0.12
Main	3732	10-yr FIS	200.00	2765.00	2769.07	0.000110	2.45	2.45	81.56	25.07	0.24	0.24	0.02
Main	3732	10-yr SBCFCD	1600.00	2765.00	2768.60	0.010962	22.89	22.89	69.91	23.89	2.36	2.36	1.81
Main	3732	5-yr SBCFCD	1070.00	2765.00	2772.68	0.000308	5.69	5.69	188.09	34.00	0.43	0.43	0.09
Main	3732	2-yr SBCFCD	650.00	2765.00	2771.29	0.000240	4.53	4.53	143.38	30.57	0.37	0.37	0.06
Main	3730		Lat Struct										
Main	3728	100-yr SBCFCD	3380.00	2765.00	2770.71	0.009326	26.86	26.86	125.83	29.12	2.28	2.28	2.21
Main	3728	100-yr FIS	2700.00	2765.00	2769.93	0.010101	25.93	25.93	104.12	27.21	2.34	2.34	2.14
Main	3728	50-yr FIS	1500.00	2765.00	2773.80	0.000359	6.58	6.58	227.88	36.78	0.47	0.47	0.12
Main	3728	10-yr FIS	200.00	2765.00	2769.07	0.000110	2.45	2.45	81.54	25.07	0.24	0.24	0.02
Main	3728	10-yr SBCFCD	1600.00	2765.00	2774.04	0.000369	6.76	6.76	236.52	37.36	0.47	0.47	0.12
Main	3728	5-yr SBCFCD	1070.00	2765.00	2772.68	0.000309	5.69	5.69	188.04	33.99	0.43	0.43	0.09
Main	3728	2-yr SBCFCD	650.00	2765.00	2771.29	0.000240	4.53	4.53	143.34	30.57	0.37	0.37	0.06
Main	3720	100-yr SBCFCD	3380.00	2766.70	2772.82	0.006297	22.83	22.83	148.05	33.37	1.91	1.91	1.57
Main	3720	100-yr FIS	2700.00	2766.70	2772.11	0.006425	21.61	21.61	124.94	31.22	1.90	1.90	1.45
Main	3720	50-yr FIS	1500.00	2766.70	2772.30	0.001742	11.46	11.46	130.91	31.79	1.00	1.00	0.40
Main	3720	10-yr FIS	200.00	2766.70	2768.36	0.002347	6.88	6.88	29.07	19.99	1.01	1.01	0.20
Main	3720	10-yr SBCFCD	1600.00	2766.70	2772.51	0.001722	11.62	11.62	137.75	32.43	0.99	0.99	0.41
Main	3720	5-yr SBCFCD	1070.00	2766.70	2771.32	0.001812	10.57	10.57	101.27	28.86	0.99	0.99	0.36
Main	3720	2-yr SBCFCD	650.00	2766.70	2770.16	0.001916	9.32	9.32	69.78	25.37	0.99	0.99	0.30
Main	3520.3	100-yr SBCFCD	3380.00	2761.30	2766.55	0.011240	28.14	28.14	120.09	30.75	2.51	2.51	2.48
Main	3520.3	100-yr FIS	2700.00	2761.30	2765.87	0.012024	27.06	27.06	99.80	28.70	2.56	2.56	2.38
Main	3520.3	50-yr FIS	1500.00	2761.30	2764.54	0.012813	23.28	23.28	64.43	24.73	2.54	2.54	1.93
Main	3520.3	10-yr FIS	200.00	2761.30	2761.97	0.050663	18.63	18.63	10.73	17.01	4.13	4.13	1.95
Main	3520.3	10-yr SBCFCD	1600.00	2761.30	2764.70	0.012380	23.45	23.45	68.22	25.19	2.51	2.51	1.94
Main	3520.3	5-yr SBCFCD	1070.00	2761.30	2763.84	0.015495	22.41	22.41	47.75	22.62	2.72	2.72	1.91
Main	3520.3	2-yr SBCFCD	650.00	2761.30	2763.04	0.021206	21.22	21.22	30.63	20.22	3.04	3.04	1.91
Main	3422	100-yr SBCFCD	3380.00	2758.30	2763.30	0.013584	30.18	30.18	111.99	29.77	2.74	2.74	2.89
Main	3422	100-yr FIS	2700.00	2758.30	2762.64	0.014632	29.07	29.07	92.89	27.81	2.80	2.80	2.78

Main	3422	50-yr FIS	1500.00	2758.30	2761.33	0.016449	25.44	25.44	58.97	23.94	2.86	2.86	2.35
Main	3422	10-yr FIS	200.00	2758.30	2759.07	0.031555	16.04	16.04	12.47	17.28	3.33	3.33	1.38
Main	3422	10-yr SBCFCD	1600.00	2758.30	2761.47	0.015946	25.66	25.66	62.35	24.36	2.83	2.83	2.36
Main	3422	5-yr SBCFCD	1070.00	2758.30	2760.68	0.019400	24.24	24.24	44.15	22.04	3.02	3.02	2.28
Main	3422	2-yr SBCFCD	650.00	2758.30	2759.97	0.024624	22.33	22.33	29.10	19.92	3.26	3.26	2.14
Main	3410	100-yr SBCFCD	3380.00	2758.00	2762.96	0.013867	30.35	30.35	111.37	29.89	2.77	2.77	2.93
Main	3410	100-yr FIS	2700.00	2758.00	2762.31	0.014916	29.21	29.21	92.42	27.92	2.83	2.83	2.82
Main	3410	50-yr FIS	1500.00	2758.00	2761.01	0.016787	25.58	25.58	58.65	24.02	2.88	2.88	2.38
Main	3410	10-yr FIS	200.00	2758.00	2758.78	0.030204	15.81	15.81	12.65	17.35	3.26	3.26	1.34
Main	3410	10-yr SBCFCD	1600.00	2758.00	2761.14	0.016287	25.81	25.81	61.99	24.43	2.86	2.86	2.39
Main	3410	5-yr SBCFCD	1070.00	2758.00	2760.37	0.019684	24.32	24.32	43.99	22.11	3.04	3.04	2.30
Main	3410	2-yr SBCFCD	650.00	2758.00	2759.66	0.024765	22.35	22.35	29.08	19.99	3.27	3.27	2.14
Main	3400.*	100-yr SBCFCD	3380.00	2758.00	2762.99	0.013542	30.09	30.09	112.32	29.98	2.74	2.74	2.88
Main	3400.*	100-yr FIS	2700.00	2758.00	2762.34	0.014515	28.93	28.93	93.32	28.02	2.79	2.79	2.76
Main	3400.*	50-yr FIS	1500.00	2758.00	2761.04	0.016136	25.23	25.23	59.46	24.12	2.83	2.83	2.31
Main	3400.*	10-yr FIS	200.00	2758.00	2758.83	0.024807	14.85	14.85	13.47	17.49	2.98	2.98	1.16
Main	3400.*	10-yr SBCFCD	1600.00	2758.00	2761.18	0.015681	25.47	25.47	62.81	24.53	2.81	2.81	2.32
Main	3400.*	5-yr SBCFCD	1070.00	2758.00	2760.41	0.018672	23.89	23.89	44.79	22.22	2.97	2.97	2.21
Main	3400.*	2-yr SBCFCD	650.00	2758.00	2759.70	0.022914	21.78	21.78	29.84	20.10	3.15	3.15	2.02
Main	3266.4	100-yr SBCFCD	3380.00	2754.50	2759.30	0.015728	31.75	31.75	106.45	29.39	2.94	2.94	3.24
Main	3266.4	100-yr FIS	2700.00	2754.50	2758.67	0.016825	30.49	30.49	88.55	27.50	2.99	2.99	3.10
Main	3266.4	50-yr FIS	1500.00	2754.50	2757.40	0.019009	26.70	26.70	56.17	23.71	3.06	3.06	2.62
Main	3266.4	10-yr FIS	200.00	2754.50	2755.32	0.026025	15.07	15.07	13.27	17.45	3.05	3.05	1.20
Main	3266.4	10-yr SBCFCD	1600.00	2754.50	2757.53	0.018544	27.00	27.00	59.25	24.09	3.03	3.03	2.65
Main	3266.4	5-yr SBCFCD	1070.00	2754.50	2756.82	0.021345	25.01	25.01	42.79	21.95	3.16	3.16	2.44
Main	3266.4	2-yr SBCFCD	650.00	2754.50	2756.17	0.024493	22.27	22.27	29.19	20.00	3.25	3.25	2.12
Main	3220	100-yr SBCFCD	3380.00	2753.60	2758.38	0.015964	31.92	31.92	105.89	29.33	2.96	2.96	3.28
Main	3220	100-yr FIS	2700.00	2753.60	2757.75	0.017017	30.61	30.61	88.20	27.46	3.01	3.01	3.13
Main	3220	50-yr FIS	1500.00	2753.60	2756.50	0.019049	26.72	26.72	56.13	23.70	3.06	3.06	2.62
Main	3220	10-yr FIS	200.00	2753.60	2754.46	0.022007	14.29	14.29	14.00	17.58	2.82	2.82	1.06
Main	3220	10-yr SBCFCD	1600.00	2753.60	2756.63	0.018618	27.04	27.04	59.17	24.08	3.04	3.04	2.65
Main	3220	5-yr SBCFCD	1070.00	2753.60	2755.93	0.020904	24.83	24.83	43.10	21.99	3.13	3.13	2.40
Main	3220	2-yr SBCFCD	650.00	2753.60	2755.30	0.022869	21.77	21.77	29.86	20.10	3.15	3.15	2.02
Main	3212	100-yr SBCFCD	3380.00	2751.70	2756.54	0.017116	33.44	33.44	101.07	26.74	3.03	3.03	3.57
Main	3212	100-yr FIS	2700.00	2751.70	2755.88	0.018544	32.23	32.23	83.78	25.12	3.11	3.11	3.45
Main	3212	50-yr FIS	1500.00	2751.70	2754.54	0.022057	28.63	28.63	52.40	21.89	3.26	3.26	3.02
Main	3212	10-yr FIS	200.00	2751.70	2755.98	0.000093	2.31	2.31	86.42	25.38	0.22	0.22	0.02
Main	3212	10-yr SBCFCD	1600.00	2751.70	2754.67	0.021436	28.92	28.92	55.32	22.21	3.23	3.23	3.04
Main	3212	5-yr SBCFCD	1070.00	2751.70	2753.95	0.025126	26.86	26.86	39.83	20.45	3.39	3.39	2.83
Main	3212	2-yr SBCFCD	650.00	2751.70	2758.23	0.000212	4.34	4.34	149.61	30.83	0.35	0.35	0.06
Main	3210		Lat Struct										
Main	3208	100-yr SBCFCD	3380.00	2751.70	2756.56	0.016958	33.33	33.33	101.40	26.77	3.02	3.02	3.55
Main	3208	100-yr FIS	2700.00	2751.70	2755.89	0.018341	32.10	32.10	84.11	25.16	3.09	3.09	3.42
Main	3208	50-yr FIS	1500.00	2751.70	2754.56	0.021694	28.46	28.46	52.70	21.92	3.24	3.24	2.98
Main	3208	10-yr FIS	200.00	2751.70	2755.98	0.000093	2.31	2.31	86.40	25.38	0.22	0.22	0.02
Main	3208	10-yr SBCFCD	1600.00	2751.70	2754.69	0.021098	28.77	28.77	55.62	22.24	3.21	3.21	3.00
Main	3208	5-yr SBCFCD	1070.00	2751.70	2753.96	0.024592	26.67	26.67	40.12	20.48	3.36	3.36	2.79
Main	3208	2-yr SBCFCD	650.00	2751.70	2758.23	0.000213	4.35	4.35	149.58	30.83	0.35	0.35	0.06
Main	3200	100-yr SBCFCD	3380.00	2753.60	2758.58	0.013706	30.22	30.22	111.83	29.93	2.76	2.76	2.90
Main	3200	100-yr FIS	2700.00	2753.60	2757.96	0.014304	28.78	28.78	93.81	28.07	2.77	2.77	2.73
Main	3200	50-yr FIS	1500.00	2753.60	2756.72	0.014766	24.46	24.46	61.32	24.35	2.72	2.72	2.15
Main	3200	10-yr FIS	200.00	2753.60	2755.27	0.002311	6.84	6.84	29.22	20.01	1.00	1.00	0.20
Main	3200	10-yr SBCFCD	1600.00	2753.60	2756.84	0.014571	24.83	24.83	64.44	24.73	2.71	2.71	2.20
Main	3200	5-yr SBCFCD	1070.00	2753.60	2756.15	0.015227	22.28	22.28	48.03	22.65	2.70	2.70	1.89
Main	3200	2-yr SBCFCD	650.00	2753.60	2756.99	0.002055	9.55	9.55	68.08	25.17	1.02	1.02	0.32
Main	2942.6	100-yr SBCFCD	3380.00	2750.00	2754.97	0.013791	30.29	30.29	111.59	29.91	2.76	2.76	2.92
Main	2942.6	100-yr FIS	2700.00	2750.00	2754.37	0.014138	28.66	28.66	94.20	28.11	2.76	2.76	2.70
Main	2942.6	50-yr FIS	1500.00	2750.00	2753.15	0.014228	24.15	24.15	62.12	24.45	2.67	2.67	2.09
Main	2942.6	10-yr FIS	200.00	2750.00	2750.82	0.025610	15.00	15.00	13.34	17.46	3.02	3.02	1.19
Main	2942.6	10-yr SBCFCD	1600.00	2750.00	2753.27	0.014179	24.59	24.59	65.06	24.81	2.68	2.68	2.15
Main	2942.6	5-yr SBCFCD	1070.00	2750.00	2752.60	0.014224	21.76	21.76	49.17	22.80	2.61	2.61	1.79
Main	2942.6	2-yr SBCFCD	650.00	2750.00	2752.02	0.012710	17.87	17.87	36.37	21.05	2.40	2.40	1.30

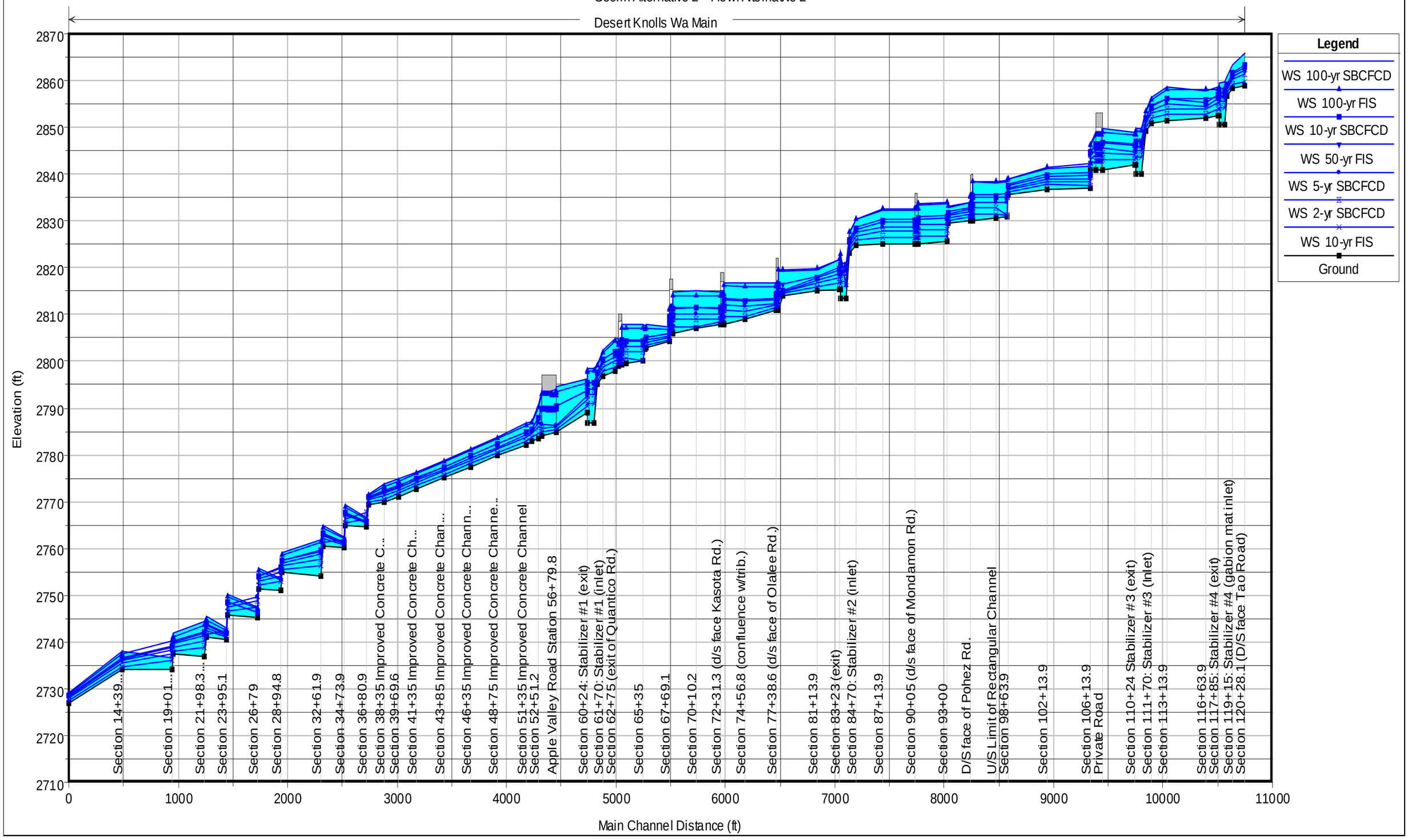
Main	2910	100-yr SBCFCD	3380.00	2750.00	2755.07	0.012774	29.47	29.47	114.70	30.22	2.67	2.67	2.75
Main	2910	100-yr FIS	2700.00	2750.00	2754.48	0.012944	27.78	27.78	97.21	28.43	2.65	2.65	2.52
Main	2910	50-yr FIS	1500.00	2750.00	2753.27	0.012512	23.09	23.09	64.97	24.80	2.51	2.51	1.90
Main	2910	10-yr FIS	200.00	2750.00	2750.98	0.014299	12.44	12.44	16.08	17.93	2.31	2.31	0.78
Main	2910	10-yr SBCFCD	1600.00	2750.00	2753.38	0.012538	23.56	23.56	67.92	25.15	2.53	2.53	1.95
Main	2910	5-yr SBCFCD	1070.00	2750.00	2752.73	0.012069	20.56	20.56	52.03	23.18	2.42	2.42	1.58
Main	2910	2-yr SBCFCD	650.00	2750.00	2752.16	0.010065	16.51	16.51	39.37	21.48	2.15	2.15	1.09
Main	2900	100-yr SBCFCD	3380.00	2750.00	2755.11	0.012478	29.22	29.22	115.67	30.31	2.64	2.64	2.70
Main	2900	100-yr FIS	2700.00	2750.00	2754.51	0.012597	27.51	27.51	98.15	28.53	2.61	2.61	2.47
Main	2900	50-yr FIS	1500.00	2750.00	2753.30	0.012023	22.77	22.77	65.88	24.91	2.47	2.47	1.84
Main	2900	10-yr FIS	200.00	2750.00	2751.03	0.012001	11.75	11.75	17.02	18.09	2.14	2.14	0.68
Main	2900	10-yr SBCFCD	1600.00	2750.00	2753.42	0.012070	23.25	23.25	68.83	25.26	2.48	2.48	1.90
Main	2900	5-yr SBCFCD	1070.00	2750.00	2752.77	0.011479	20.21	20.21	52.94	23.29	2.36	2.36	1.52
Main	2900	2-yr SBCFCD	650.00	2750.00	2752.20	0.009363	16.11	16.11	40.34	21.61	2.08	2.08	1.03
Main	2770	100-yr SBCFCD	3380.00	2747.90	2752.94	0.013080	29.72	29.72	113.73	30.12	2.70	2.70	2.80
Main	2770	100-yr FIS	2700.00	2747.90	2752.35	0.013257	28.01	28.01	96.38	28.34	2.68	2.68	2.57
Main	2770	50-yr FIS	1500.00	2747.90	2751.12	0.013106	23.47	23.47	63.92	24.67	2.57	2.57	1.96
Main	2770	10-yr FIS	200.00	2747.90	2748.86	0.015415	12.74	12.74	15.69	17.87	2.40	2.40	0.82
Main	2770	10-yr SBCFCD	1600.00	2747.90	2751.24	0.013100	23.92	23.92	66.88	25.03	2.58	2.58	2.02
Main	2770	5-yr SBCFCD	1070.00	2747.90	2750.57	0.012956	21.07	21.07	50.78	23.01	2.50	2.50	1.67
Main	2770	2-yr SBCFCD	650.00	2747.90	2749.94	0.012223	17.63	17.63	36.86	21.12	2.35	2.35	1.26
Main	2762	100-yr SBCFCD	3380.00	2746.00	2751.09	0.014323	31.38	31.38	107.70	27.33	2.79	2.79	3.11
Main	2762	100-yr FIS	2700.00	2746.00	2750.44	0.014902	29.83	29.83	90.51	25.77	2.80	2.80	2.91
Main	2762	50-yr FIS	1500.00	2746.00	2749.11	0.016170	25.72	25.72	58.31	22.53	2.82	2.82	2.38
Main	2762	10-yr FIS	200.00	2746.00	2750.28	0.000093	2.31	2.31	86.44	25.38	0.22	0.22	0.02
Main	2762	10-yr SBCFCD	1600.00	2746.00	2749.24	0.015992	26.14	26.14	61.21	22.84	2.81	2.81	2.43
Main	2762	5-yr SBCFCD	1070.00	2746.00	2753.92	0.000279	5.49	5.49	194.74	34.19	0.41	0.41	0.09
Main	2762	2-yr SBCFCD	650.00	2746.00	2752.52	0.000214	4.35	4.35	149.33	30.81	0.35	0.35	0.06
Main	2760		Lat Struct										
Main	2758	100-yr SBCFCD	3380.00	2746.00	2751.10	0.014211	31.30	31.30	108.00	27.36	2.78	2.78	3.09
Main	2758	100-yr FIS	2700.00	2746.00	2750.45	0.014745	29.72	29.72	90.85	25.80	2.79	2.79	2.88
Main	2758	50-yr FIS	1500.00	2746.00	2749.12	0.015917	25.58	25.58	58.63	22.57	2.80	2.80	2.35
Main	2758	10-yr FIS	200.00	2746.00	2750.28	0.000093	2.31	2.31	86.42	25.38	0.22	0.22	0.02
Main	2758	10-yr SBCFCD	1600.00	2746.00	2749.25	0.015750	26.00	26.00	61.53	22.88	2.79	2.79	2.40
Main	2758	5-yr SBCFCD	1070.00	2746.00	2753.92	0.000279	5.50	5.50	194.69	34.19	0.41	0.41	0.09
Main	2758	2-yr SBCFCD	650.00	2746.00	2752.52	0.000214	4.35	4.35	149.29	30.80	0.35	0.35	0.06
Main	2750	100-yr SBCFCD	3380.00	2747.90	2753.18	0.010969	27.90	27.90	121.15	30.85	2.48	2.48	2.44
Main	2750	100-yr FIS	2700.00	2747.90	2752.61	0.010755	26.00	26.00	103.85	29.12	2.43	2.43	2.18
Main	2750	50-yr FIS	1500.00	2747.90	2751.45	0.009267	20.78	20.78	72.17	25.65	2.18	2.18	1.50
Main	2750	10-yr FIS	200.00	2747.90	2749.56	0.002355	6.89	6.89	29.04	19.98	1.01	1.01	0.20
Main	2750	10-yr SBCFCD	1600.00	2747.90	2751.56	0.009451	21.33	21.33	75.00	25.98	2.21	2.21	1.57
Main	2750	5-yr SBCFCD	1070.00	2747.90	2752.49	0.001852	10.65	10.65	100.49	28.77	1.00	1.00	0.37
Main	2750	2-yr SBCFCD	650.00	2747.90	2751.36	0.001916	9.32	9.32	69.77	25.37	0.99	0.99	0.30
Main	2730.8	100-yr SBCFCD	3380.00	2747.60	2752.87	0.011091	28.01	28.01	120.67	30.81	2.49	2.49	2.46
Main	2730.8	100-yr FIS	2700.00	2747.60	2752.29	0.010890	26.11	26.11	103.39	29.07	2.44	2.44	2.20
Main	2730.8	50-yr FIS	1500.00	2747.60	2751.12	0.009537	20.99	20.99	71.45	25.57	2.21	2.21	1.54
Main	2730.8	10-yr FIS	200.00	2747.60	2748.91	0.005309	9.01	9.01	22.19	18.93	1.47	1.47	0.37
Main	2730.8	10-yr SBCFCD	1600.00	2747.60	2751.23	0.009703	21.53	21.53	74.31	25.90	2.24	2.24	1.60
Main	2730.8	5-yr SBCFCD	1070.00	2747.60	2751.59	0.003082	12.76	12.76	83.85	26.98	1.28	1.28	0.55
Main	2730.8	2-yr SBCFCD	650.00	2747.60	2750.51	0.003556	11.56	11.56	56.25	23.72	1.32	1.32	0.49
Main	2513.9	100-yr SBCFCD	3380.00	2744.90	2750.13	0.011435	28.32	28.32	119.35	30.68	2.53	2.53	2.52
Main	2513.9	100-yr FIS	2700.00	2744.90	2749.54	0.011338	26.49	26.49	101.91	28.92	2.49	2.49	2.27
Main	2513.9	50-yr FIS	1500.00	2744.90	2748.31	0.010674	21.84	21.84	68.68	25.24	2.33	2.33	1.68
Main	2513.9	10-yr FIS	200.00	2744.90	2745.88	0.014299	12.44	12.44	16.08	17.93	2.31	2.31	0.78
Main	2513.9	10-yr SBCFCD	1600.00	2744.90	2748.43	0.010754	22.32	22.32	71.67	25.59	2.35	2.35	1.74
Main	2513.9	5-yr SBCFCD	1070.00	2744.90	2747.97	0.007909	17.76	17.76	60.24	24.22	1.98	1.98	1.14
Main	2513.9	2-yr SBCFCD	650.00	2744.90	2747.09	0.009579	16.24	16.24	40.03	21.57	2.10	2.10	1.05
Main	2410	100-yr SBCFCD	3380.00	2743.50	2748.69	0.011702	28.56	28.56	118.36	30.58	2.56	2.56	2.56
Main	2410	100-yr FIS	2700.00	2743.50	2748.11	0.011656	26.76	26.76	100.91	28.82	2.52	2.52	2.32
Main	2410	50-yr FIS	1500.00	2743.50	2746.86	0.011253	22.25	22.25	67.42	25.09	2.39	2.39	1.75
Main	2410	10-yr FIS	200.00	2743.50	2744.49	0.013587	12.24	12.24	16.35	17.97	2.26	2.26	0.75

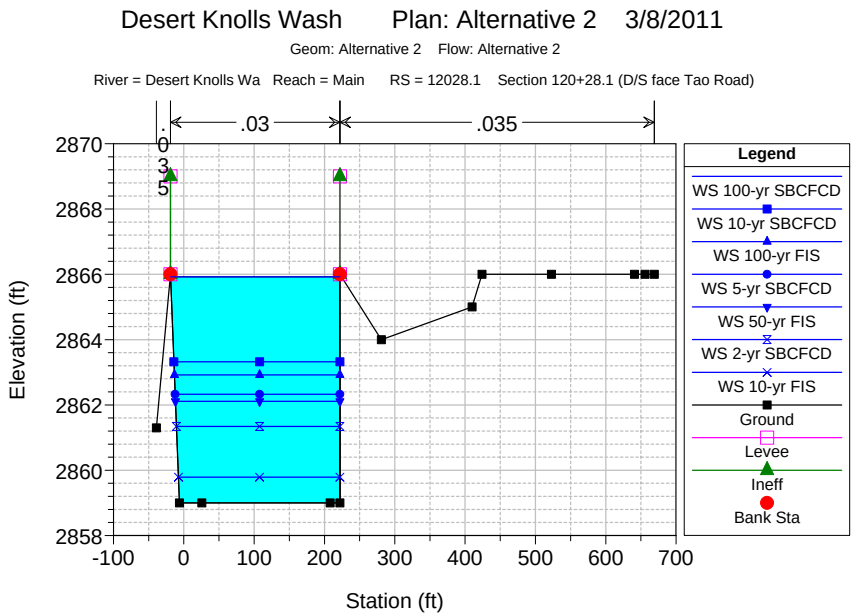
Main	2410	10-yr SBCFCD	1600.00	2743.50	2746.98	0.011300	22.71	22.71	70.44	25.45	2.41	2.41	1.80
Main	2410	5-yr SBCFCD	1070.00	2743.50	2746.43	0.009316	18.80	18.80	56.91	23.80	2.14	2.14	1.29
Main	2410	2-yr SBCFCD	650.00	2743.50	2745.61	0.010931	16.98	16.98	38.28	21.32	2.23	2.23	1.16
Main	2400	100-yr SBCFCD	3380.00	2743.50	2748.73	0.011431	28.32	28.32	119.37	30.68	2.53	2.53	2.52
Main	2400	100-yr FIS	2700.00	2743.50	2748.14	0.011344	26.50	26.50	101.89	28.92	2.49	2.49	2.27
Main	2400	50-yr FIS	1500.00	2743.50	2746.90	0.010814	21.94	21.94	68.37	25.20	2.35	2.35	1.69
Main	2400	10-yr FIS	200.00	2743.50	2744.54	0.011395	11.56	11.56	17.30	18.13	2.09	2.09	0.66
Main	2400	10-yr SBCFCD	1600.00	2743.50	2747.02	0.010878	22.41	22.41	71.39	25.56	2.36	2.36	1.75
Main	2400	5-yr SBCFCD	1070.00	2743.50	2746.48	0.008856	18.48	18.48	57.91	23.93	2.09	2.09	1.24
Main	2400	2-yr SBCFCD	650.00	2743.50	2745.65	0.010173	16.57	16.57	39.22	21.46	2.16	2.16	1.09
Main	2320	100-yr SBCFCD	3380.00	2742.20	2747.37	0.011925	28.75	28.75	117.57	30.50	2.58	2.58	2.60
Main	2320	100-yr FIS	2700.00	2742.20	2746.78	0.011916	26.97	26.97	100.12	28.74	2.55	2.55	2.36
Main	2320	50-yr FIS	1500.00	2742.20	2745.53	0.011720	22.57	22.57	66.47	24.98	2.44	2.44	1.80
Main	2320	10-yr FIS	200.00	2742.20	2743.18	0.014215	12.41	12.41	16.11	17.93	2.31	2.31	0.77
Main	2320	10-yr SBCFCD	1600.00	2742.20	2745.65	0.011739	23.02	23.02	69.50	25.34	2.45	2.45	1.86
Main	2320	5-yr SBCFCD	1070.00	2742.20	2745.05	0.010323	19.48	19.48	54.92	23.55	2.25	2.25	1.40
Main	2320	2-yr SBCFCD	650.00	2742.20	2744.26	0.011856	17.45	17.45	37.24	21.18	2.32	2.32	1.23
Main	2312	100-yr SBCFCD	3380.00	2740.30	2745.50	0.013207	30.49	30.49	110.86	27.61	2.68	2.68	2.92
Main	2312	100-yr FIS	2700.00	2740.30	2744.86	0.013606	28.88	28.88	93.48	26.04	2.69	2.69	2.71
Main	2312	50-yr FIS	1500.00	2740.30	2743.49	0.014796	24.95	24.95	60.13	22.73	2.70	2.70	2.22
Main	2312	10-yr FIS	200.00	2740.30	2744.58	0.000093	2.31	2.31	86.47	25.38	0.22	0.22	0.02
Main	2312	10-yr SBCFCD	1600.00	2740.30	2743.62	0.014628	25.35	25.35	63.13	23.05	2.70	2.70	2.27
Main	2312	5-yr SBCFCD	1070.00	2740.30	2748.21	0.000279	5.50	5.50	194.64	34.19	0.41	0.41	0.09
Main	2312	2-yr SBCFCD	650.00	2740.30	2746.82	0.000214	4.35	4.35	149.33	30.81	0.35	0.35	0.06
Main	2310		Lat Struct										
Main	2308	100-yr SBCFCD	3380.00	2740.30	2745.51	0.013107	30.41	30.41	111.17	27.64	2.67	2.67	2.90
Main	2308	100-yr FIS	2700.00	2740.30	2744.87	0.013486	28.79	28.79	93.77	26.07	2.68	2.68	2.69
Main	2308	50-yr FIS	1500.00	2740.30	2743.50	0.014566	24.81	24.81	60.46	22.76	2.68	2.68	2.19
Main	2308	10-yr FIS	200.00	2740.30	2744.58	0.000093	2.31	2.31	86.45	25.38	0.22	0.22	0.02
Main	2308	10-yr SBCFCD	1600.00	2740.30	2743.63	0.014412	25.21	25.21	63.46	23.08	2.68	2.68	2.24
Main	2308	5-yr SBCFCD	1070.00	2740.30	2748.21	0.000280	5.50	5.50	194.59	34.18	0.41	0.41	0.09
Main	2308	2-yr SBCFCD	650.00	2740.30	2746.82	0.000214	4.35	4.35	149.29	30.80	0.35	0.35	0.06
Main	2300	100-yr SBCFCD	3380.00	2742.20	2747.64	0.009874	26.86	26.86	125.83	31.30	2.36	2.36	2.24
Main	2300	100-yr FIS	2700.00	2742.20	2747.07	0.009496	24.87	24.87	108.59	29.61	2.29	2.29	1.98
Main	2300	50-yr FIS	1500.00	2742.20	2745.91	0.007940	19.68	19.68	76.21	26.12	2.03	2.03	1.33
Main	2300	10-yr FIS	200.00	2742.20	2743.85	0.002394	6.93	6.93	28.88	19.96	1.01	1.01	0.21
Main	2300	10-yr SBCFCD	1600.00	2742.20	2746.02	0.008131	20.23	20.23	79.09	26.45	2.06	2.06	1.40
Main	2300	5-yr SBCFCD	1070.00	2742.20	2746.82	0.001816	10.57	10.57	101.20	28.85	0.99	0.99	0.36
Main	2300	2-yr SBCFCD	650.00	2742.20	2745.66	0.001920	9.32	9.32	69.73	25.36	0.99	0.99	0.30
Main	2260.4	100-yr SBCFCD	3380.00	2741.50	2746.88	0.010275	27.25	27.25	124.04	31.13	2.41	2.41	2.31
Main	2260.4	100-yr FIS	2700.00	2741.50	2746.31	0.009972	25.31	25.31	106.70	29.41	2.34	2.34	2.06
Main	2260.4	50-yr FIS	1500.00	2741.50	2745.11	0.008752	20.37	20.37	73.64	25.82	2.13	2.13	1.44
Main	2260.4	10-yr FIS	200.00	2741.50	2742.65	0.008336	10.44	10.44	19.15	18.44	1.81	1.81	0.52
Main	2260.4	10-yr SBCFCD	1600.00	2741.50	2745.22	0.008896	20.88	20.88	76.62	26.17	2.15	2.15	1.50
Main	2260.4	5-yr SBCFCD	1070.00	2741.50	2745.18	0.004160	14.19	14.19	75.42	26.03	1.47	1.47	0.69
Main	2260.4	2-yr SBCFCD	650.00	2741.50	2744.14	0.004970	12.97	12.97	50.10	22.93	1.55	1.55	0.63
Main	1986.6	100-yr SBCFCD	3480.00	2737.90	2743.29	0.010827	28.00	28.00	124.30	31.16	2.47	2.47	2.44
Main	1986.6	100-yr FIS	2700.00	2737.90	2742.57	0.011076	26.27	26.27	102.77	29.01	2.46	2.46	2.23
Main	1986.6	50-yr FIS	1500.00	2737.90	2741.30	0.010842	21.96	21.96	68.31	25.20	2.35	2.35	1.70
Main	1986.6	10-yr FIS	200.00	2737.90	2738.87	0.014593	12.52	12.52	15.97	17.91	2.34	2.34	0.79
Main	1986.6	10-yr SBCFCD	1650.00	2737.90	2741.52	0.010490	22.33	22.33	73.88	25.85	2.33	2.33	1.73
Main	1986.6	5-yr SBCFCD	1120.00	2737.90	2740.94	0.008965	18.81	18.81	59.53	24.13	2.11	2.11	1.28
Main	1986.6	2-yr SBCFCD	680.00	2737.90	2740.08	0.010706	17.11	17.11	39.75	21.53	2.22	2.22	1.16
Main	1910	100-yr SBCFCD	3480.00	2737.10	2742.49	0.010770	27.94	27.94	124.54	31.18	2.46	2.46	2.43
Main	1910	100-yr FIS	2700.00	2737.10	2741.78	0.010967	26.18	26.18	103.13	29.05	2.45	2.45	2.21
Main	1910	50-yr FIS	1500.00	2737.10	2740.51	0.010731	21.88	21.88	68.55	25.23	2.34	2.34	1.68
Main	1910	10-yr FIS	200.00	2737.10	2738.15	0.011279	11.52	11.52	17.36	18.14	2.08	2.08	0.65
Main	1910	10-yr SBCFCD	1650.00	2737.10	2740.72	0.010465	22.31	22.31	73.95	25.86	2.33	2.33	1.72
Main	1910	5-yr SBCFCD	1120.00	2737.10	2740.12	0.009246	19.02	19.02	58.89	24.05	2.14	2.14	1.31
Main	1910	2-yr SBCFCD	680.00	2737.10	2739.28	0.010582	17.04	17.04	39.91	21.55	2.21	2.21	1.15
Main	1900	100-yr SBCFCD	3480.00	2737.00	2742.39	0.010770	27.94	27.94	124.54	31.18	2.46	2.46	2.43

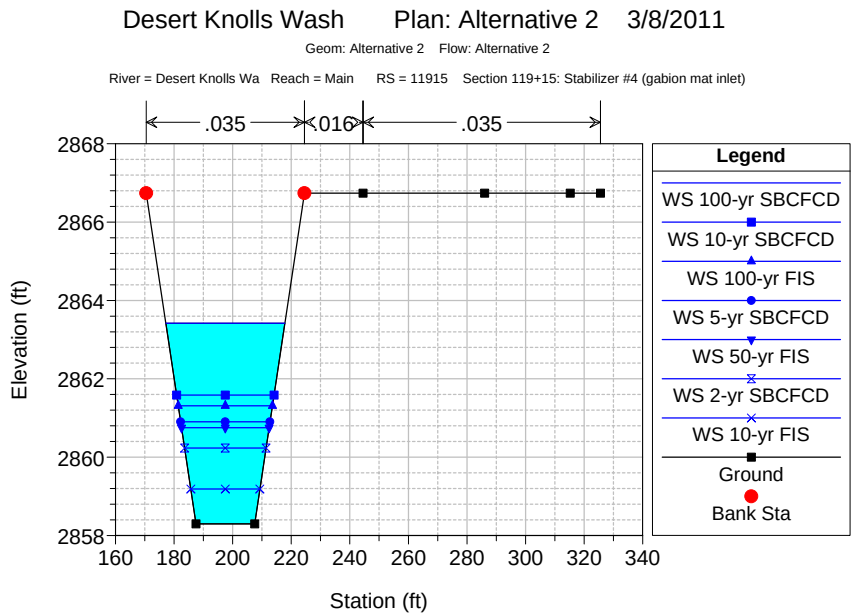
Main	1900	100-yr FIS	2700.00	2737.00	2741.68	0.010967	26.18	26.18	103.13	29.05	2.45	2.45	2.21
Main	1900	50-yr FIS	1500.00	2737.00	2740.41	0.010731	21.88	21.88	68.55	25.23	2.34	2.34	1.68
Main	1900	10-yr FIS	200.00	2737.00	2738.05	0.011164	11.48	11.48	17.42	18.15	2.07	2.07	0.65
Main	1900	10-yr SBCFCD	1650.00	2737.00	2740.62	0.010465	22.31	22.31	73.95	25.86	2.33	2.33	1.72
Main	1900	5-yr SBCFCD	1120.00	2737.00	2740.01	0.009289	19.05	19.05	58.80	24.04	2.15	2.15	1.32
Main	1900	2-yr SBCFCD	680.00	2737.00	2739.18	0.010582	17.04	17.04	39.91	21.55	2.21	2.21	1.15
Main	1720	100-yr SBCFCD	3480.00	2735.40	2740.88	0.010137	27.34	27.34	127.29	31.44	2.39	2.39	2.32
Main	1720	100-yr FIS	2700.00	2735.40	2740.18	0.010158	25.47	25.47	105.99	29.34	2.36	2.36	2.09
Main	1720	50-yr FIS	1500.00	2735.40	2738.90	0.009783	21.18	21.18	70.81	25.49	2.24	2.24	1.57
Main	1720	10-yr FIS	200.00	2735.40	2736.54	0.008488	10.51	10.51	19.04	18.42	1.82	1.82	0.53
Main	1720	10-yr SBCFCD	1650.00	2735.40	2739.10	0.009690	21.72	21.72	75.98	26.09	2.24	2.24	1.62
Main	1720	5-yr SBCFCD	1120.00	2735.40	2738.44	0.009045	18.87	18.87	59.35	24.11	2.12	2.12	1.29
Main	1720	2-yr SBCFCD	680.00	2735.40	2737.67	0.009302	16.31	16.31	41.69	21.80	2.08	2.08	1.04
Main	1712	100-yr SBCFCD	3480.00	2733.40	2738.87	0.011624	29.34	29.34	118.61	28.39	2.53	2.53	2.67
Main	1712	100-yr FIS	2700.00	2733.40	2738.10	0.012075	27.66	27.66	97.61	26.52	2.54	2.54	2.46
Main	1712	50-yr FIS	1500.00	2733.40	2736.70	0.013125	23.91	23.91	62.73	23.07	2.56	2.56	2.02
Main	1712	10-yr FIS	200.00	2733.40	2737.68	0.000093	2.31	2.31	86.55	25.47	0.22	0.22	0.02
Main	1712	10-yr SBCFCD	1650.00	2733.40	2736.91	0.012774	24.39	24.39	67.66	23.59	2.54	2.54	2.07
Main	1712	5-yr SBCFCD	1120.00	2733.40	2741.42	0.000289	5.63	5.63	199.01	34.64	0.41	0.41	0.09
Main	1712	2-yr SBCFCD	680.00	2733.40	2740.01	0.000220	4.45	4.45	152.70	31.19	0.35	0.35	0.06
Main	1710		Lat Struct										
Main	1708	100-yr SBCFCD	3480.00	2733.40	2738.88	0.011537	29.26	29.26	118.93	28.42	2.52	2.52	2.65
Main	1708	100-yr FIS	2700.00	2733.40	2738.11	0.011970	27.57	27.57	97.92	26.54	2.53	2.53	2.45
Main	1708	50-yr FIS	1500.00	2733.40	2736.71	0.012956	23.81	23.81	63.01	23.10	2.54	2.54	2.00
Main	1708	10-yr FIS	200.00	2733.40	2737.68	0.000093	2.31	2.31	86.54	25.47	0.22	0.22	0.02
Main	1708	10-yr SBCFCD	1650.00	2733.40	2736.92	0.012619	24.28	24.28	67.95	23.62	2.52	2.52	2.05
Main	1708	5-yr SBCFCD	1120.00	2733.40	2741.42	0.000289	5.63	5.63	198.95	34.63	0.41	0.41	0.09
Main	1708	2-yr SBCFCD	680.00	2733.40	2740.01	0.000220	4.45	4.45	152.66	31.19	0.35	0.35	0.06
Main	1699.2	100-yr SBCFCD	3480.00	2735.30	2741.02	0.008463	25.52	25.52	136.36	32.69	2.20	2.20	2.00
Main	1699.2	100-yr FIS	2700.00	2735.30	2740.36	0.008059	23.36	23.36	115.59	30.66	2.12	2.12	1.73
Main	1699.2	50-yr FIS	1500.00	2735.30	2739.23	0.006314	18.09	18.09	82.91	27.16	1.83	1.83	1.11
Main	1699.2	10-yr FIS	200.00	2735.30	2736.95	0.002414	6.93	6.93	28.86	20.09	1.02	1.02	0.21
Main	1699.2	10-yr SBCFCD	1650.00	2735.30	2739.40	0.006540	18.84	18.84	87.60	27.69	1.87	1.87	1.19
Main	1699.2	5-yr SBCFCD	1120.00	2735.30	2740.03	0.001792	10.62	10.62	105.44	29.62	0.99	0.99	0.36
Main	1699.2	2-yr SBCFCD	680.00	2735.30	2738.82	0.001936	9.45	9.45	71.99	25.89	1.00	1.00	0.31
Main	1500	100-yr SBCFCD	3480.00	2734.00	2739.92	0.007572	24.60	24.60	141.44	32.77	2.09	2.09	1.84
Main	1500	100-yr FIS	2700.00	2734.00	2739.24	0.007251	22.57	22.57	119.62	30.70	2.02	2.02	1.60
Main	1500	50-yr FIS	1500.00	2734.00	2737.95	0.006297	18.14	18.14	82.70	26.86	1.82	1.82	1.11
Main	1500	10-yr FIS	200.00	2734.00	2735.16	0.007928	10.27	10.27	19.47	18.49	1.76	1.76	0.50
Main	1500	10-yr SBCFCD	1650.00	2734.00	2738.14	0.006424	18.78	18.78	87.86	27.43	1.85	1.85	1.18
Main	1500	5-yr SBCFCD	1120.00	2734.00	2737.70	0.004477	14.76	14.76	75.90	26.08	1.52	1.52	0.75
Main	1500	2-yr SBCFCD	680.00	2734.00	2736.67	0.005273	13.43	13.43	50.64	23.00	1.59	1.59	0.68
Main	1200.*	100-yr SBCFCD	3480.00	2730.00	2731.90	0.031974	28.89	28.89	120.47	74.96	3.91	3.91	3.35
Main	1200.*	100-yr FIS	2700.00	2730.00	2731.61	0.033412	26.80	26.80	100.75	71.51	3.91	3.91	3.03
Main	1200.*	50-yr FIS	1500.00	2730.00	2731.10	0.037625	22.51	22.51	66.64	65.26	3.91	3.91	2.40
Main	1200.*	10-yr FIS	200.00	2730.00	2730.32	0.042286	10.86	10.86	18.42	58.57	3.41	3.41	0.83
Main	1200.*	10-yr SBCFCD	1650.00	2730.00	2731.17	0.036813	23.15	23.15	71.28	66.14	3.91	3.91	2.49
Main	1200.*	5-yr SBCFCD	1120.00	2730.00	2730.90	0.041918	20.91	20.91	53.57	63.19	4.00	4.00	2.21
Main	1200.*	2-yr SBCFCD	680.00	2730.00	2730.65	0.047420	18.01	18.01	37.76	61.16	4.04	4.04	1.82
Main	957.5	100-yr SBCFCD	3480.00	2727.00	2729.14	0.045999	15.48	15.48	224.84	127.54	2.05	2.05	5.05
Main	957.5	100-yr FIS	2700.00	2727.00	2728.93	0.036766	13.53	13.53	199.51	117.01	1.83	1.83	3.90
Main	957.5	50-yr FIS	1500.00	2727.00	2728.57	0.023219	9.49	9.49	158.03	111.82	1.41	1.41	2.04
Main	957.5	10-yr FIS	200.00	2727.00	2727.55	0.015007	3.94	3.94	50.80	97.13	0.96	0.96	0.49
Main	957.5	10-yr SBCFCD	1650.00	2727.00	2728.63	0.024939	10.05	10.05	164.25	112.61	1.47	1.47	2.27
Main	957.5	5-yr SBCFCD	1120.00	2727.00	2728.41	0.018828	8.00	8.00	140.04	109.49	1.25	1.25	1.50
Main	957.5	2-yr SBCFCD	680.00	2727.00	2728.15	0.013700	6.04	6.04	112.65	105.85	1.03	1.03	0.91

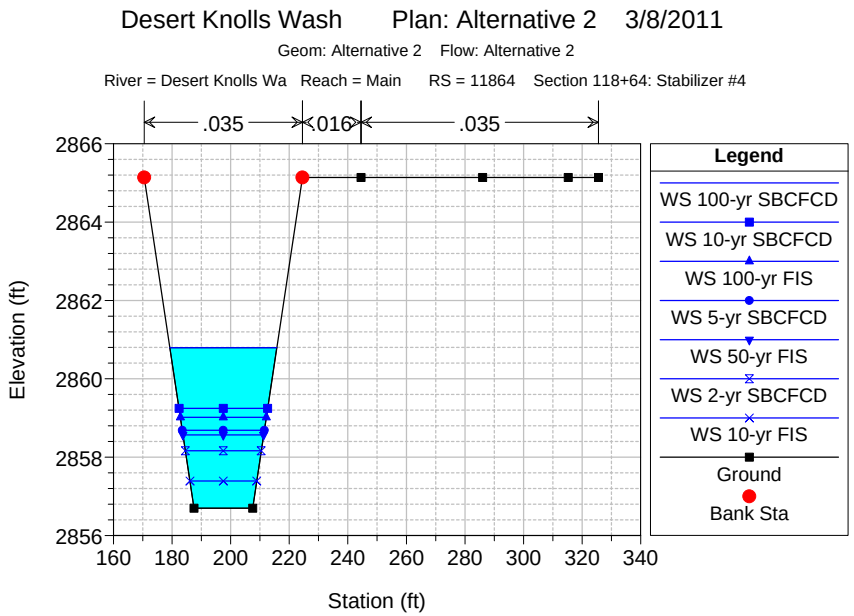
Desert Knolls Wash Plan: Alternative 2 3/8/2011

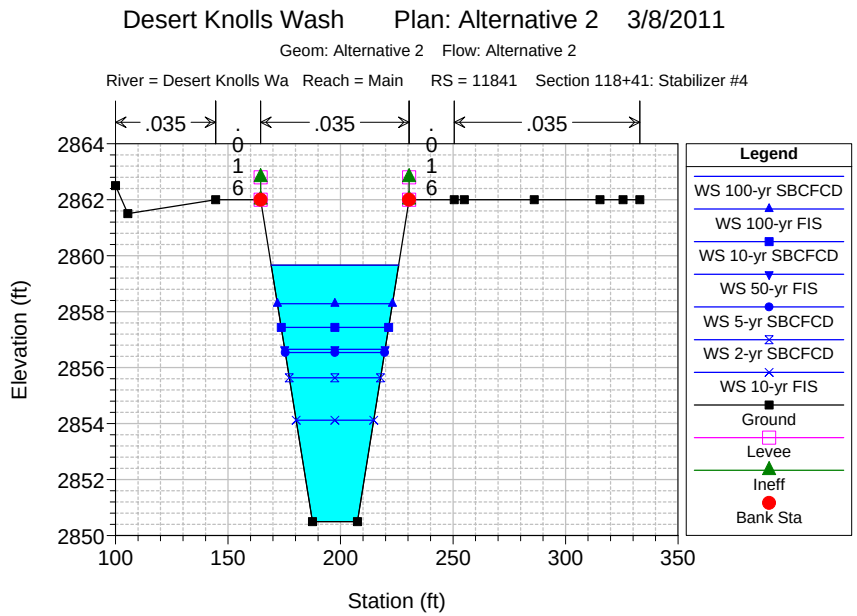
Geom: Alternative 2 Flow: Alternative 2




Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 12028.1 Section 120+28.1 (D/S face Tao Road)
.03
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 10-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 11915 Section 119+15: Stabilizer #4 (gabion mat inlet)
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 10-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

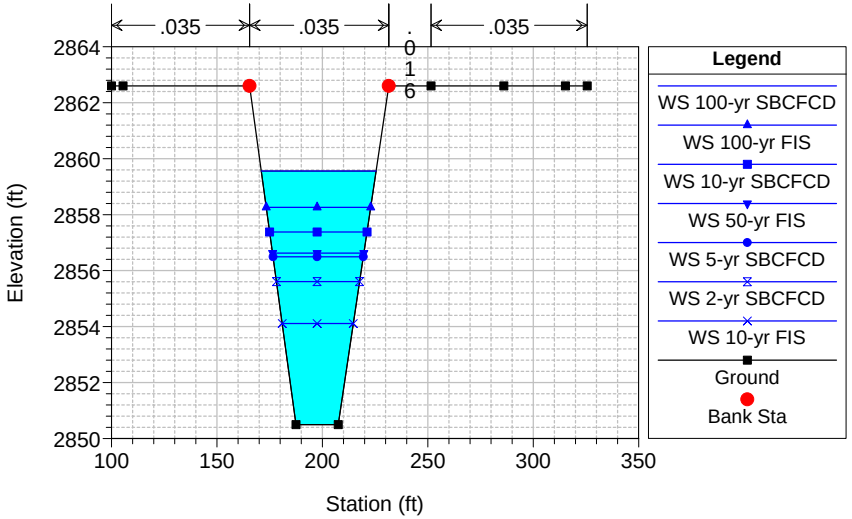

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 11864 Section 118+64: Stabilizer #4
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 10-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 11841 Section 118+41: Stabilizer #4
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

Desert Knolls Wash Plan: Alternative 2 3/8/2011

Geom: Alternative 2 Flow: Alternative 2

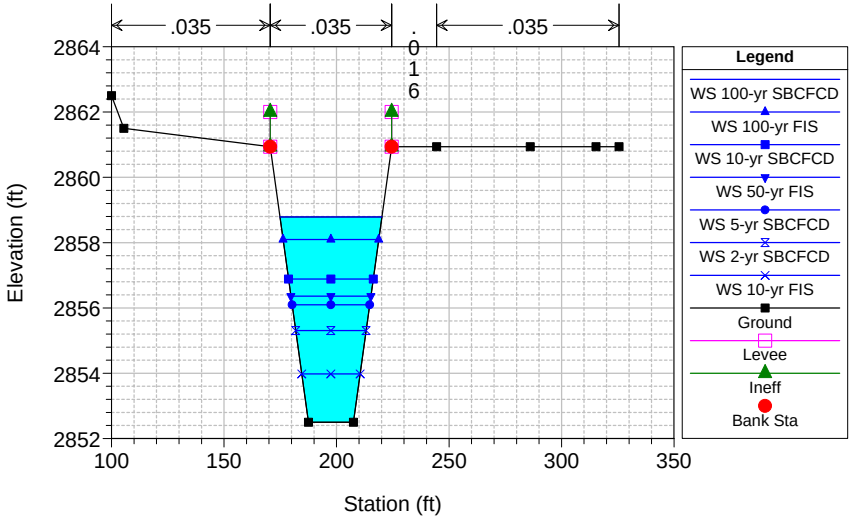
River = Desert Knolls Wa Reach = Main RS = 11792 Section 117+92: Stabilizer #4



Desert Knolls Wash Plan: Alternative 2 3/8/2011

Geom: Alternative 2 Flow: Alternative 2

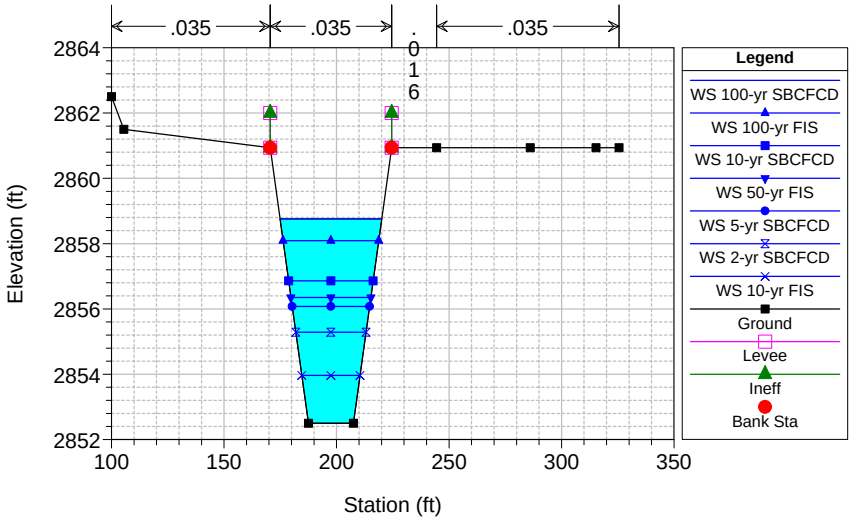
River = Desert Knolls Wa Reach = Main RS = 11788 Section 117+88: Stabilizer #4



Desert Knolls Wash Plan: Alternative 2 3/8/2011

Geom: Alternative 2 Flow: Alternative 2

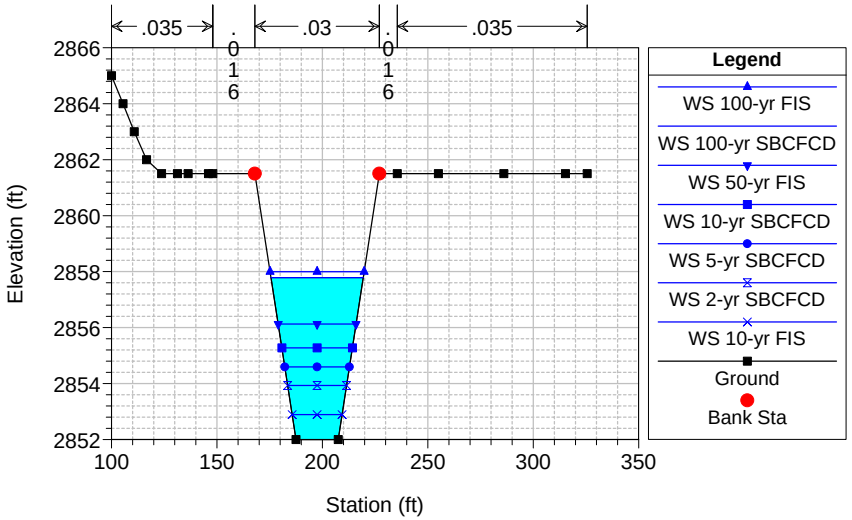
River = Desert Knolls Wa Reach = Main RS = 11785 Section 117+85: Stabilizer #4 (exit)

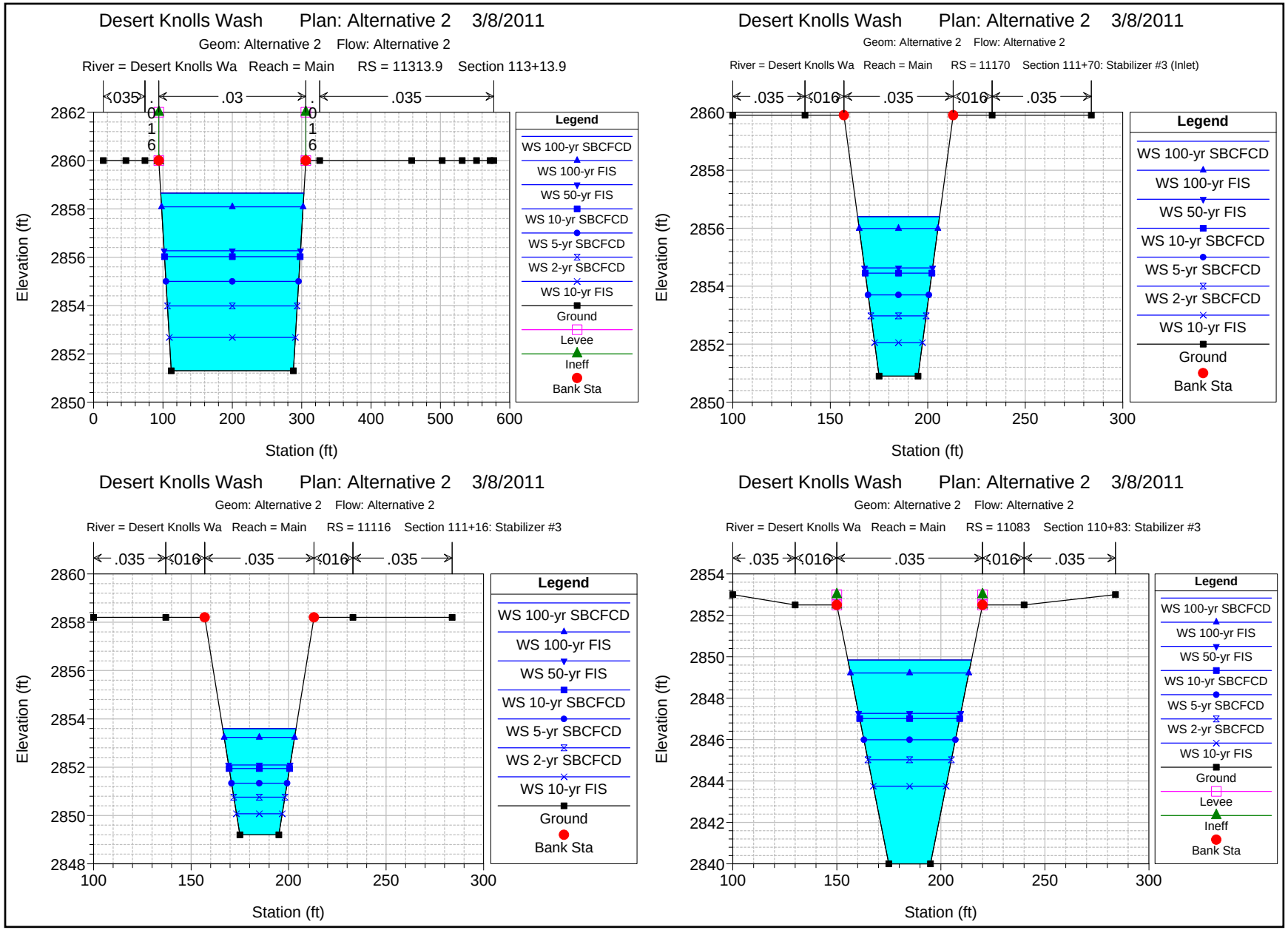


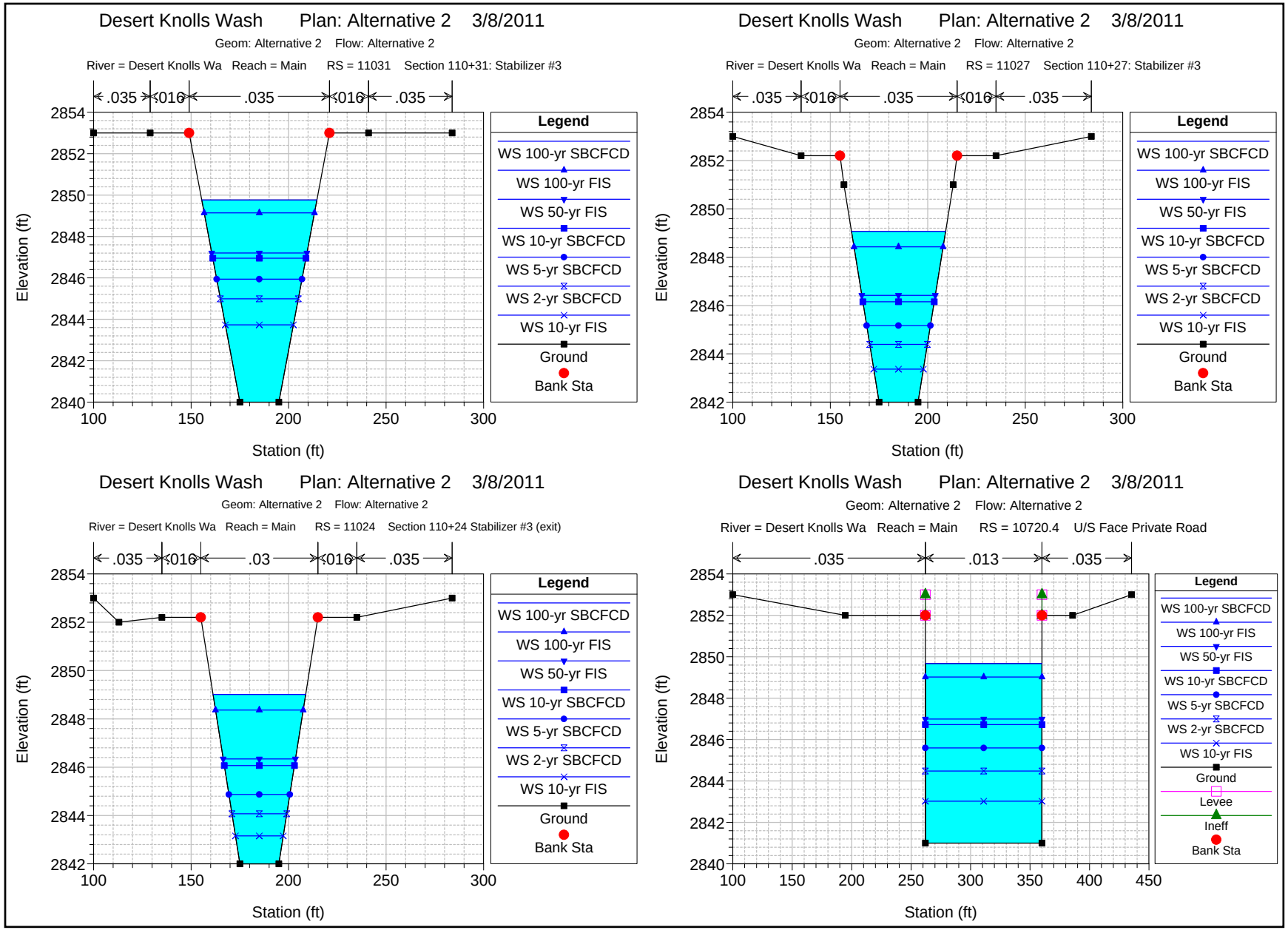
Desert Knolls Wash Plan: Alternative 2 3/8/2011

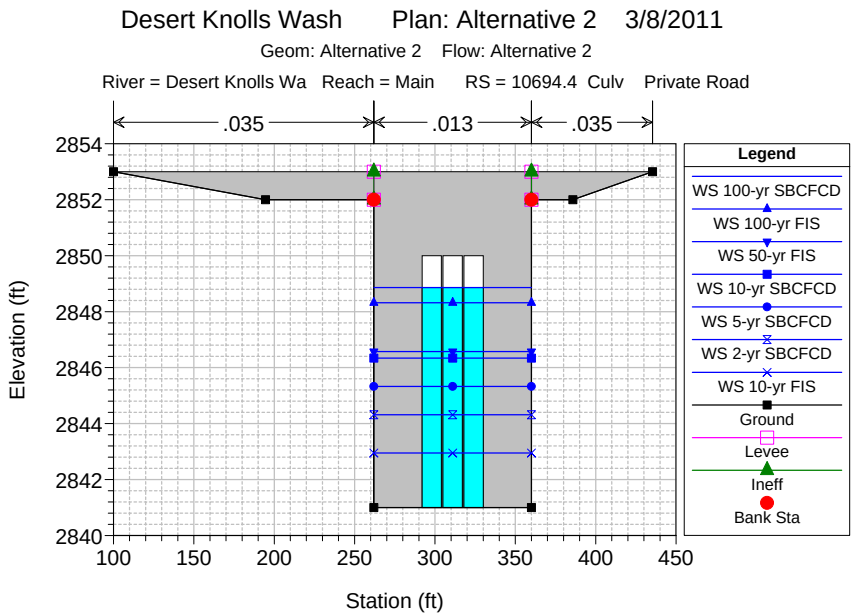
Geom: Alternative 2 Flow: Alternative 2

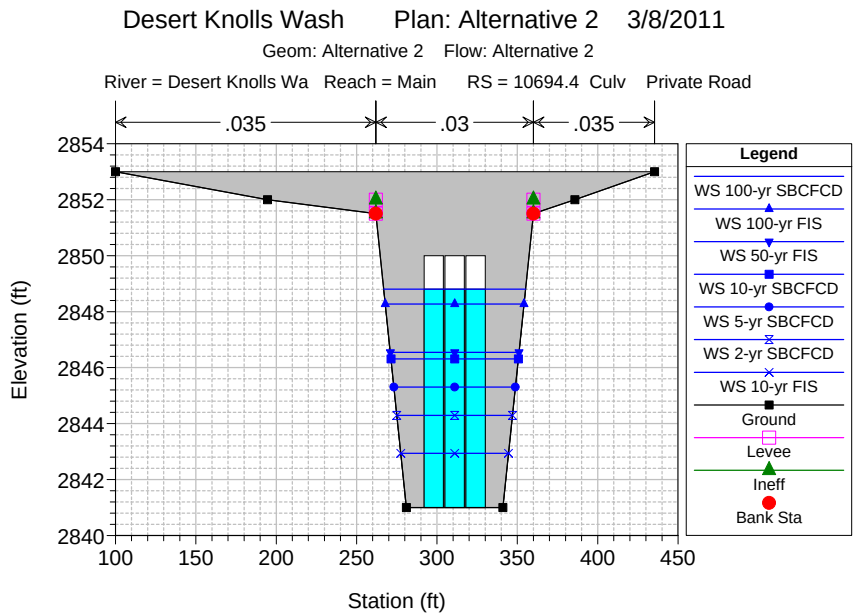
River = Desert Knolls Wa Reach = Main RS = 11663.9 Section 116+63.9

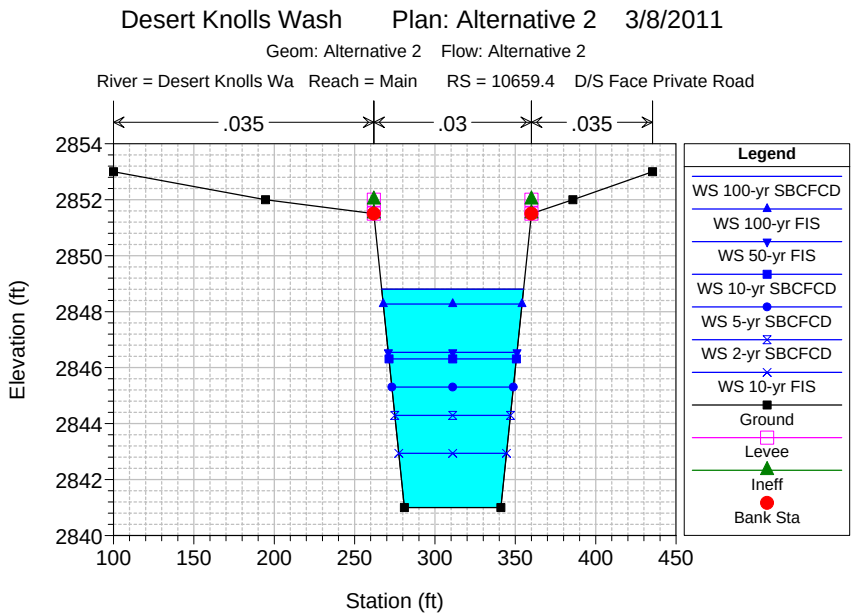


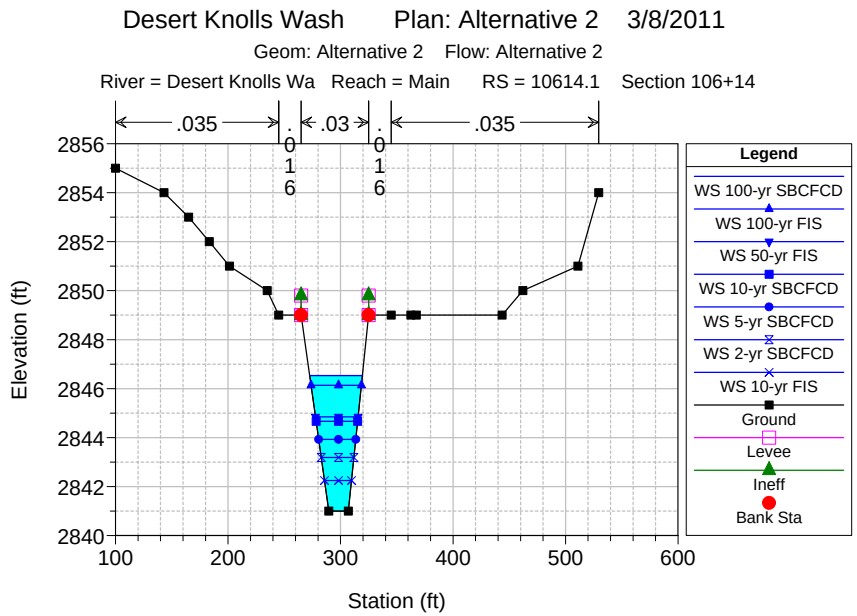

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 11313.9 Section 113+13.9
.035
.03
.035
.016
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 11170 Section 111+70: Stabilizer #3 (Inlet)
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 11116 Section 111+16: Stabilizer #3
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 11083 Section 110+83: Stabilizer #3
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

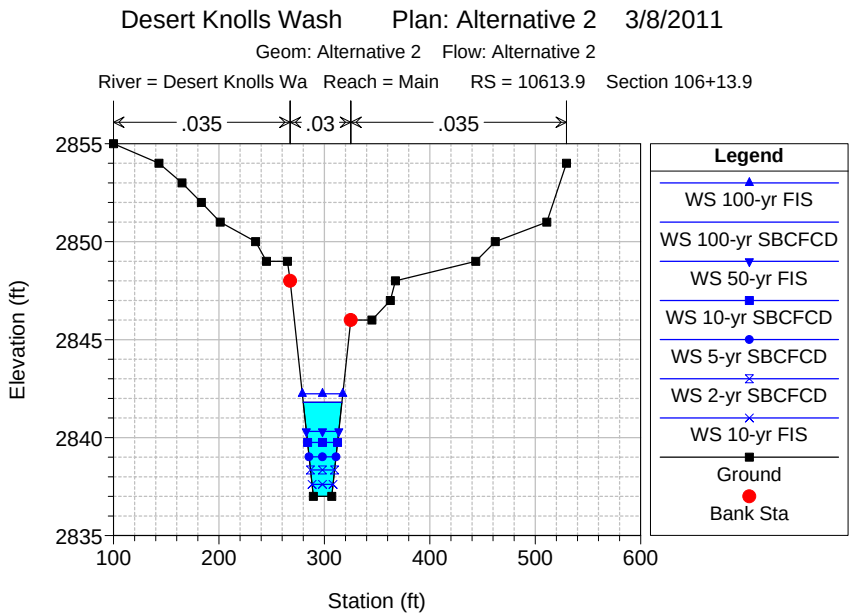

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 11031 Section 110+31: Stabilizer #3
.035 .016 .035 .016 .035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 11027 Section 110+27: Stabilizer #3
.035 .016 .035 .016 .035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 11024 Section 110+24 Stabilizer #3 (exit)
.035 .016 .03 .016 .035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 10720.4 U/S Face Private Road
.035 .013 .035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

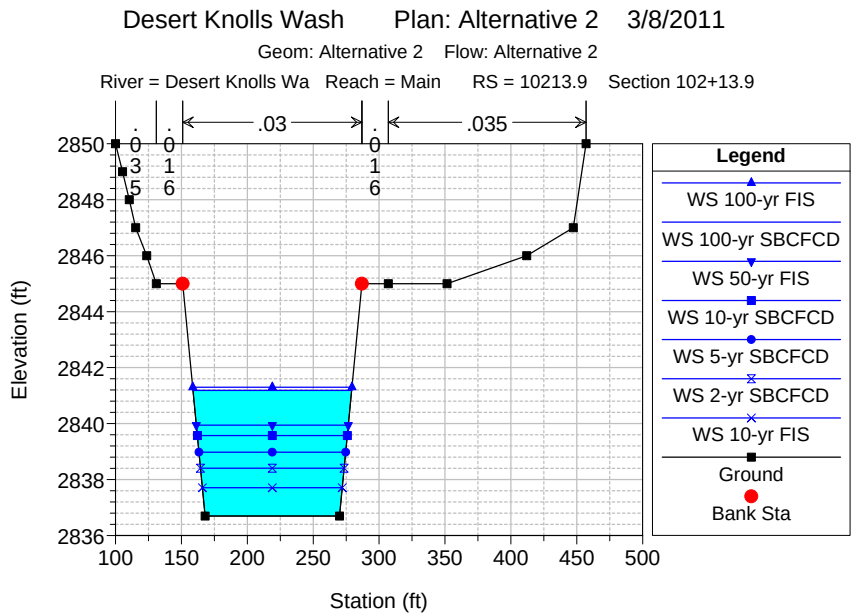

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 10694.4 Culv Private Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

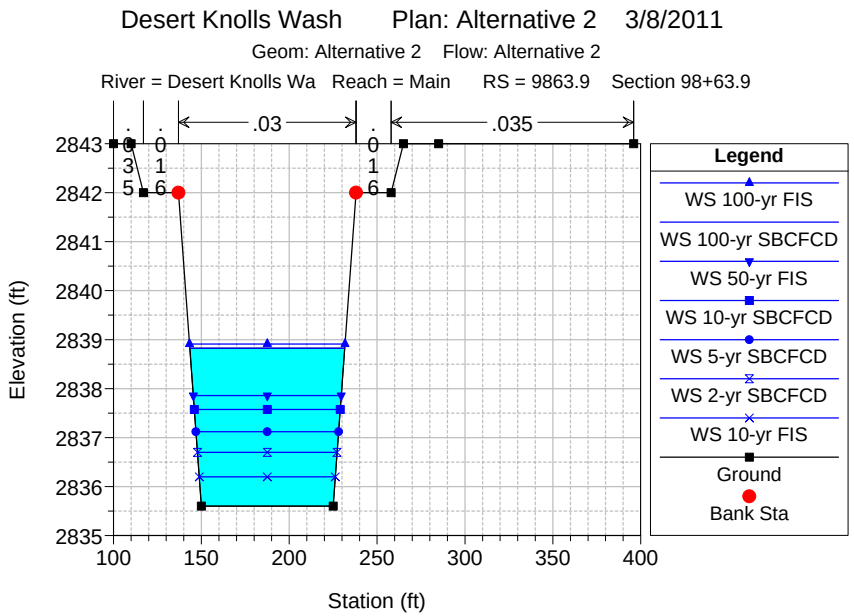

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 10694.4 Culv Private Road
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

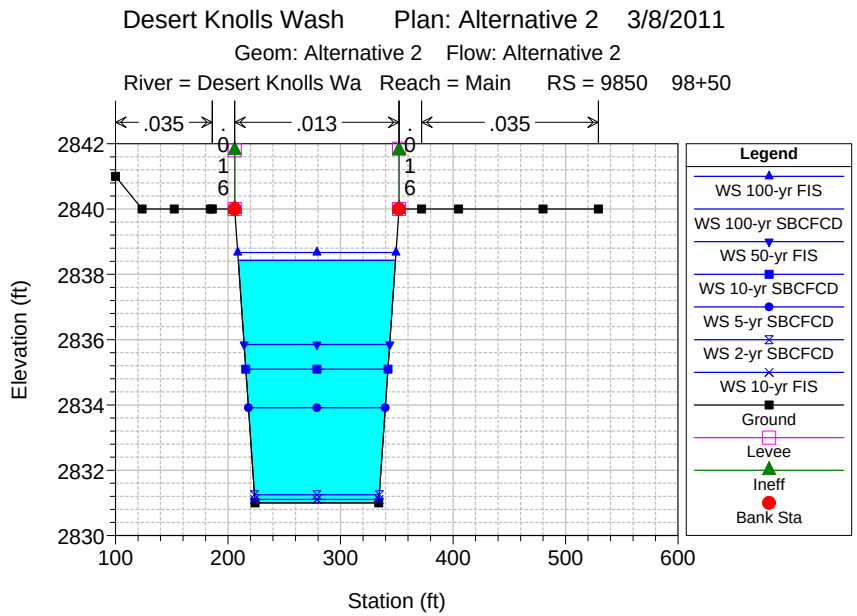

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 10659.4 D/S Face Private Road
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

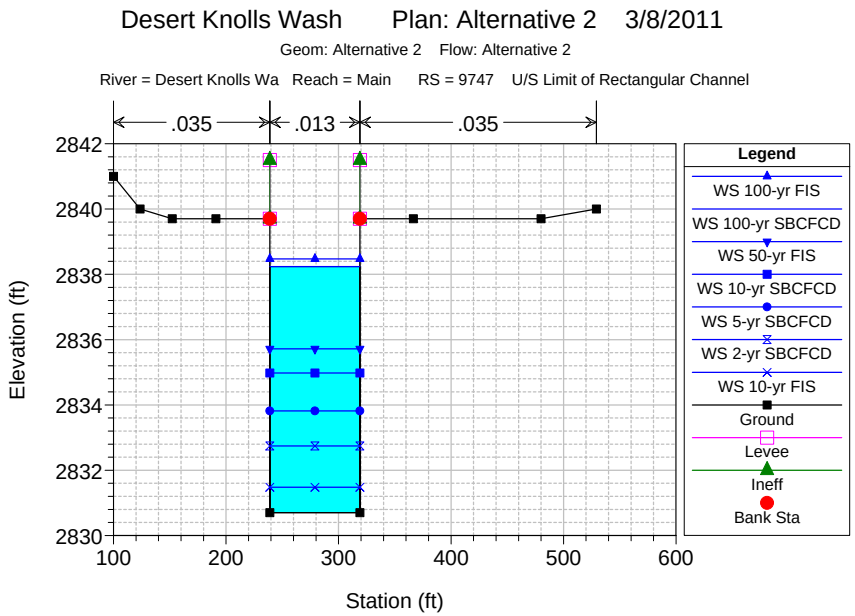

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 10614.1 Section 106+14
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

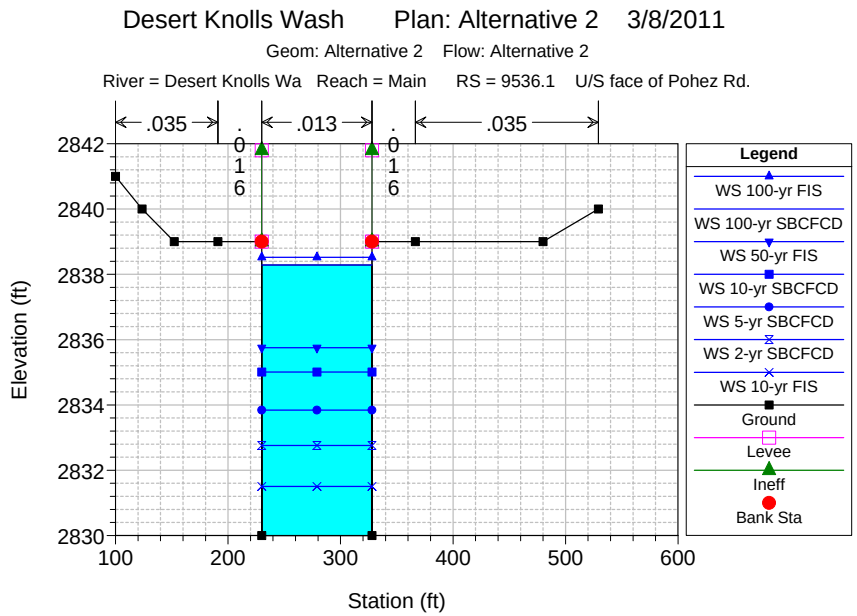

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 10613.9 Section 106+13.9
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

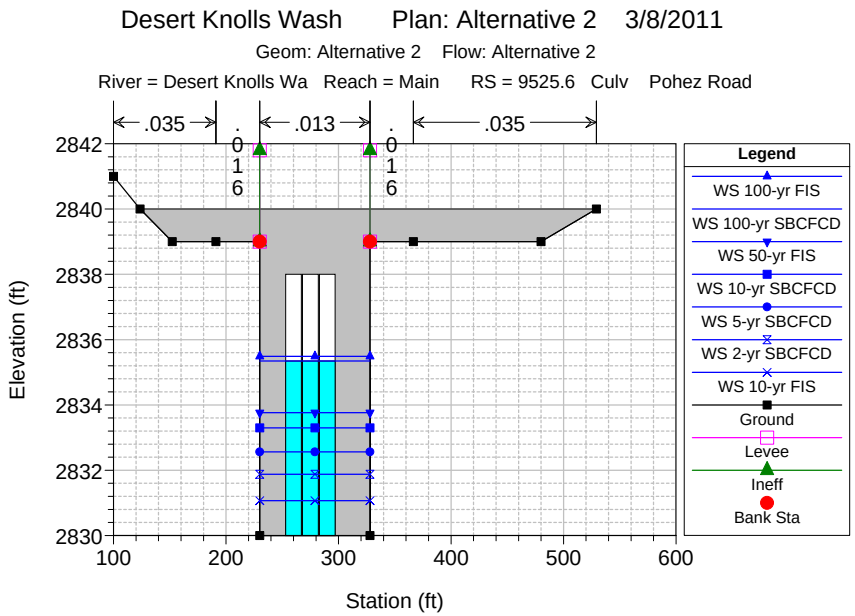

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 10213.9 Section 102+13.9
.035
.016
.03
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

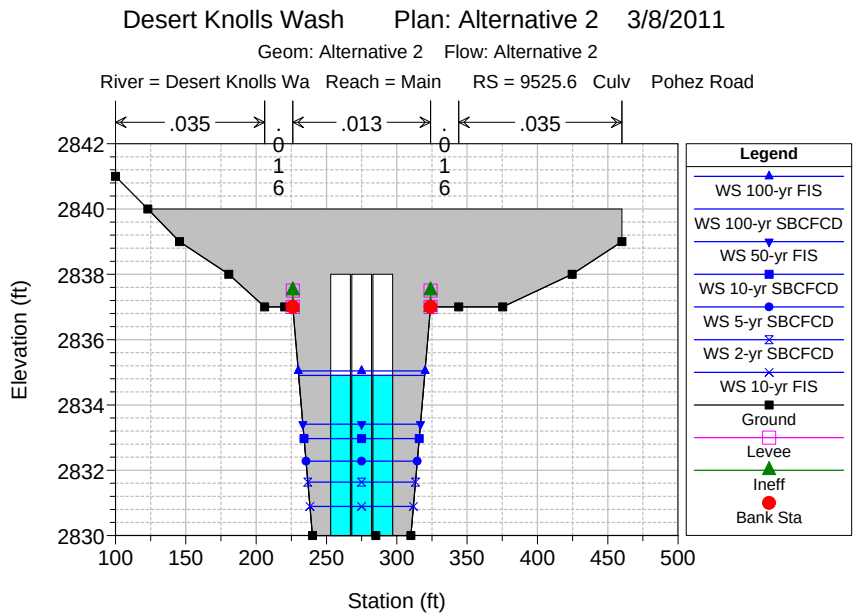

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 9863.9 Section 98+63.9
.035
.016
.03
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

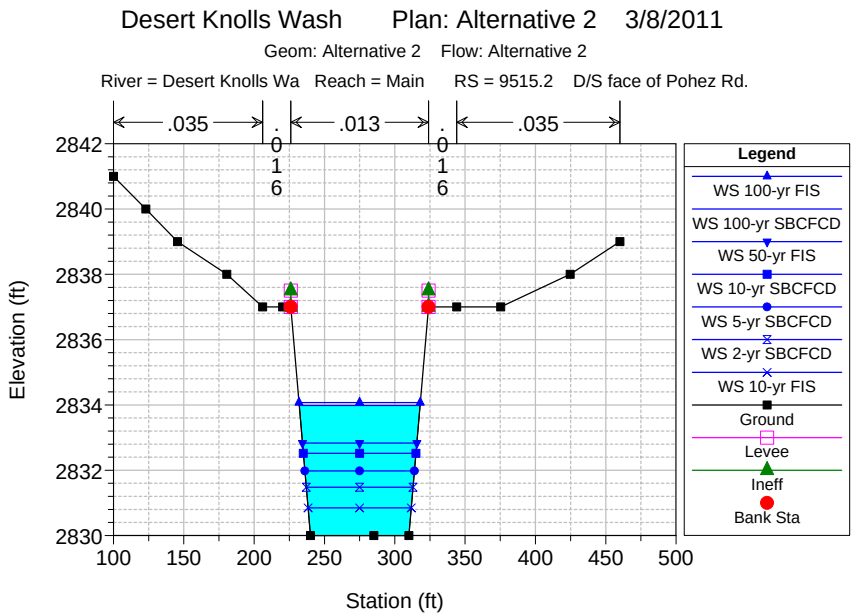

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 9850 98+50
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

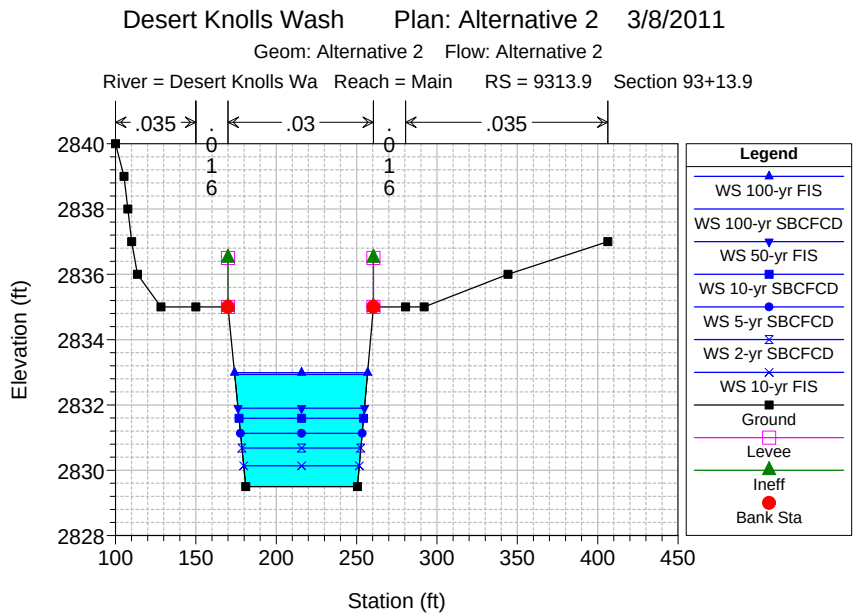

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 9747 U/S Limit of Rectangular Channel
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

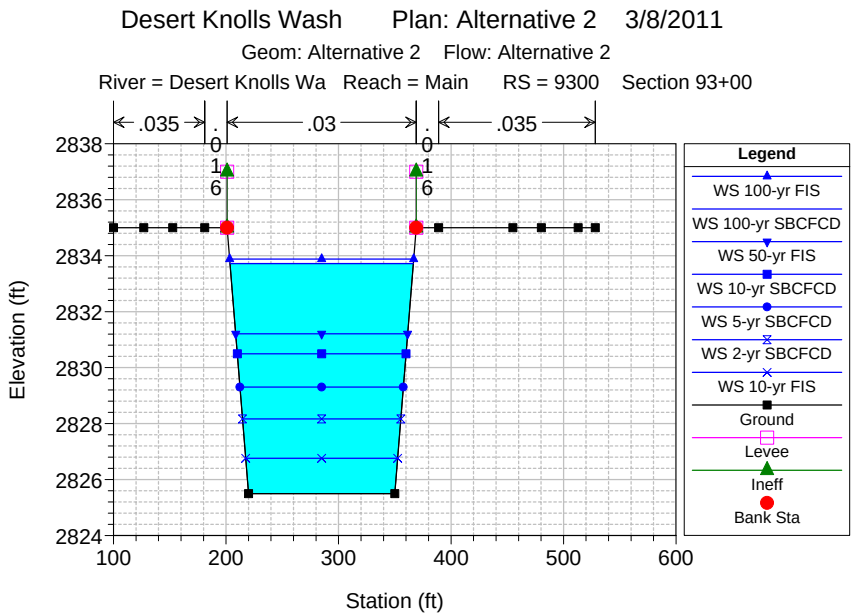

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 9536.1 U/S face of Pohez Rd.
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

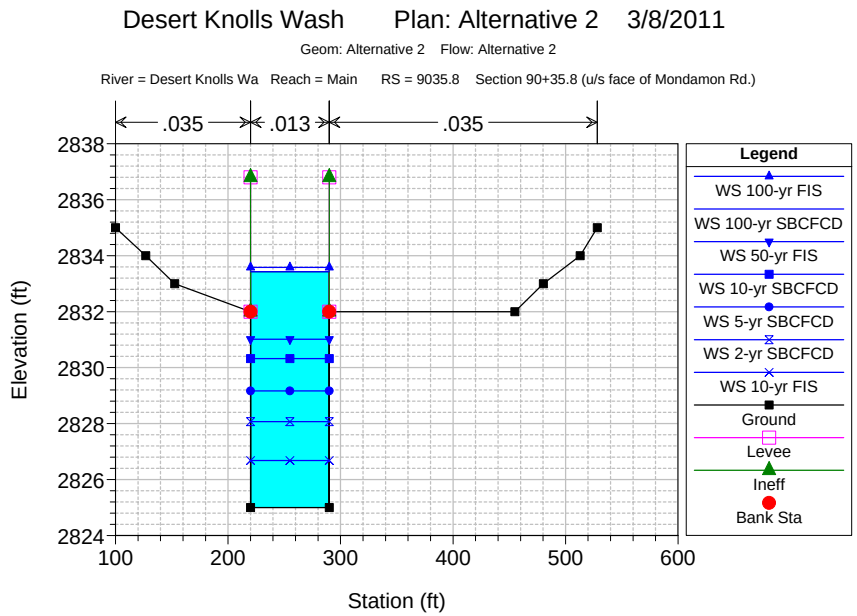

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 9525.6 Culv Pohez Road
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

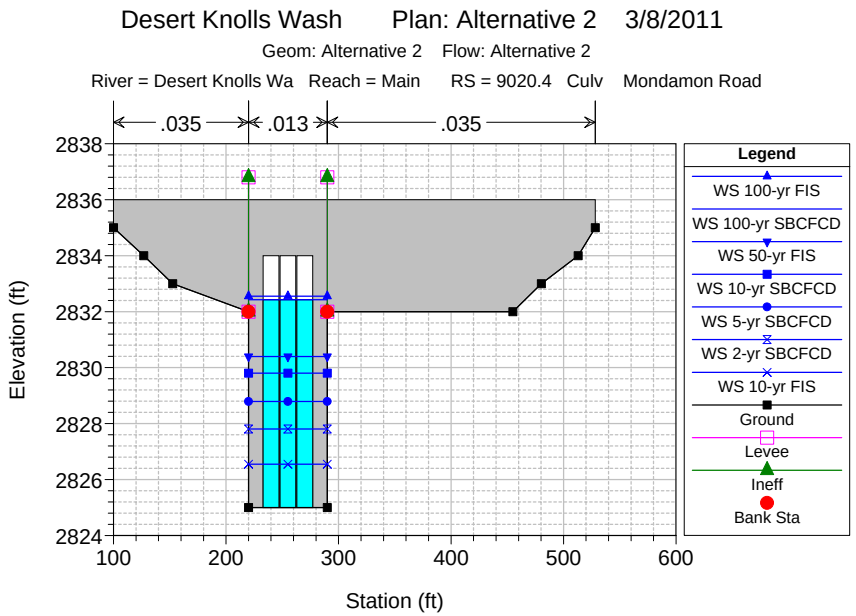

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 9525.6 Culv Pohez Road
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

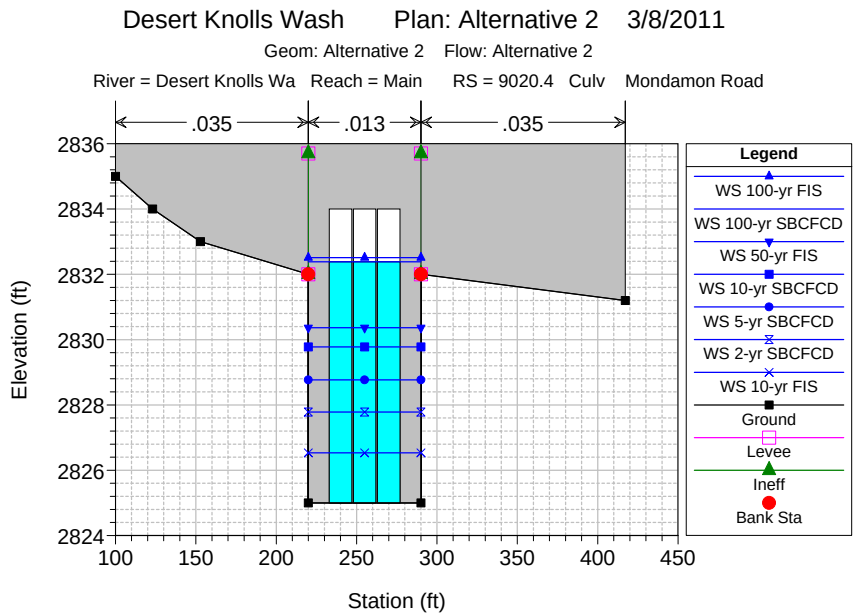

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 9515.2 D/S face of Pohez Rd.
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

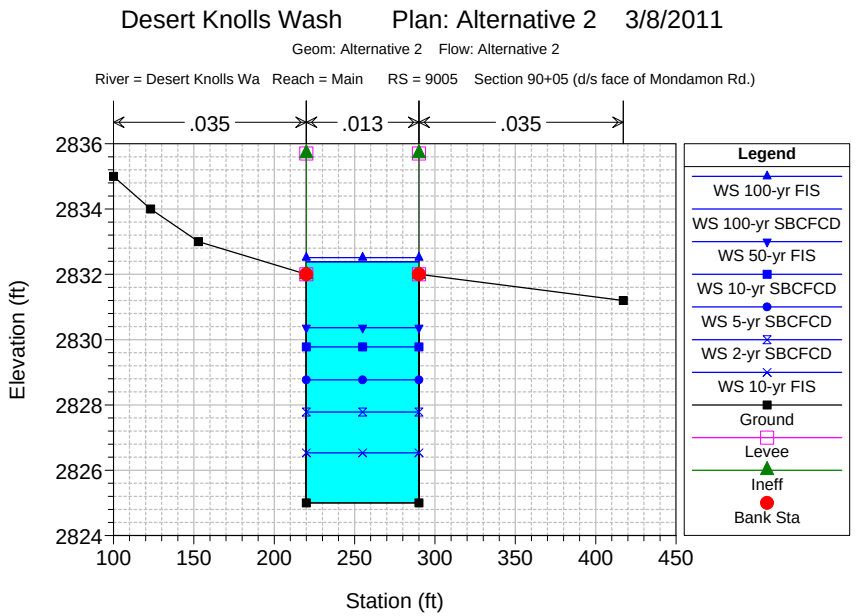

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 9313.9 Section 93+13.9
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

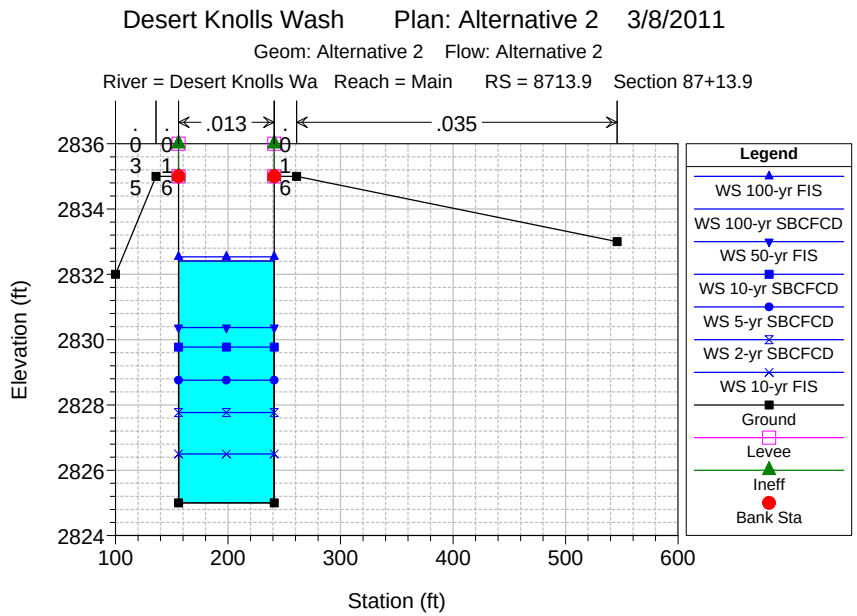

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 9300 Section 93+00
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

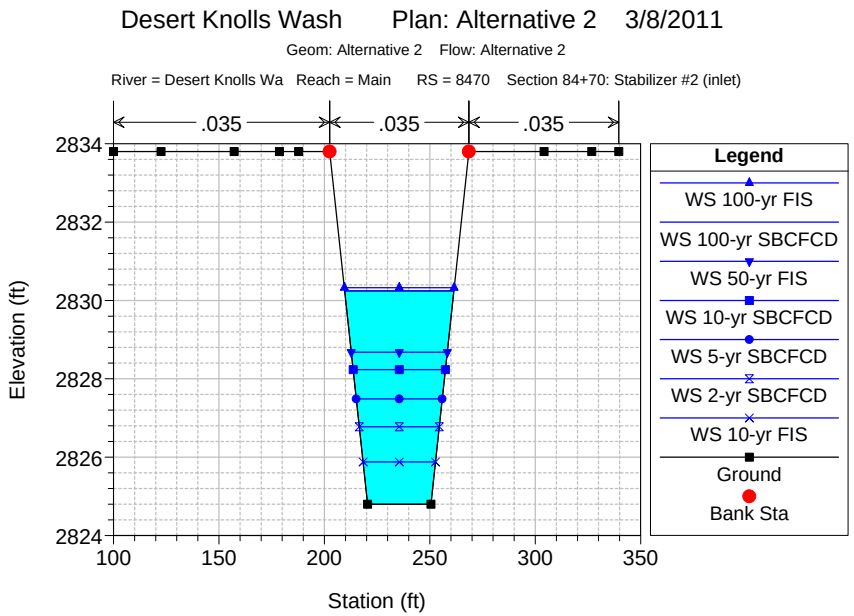

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 9035.8 Section 90+35.8 (u/s face of Mondamon Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

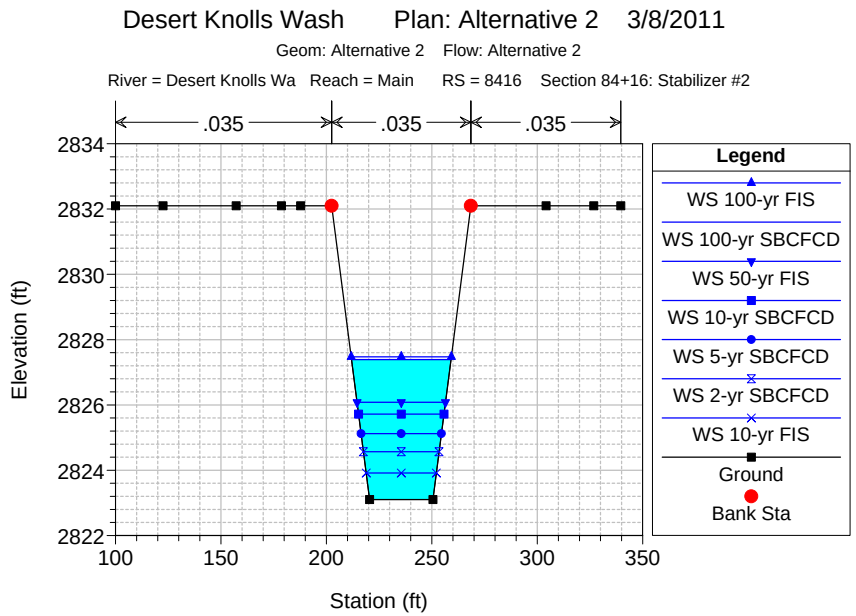

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 9020.4 Culv Mondamon Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

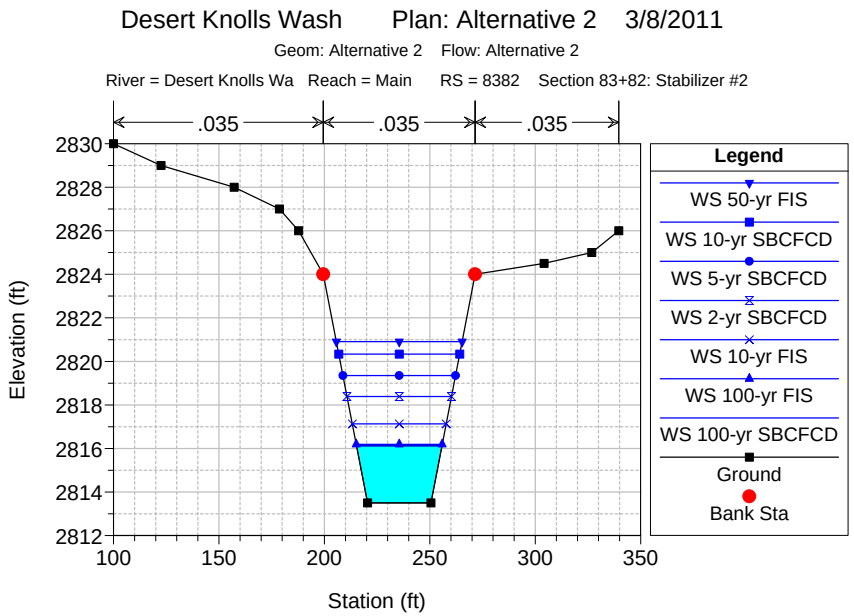

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 9020.4 Culv Mondamon Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

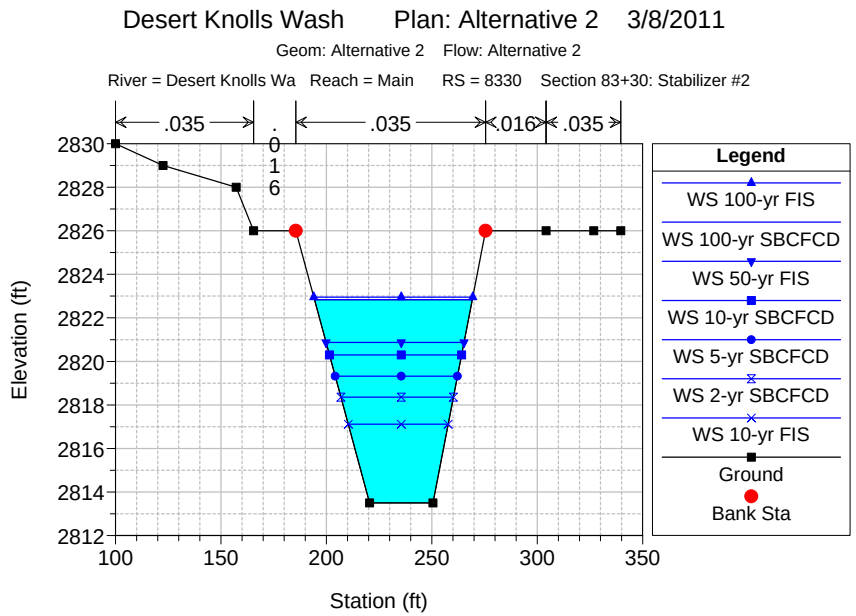

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 9005 Section 90+05 (d/s face of Mondamon Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

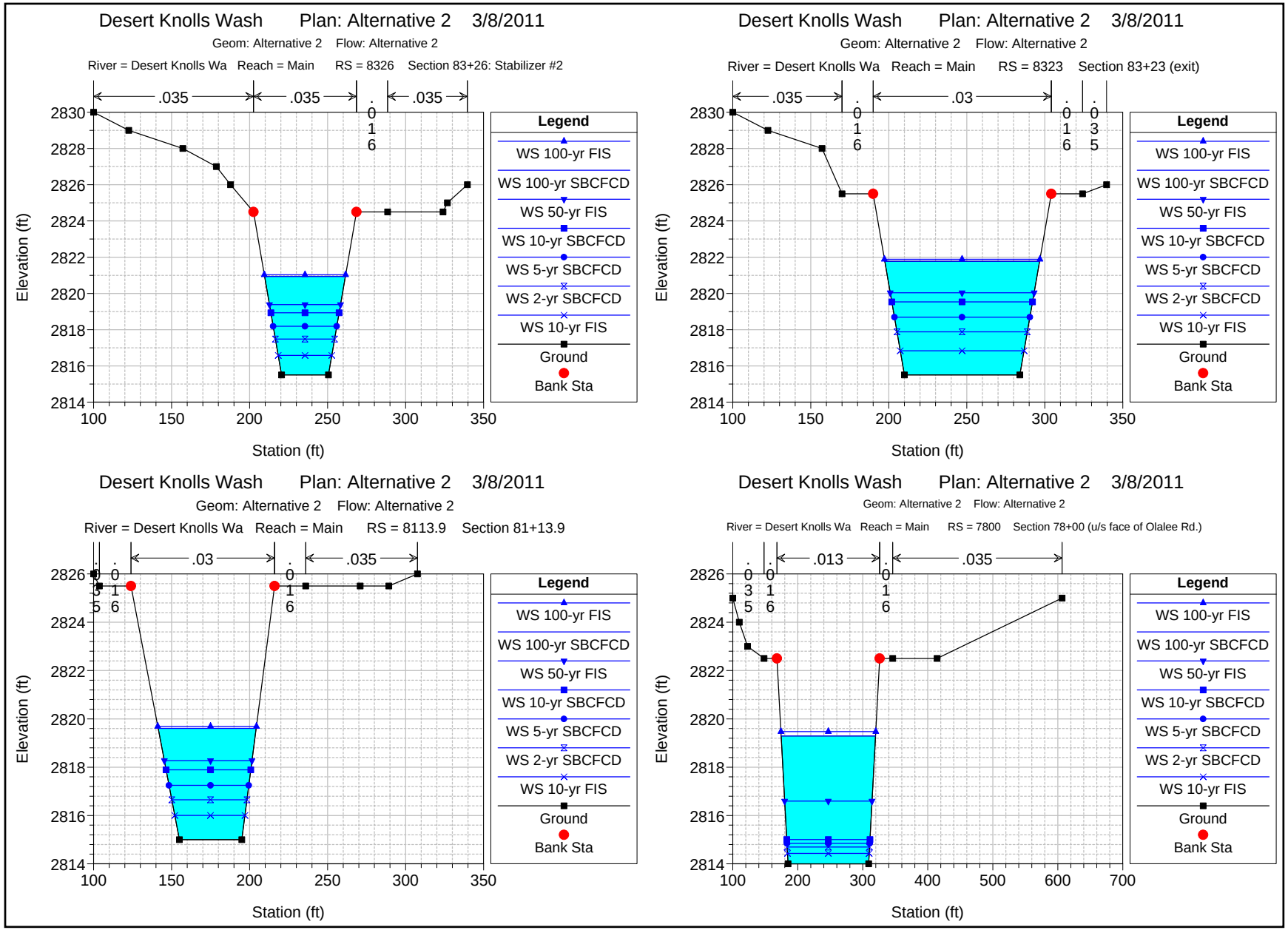

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 8713.9 Section 87+13.9
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

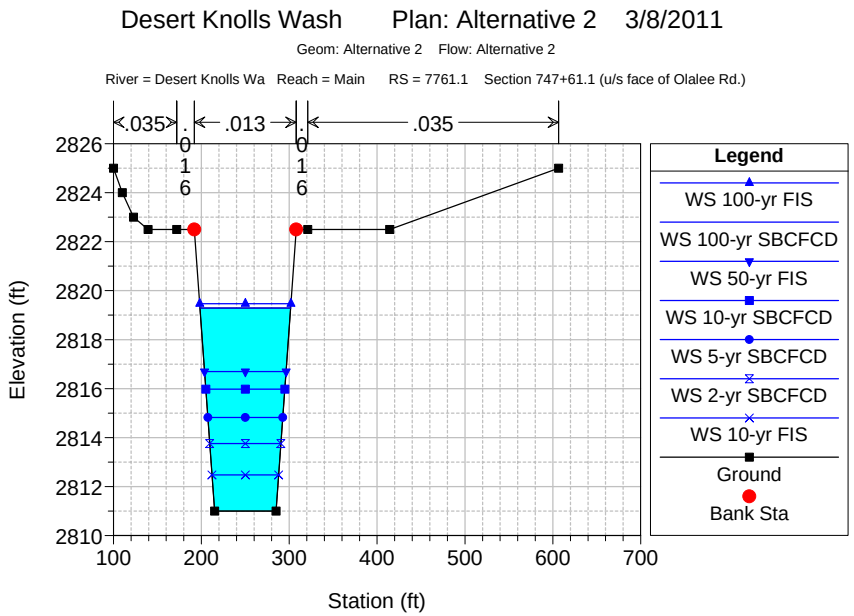

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 8470 Section 84+70: Stabilizer #2 (inlet)
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

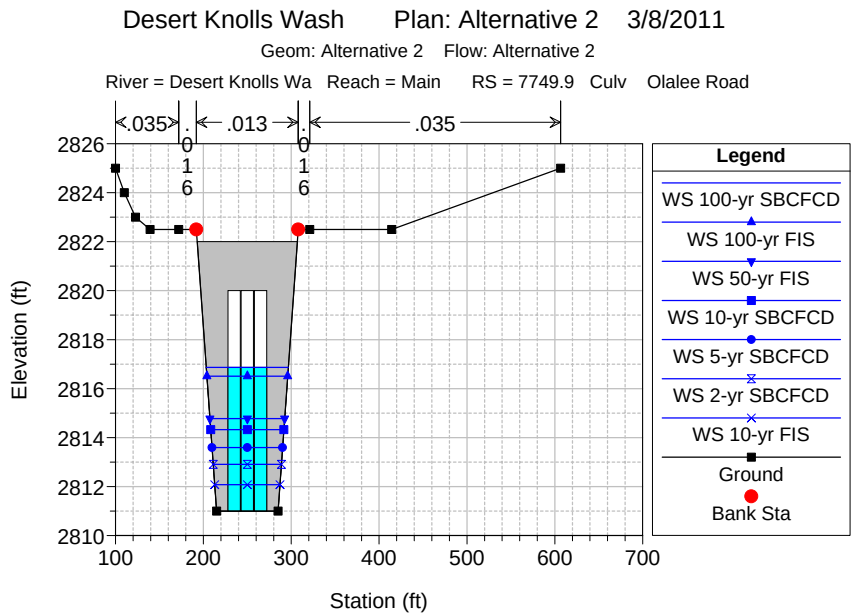

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 8416 Section 84+16: Stabilizer #2
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

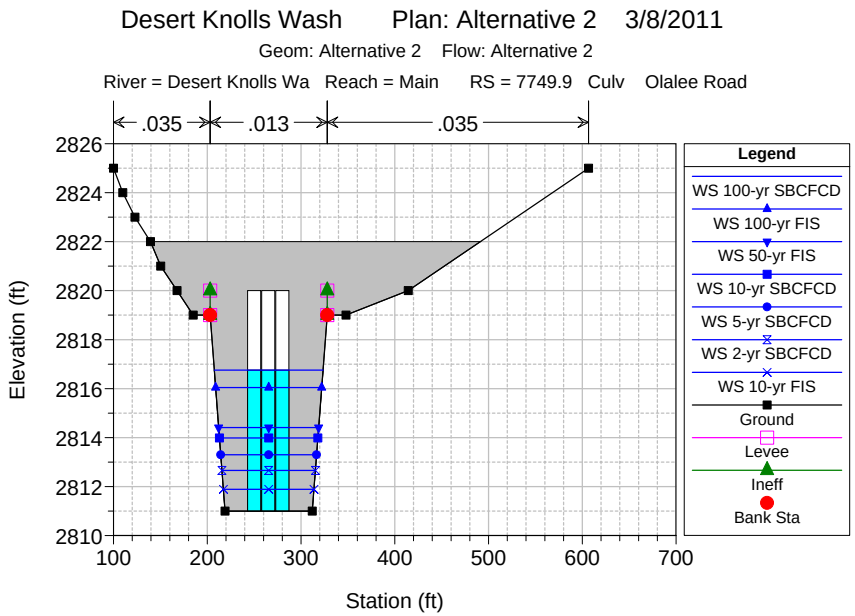

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 8382 Section 83+82: Stabilizer #2
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
WS 100-yr FIS
WS 100-yr SBCFCD
Ground
Bank Sta

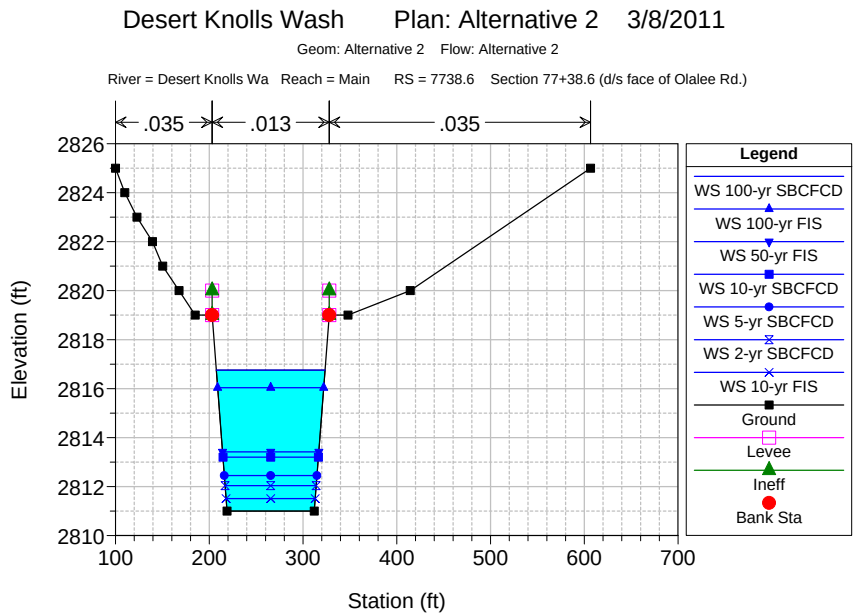

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 8330 Section 83+30: Stabilizer #2
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 8326 Section 83+26: Stabilizer #2
.035
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 8323 Section 83+23 (exit)
.035
.016
.03
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 8113.9 Section 81+13.9
.035
.016
.03
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 7800 Section 78+00 (u/s face of Olalee Rd.)
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 7761.1 Section 747+61.1 (u/s face of Olalee Rd.)
.035
.013
.035
.016
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 7749.9 Culv Olalee Road
.035
.013
.035
.016
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

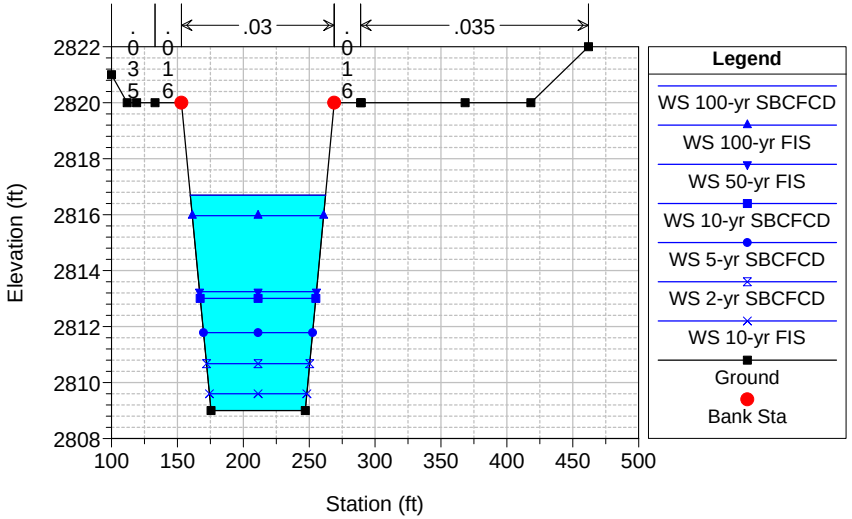

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 7749.9 Culv Olalee Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 7738.6 Section 77+38.6 (d/s face of Olalee Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

Desert Knolls Wash Plan: Alternative 2 3/8/2011

Geom: Alternative 2 Flow: Alternative 2

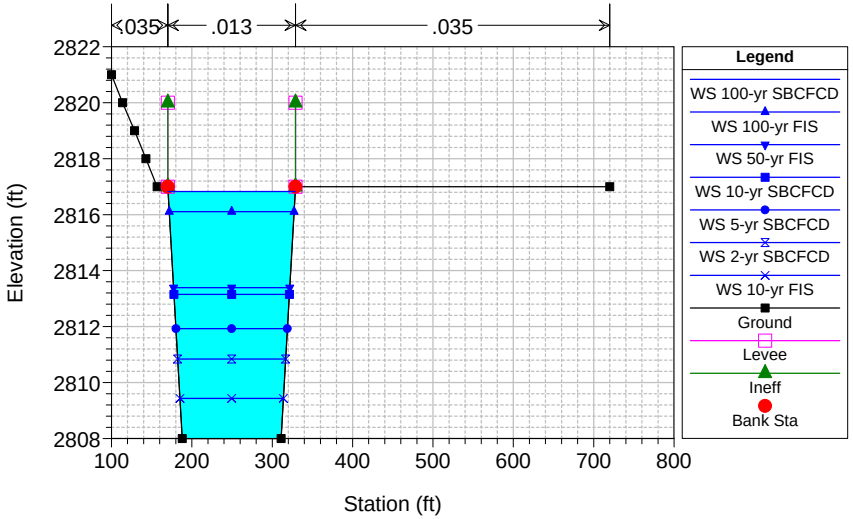
River = Desert Knolls Wa Reach = Main RS = 7456.8 Section 74+56.8 (confluence w/trib.)



Desert Knolls Wash Plan: Alternative 2 3/8/2011

Geom: Alternative 2 Flow: Alternative 2

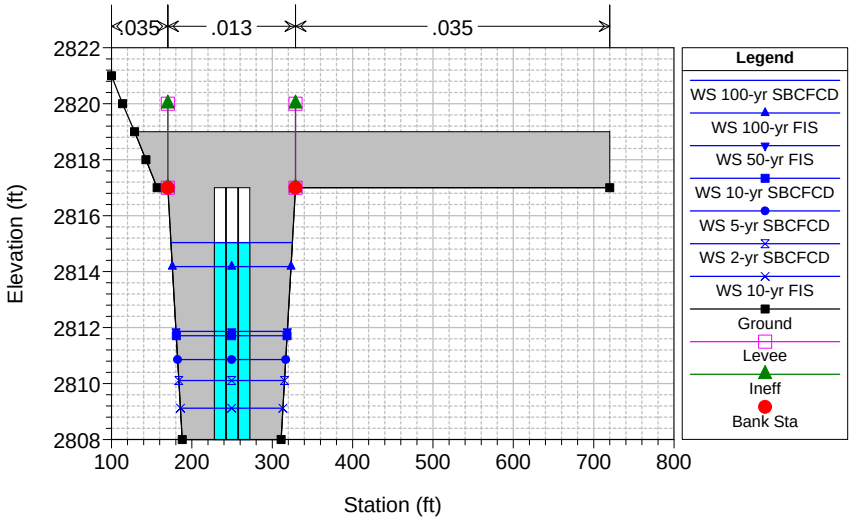
River = Desert Knolls Wa Reach = Main RS = 7267 Section 72+67 (u/s face Kasota Rd.)



Desert Knolls Wash Plan: Alternative 2 3/8/2011

Geom: Alternative 2 Flow: Alternative 2

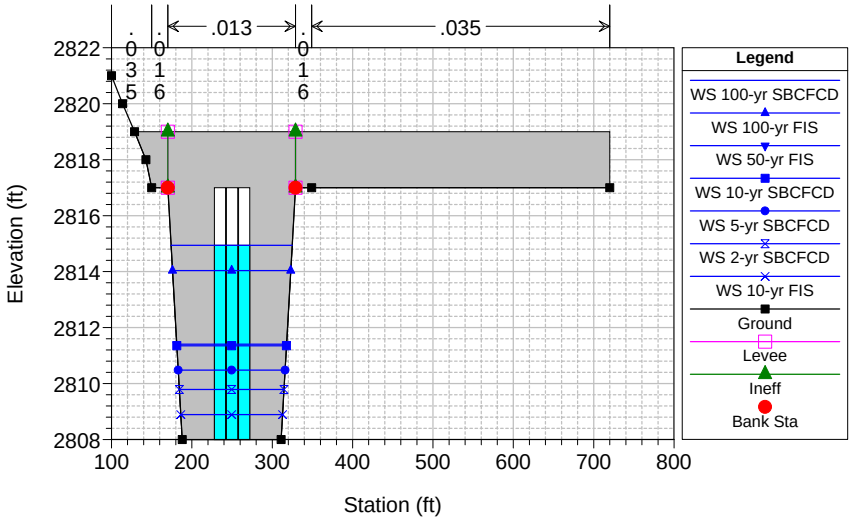
River = Desert Knolls Wa Reach = Main RS = 7249.1 Culv Kasota Road

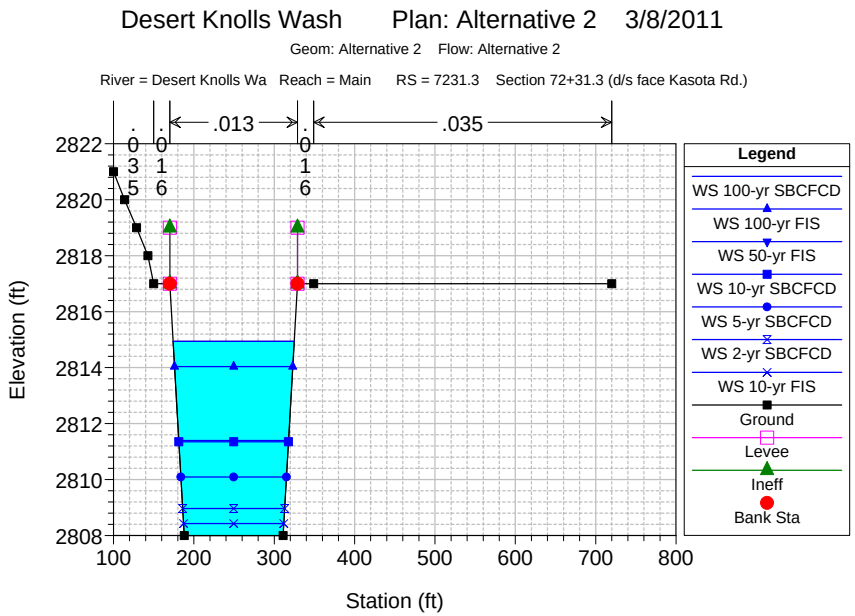


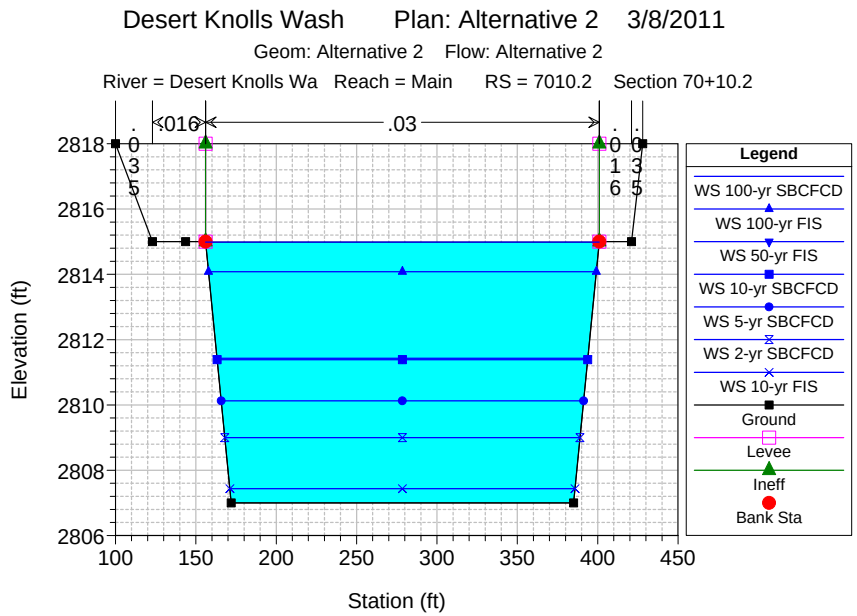
Desert Knolls Wash Plan: Alternative 2 3/8/2011

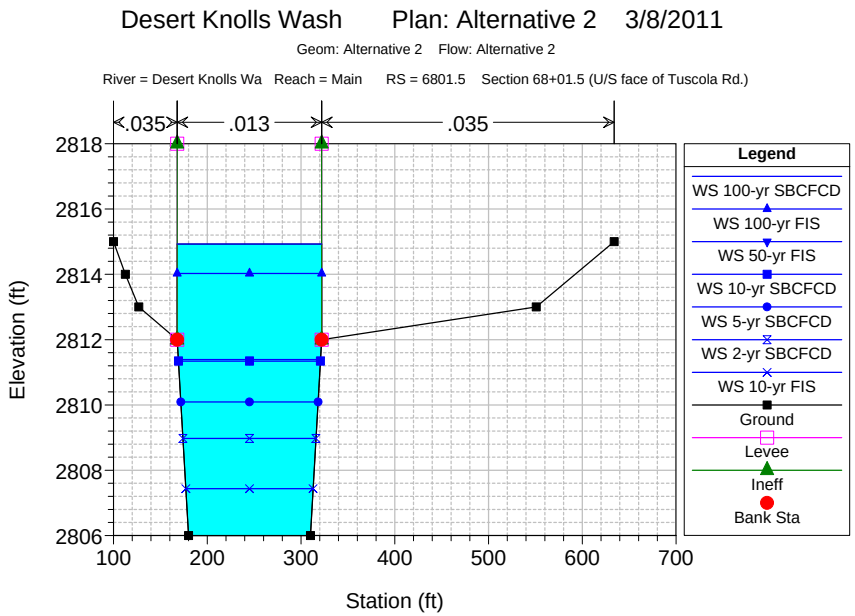
Geom: Alternative 2 Flow: Alternative 2

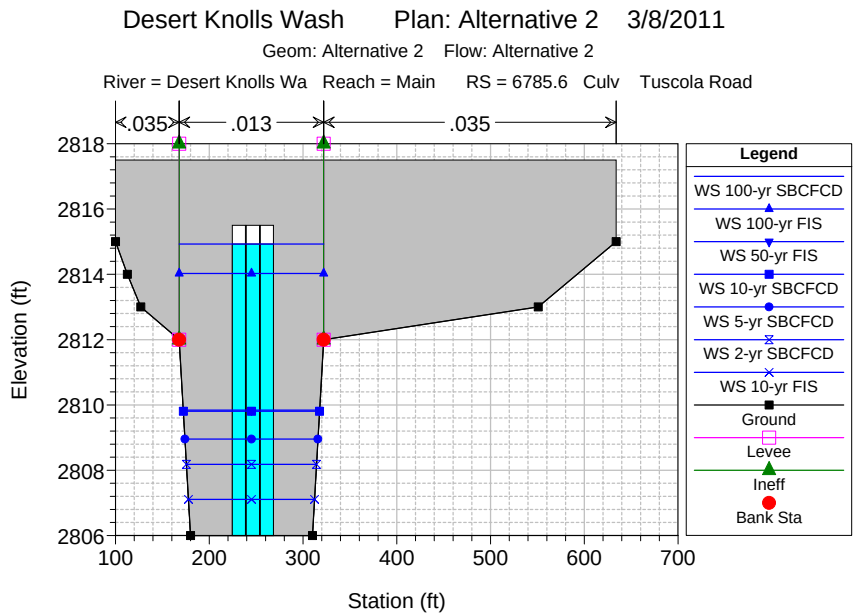
River = Desert Knolls Wa Reach = Main RS = 7249.1 Culv Kasota Road

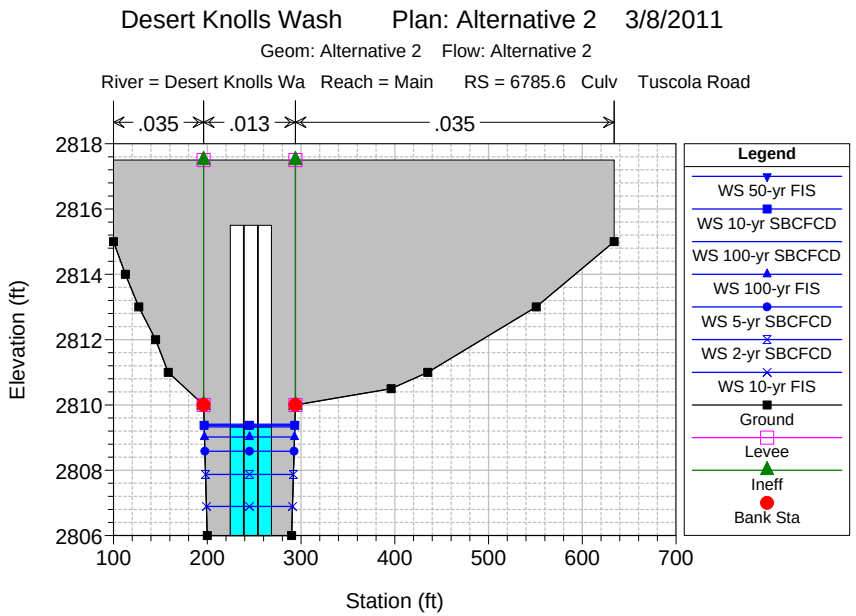


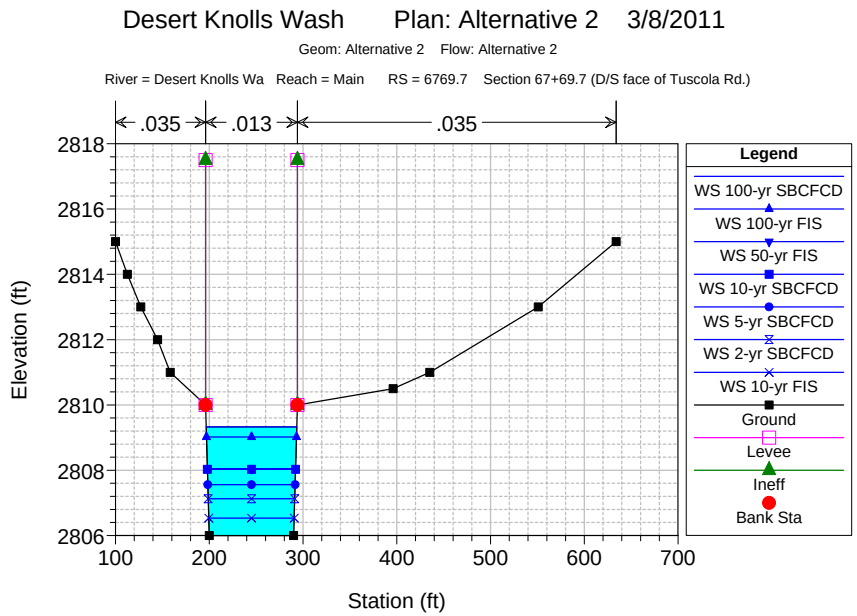

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 7231.3 Section 72+31.3 (d/s face Kasota Rd.)
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

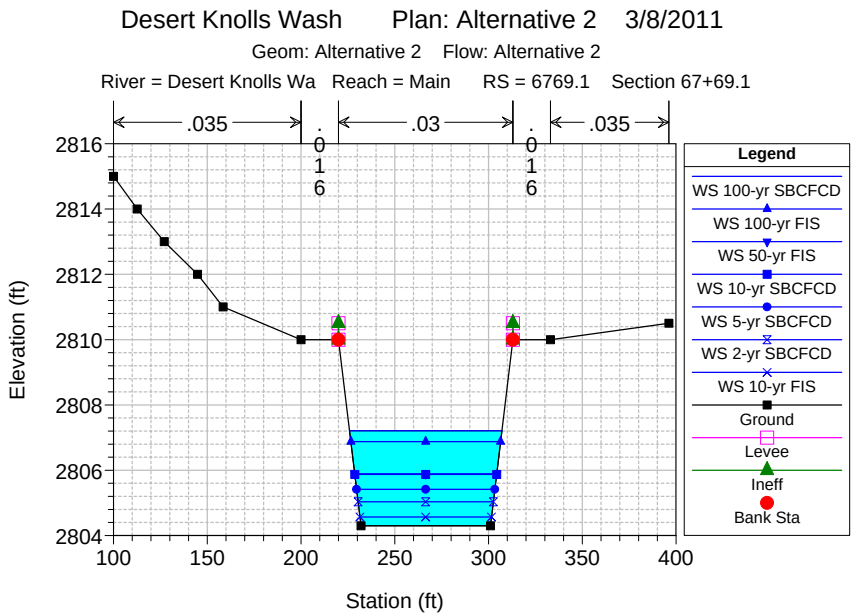

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 7010.2 Section 70+10.2
.035
.016
.03
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

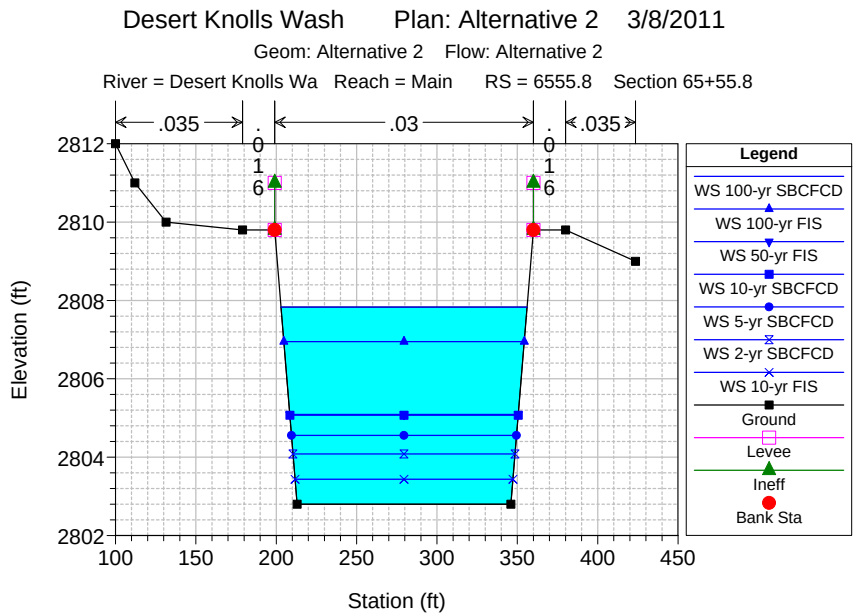

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6801.5 Section 68+01.5 (U/S face of Tuscola Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

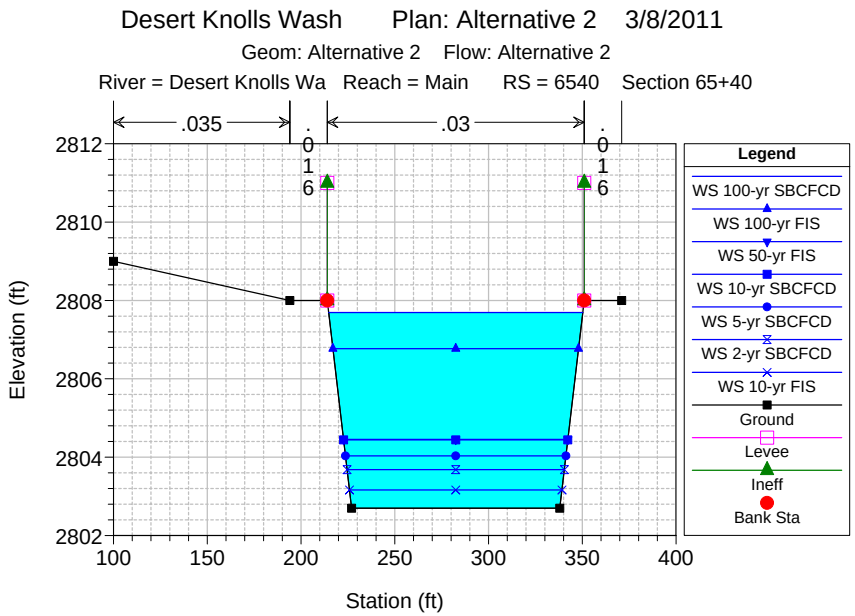

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6785.6 Culv Tuscola Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

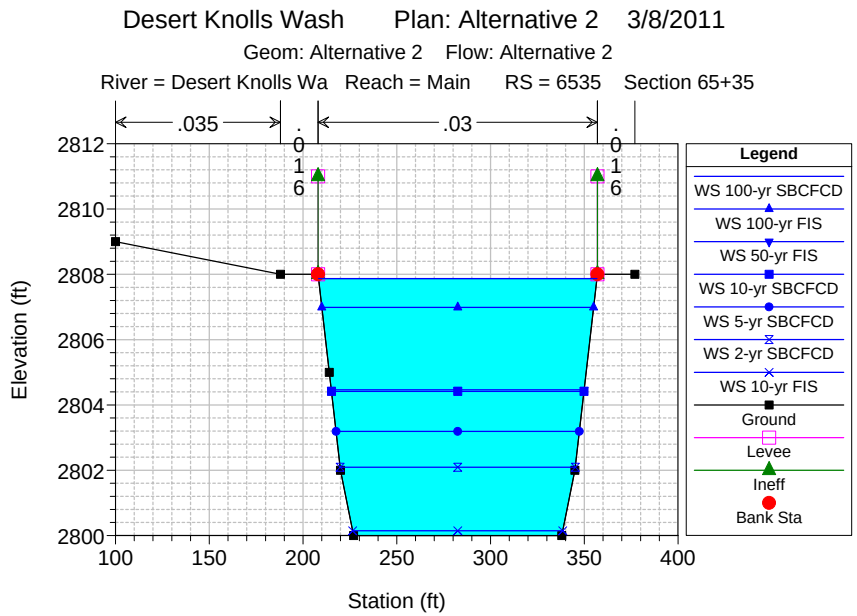

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6785.6 Culv Tuscola Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 50-yr FIS
WS 10-yr SBCFCD
WS 100-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

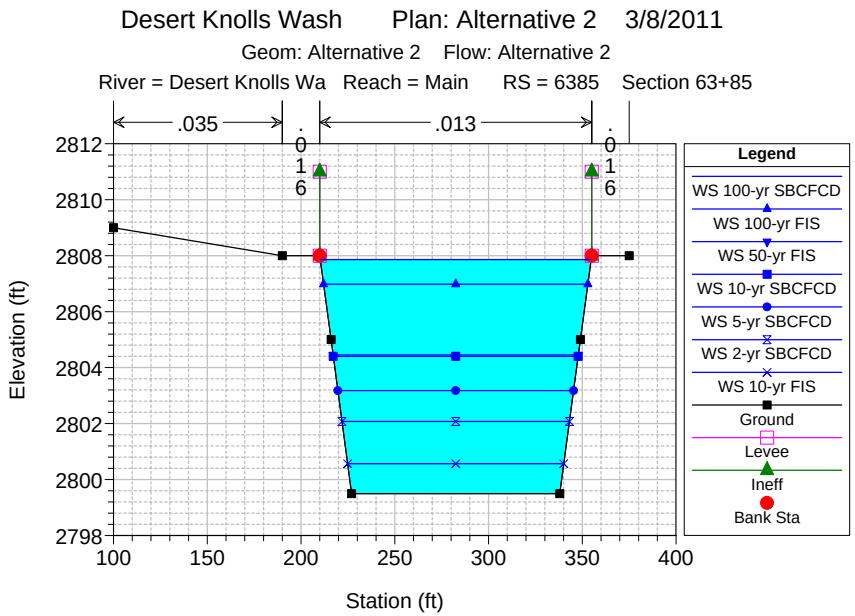

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6769.7 Section 67+69.7 (D/S face of Tuscola Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

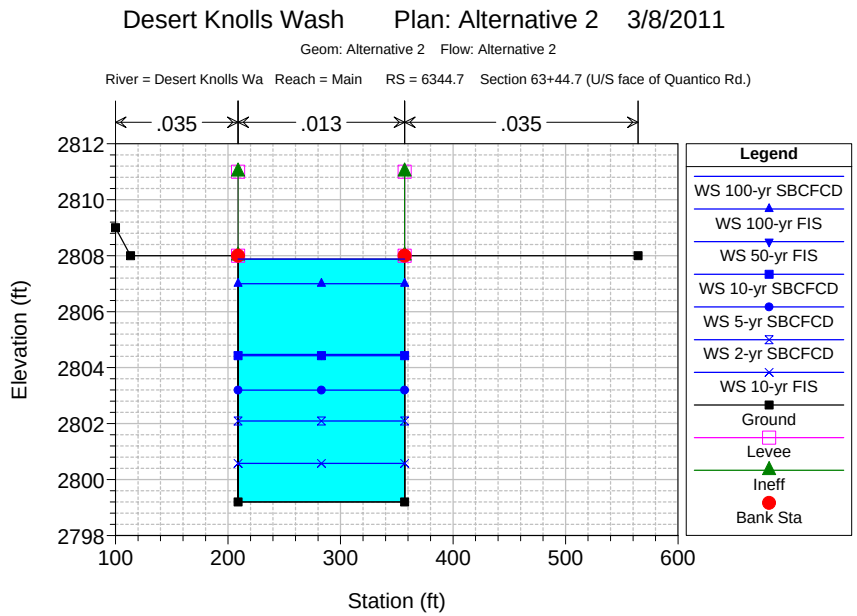

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6769.1 Section 67+69.1
.035
.016
.03
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

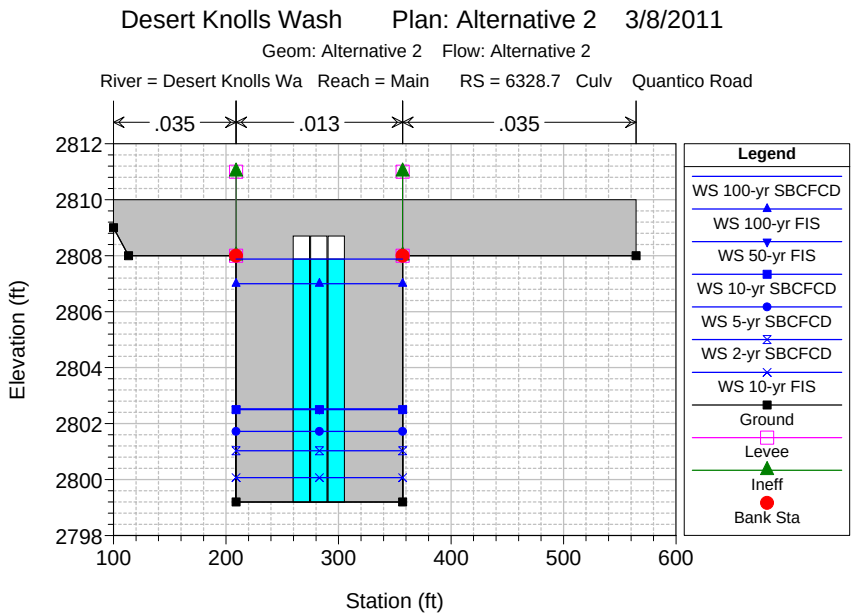

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6555.8 Section 65+55.8
.035
.016
.03
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

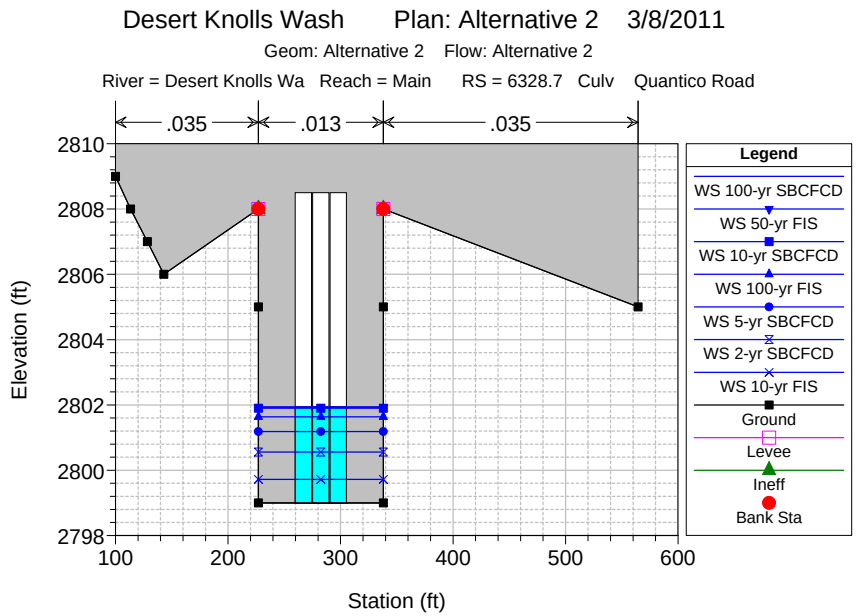

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6540 Section 65+40
.035
.016
.03
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

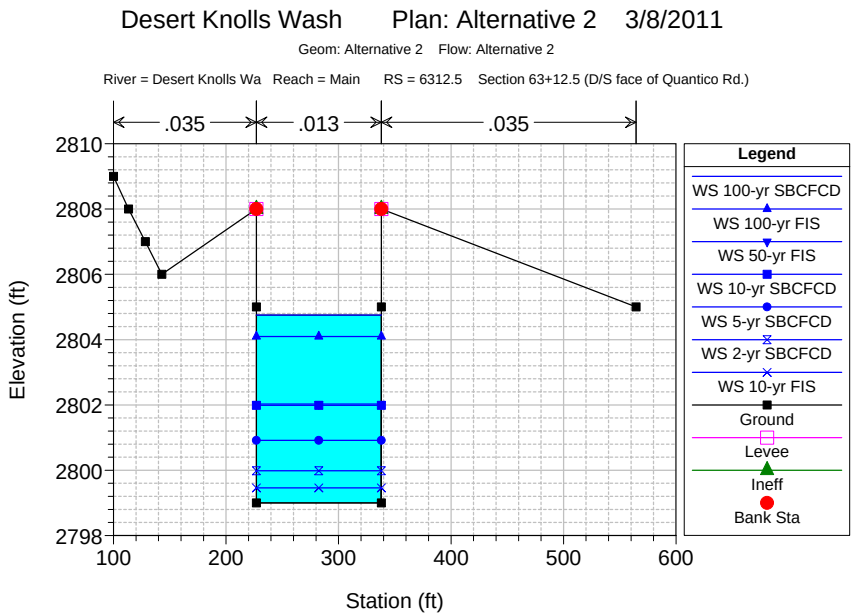

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6535 Section 65+35
.035
.016
.03
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

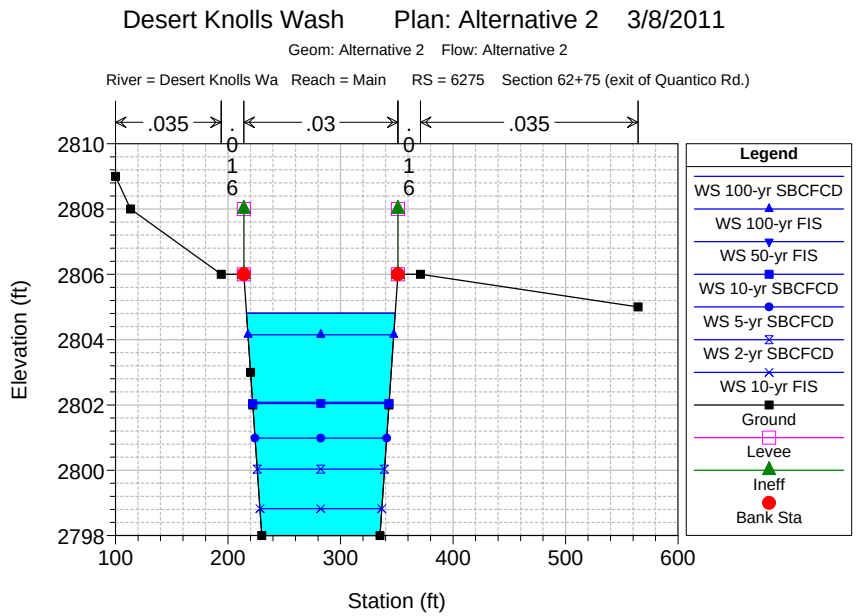

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6385 Section 63+85
.035
.016
.013
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

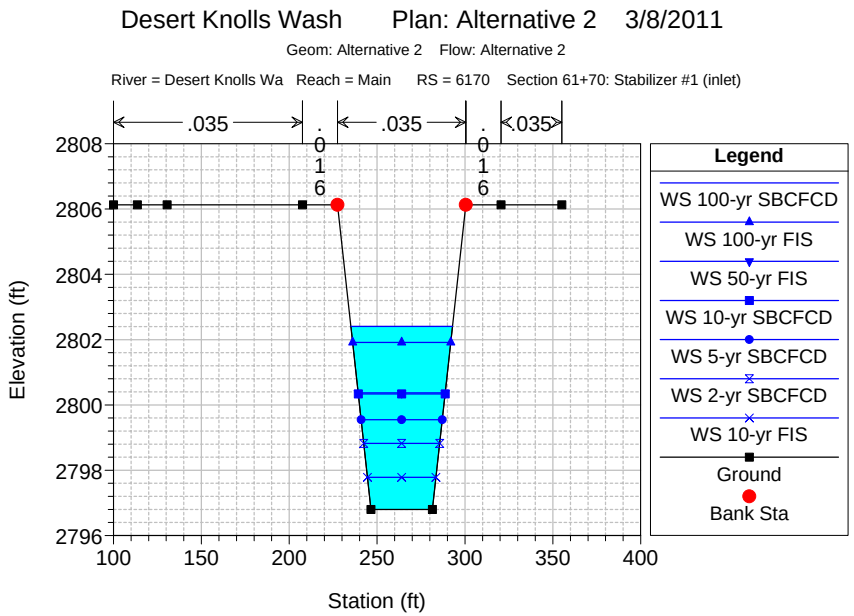

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6344.7 Section 63+44.7 (U/S face of Quantico Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

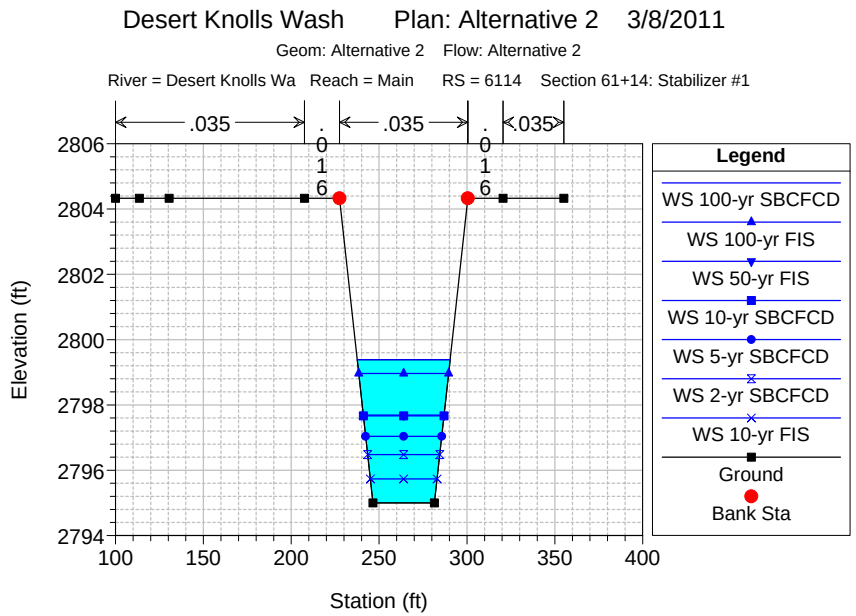

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6328.7 Culv Quantico Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

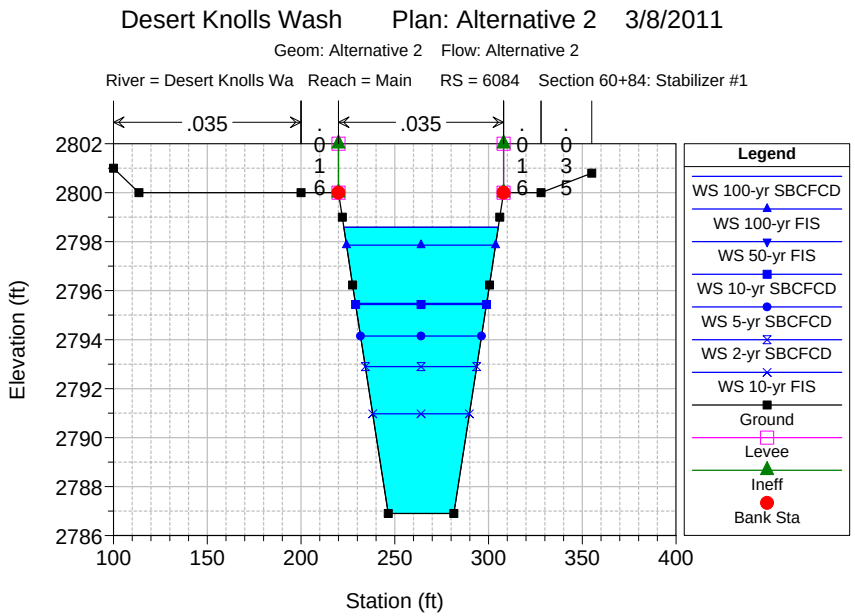

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6328.7 Culv Quantico Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

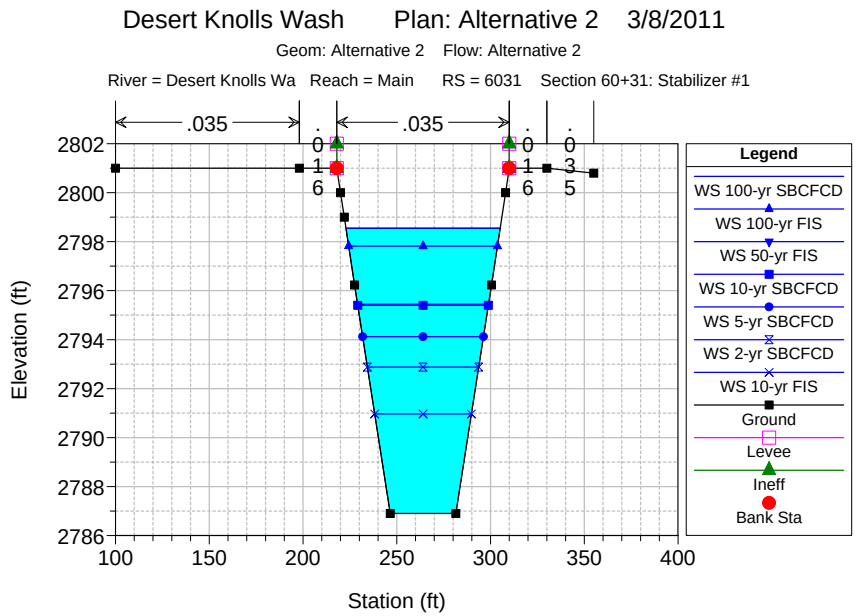

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6312.5 Section 63+12.5 (D/S face of Quantico Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6275 Section 62+75 (exit of Quantico Rd.)
.035
.016
.03
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6170 Section 61+70: Stabilizer #1 (inlet)
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6114 Section 61+14: Stabilizer #1
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

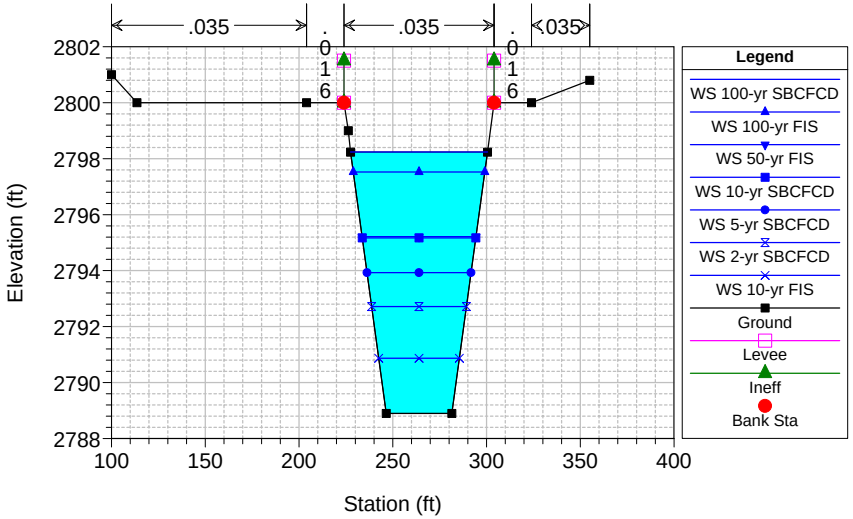

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6084 Section 60+84: Stabilizer #1
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 6031 Section 60+31: Stabilizer #1
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

Desert Knolls Wash Plan: Alternative 2 3/8/2011

Geom: Alternative 2 Flow: Alternative 2

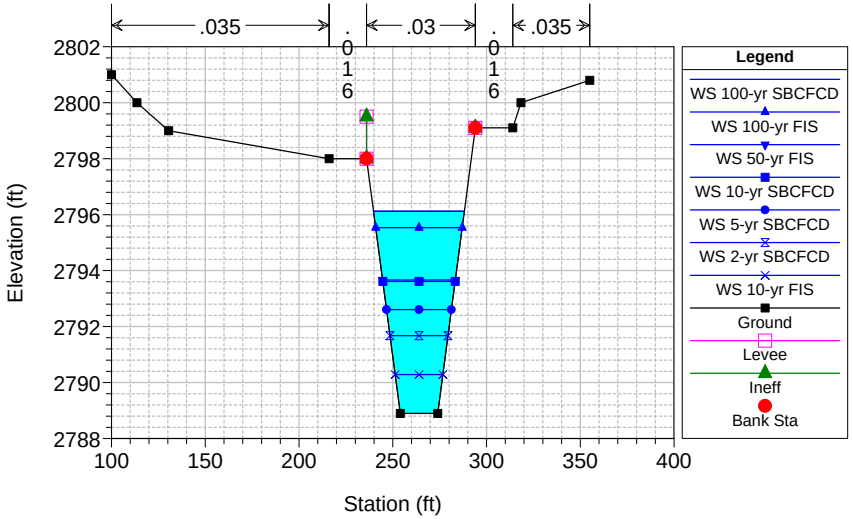
River = Desert Knolls Wa Reach = Main RS = 6027 Section 60+27: Stabilizer #1



Desert Knolls Wash Plan: Alternative 2 3/8/2011

Geom: Alternative 2 Flow: Alternative 2

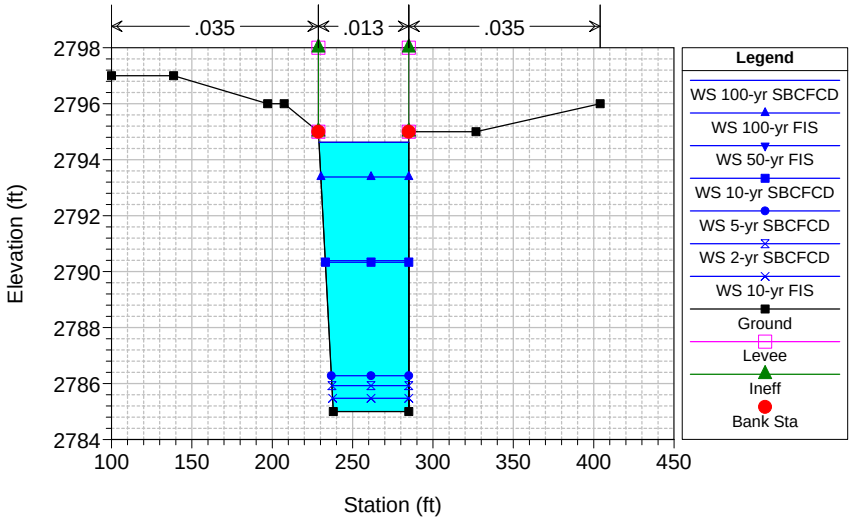
River = Desert Knolls Wa Reach = Main RS = 6024 Section 60+24: Stabilizer #1 (exit)



Desert Knolls Wash Plan: Alternative 2 3/8/2011

Geom: Alternative 2 Flow: Alternative 2

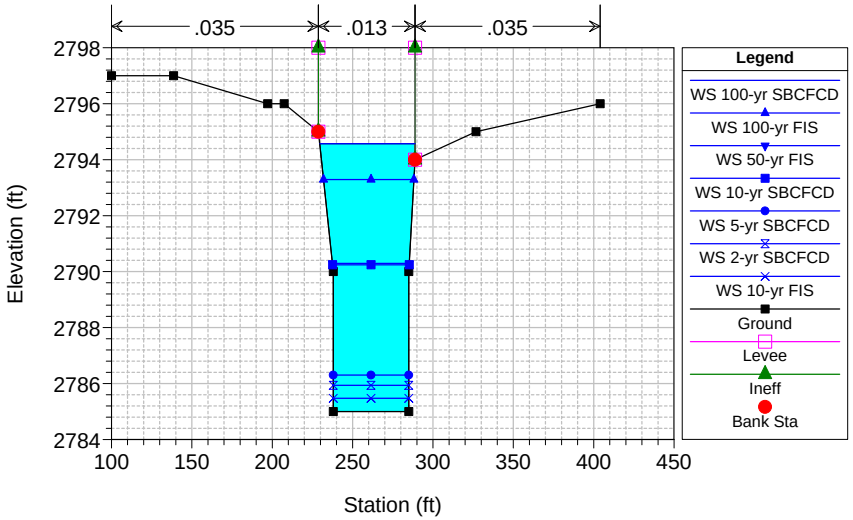
River = Desert Knolls Wa Reach = Main RS = 5742.1 Section 57+42.1

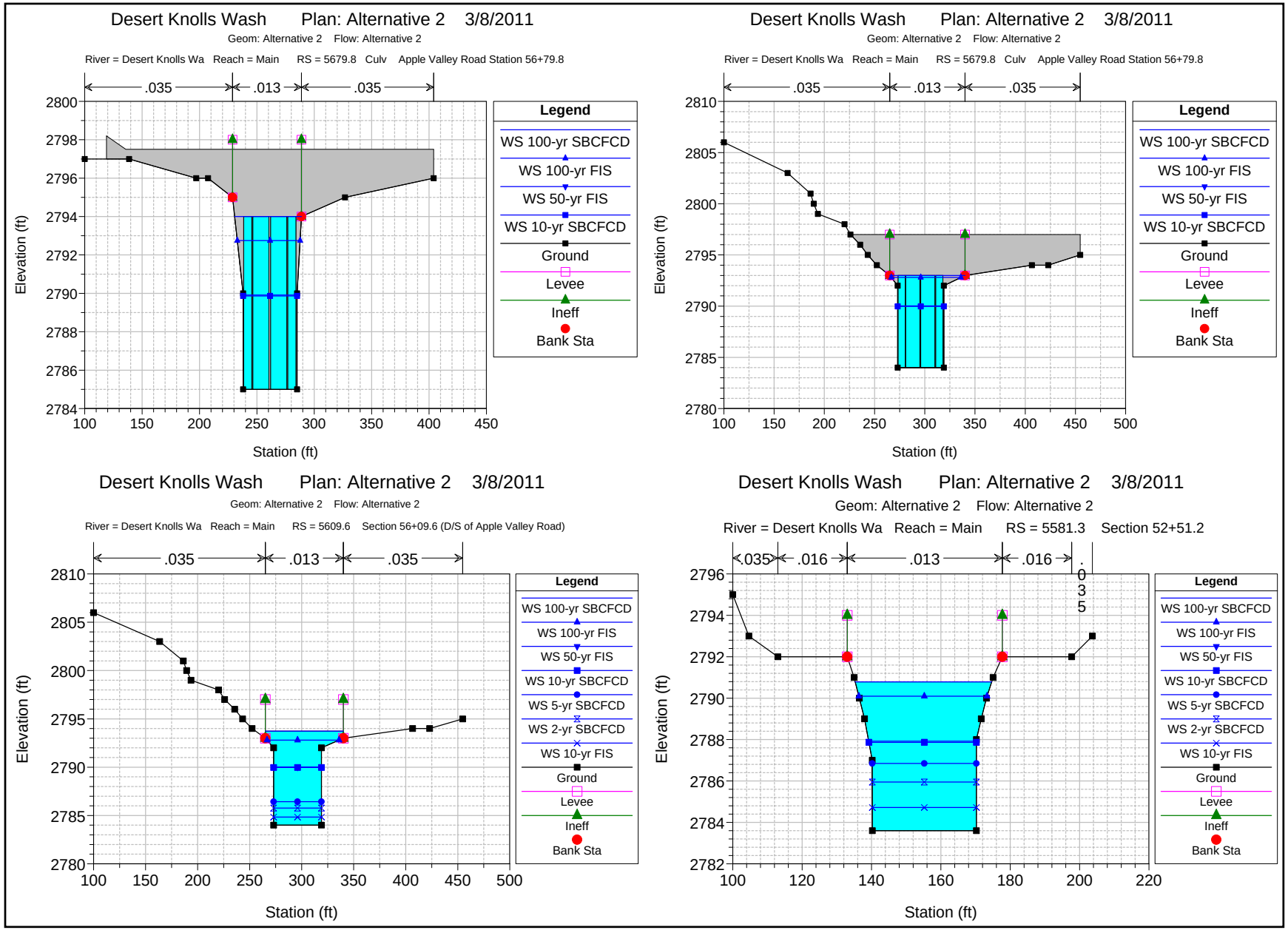


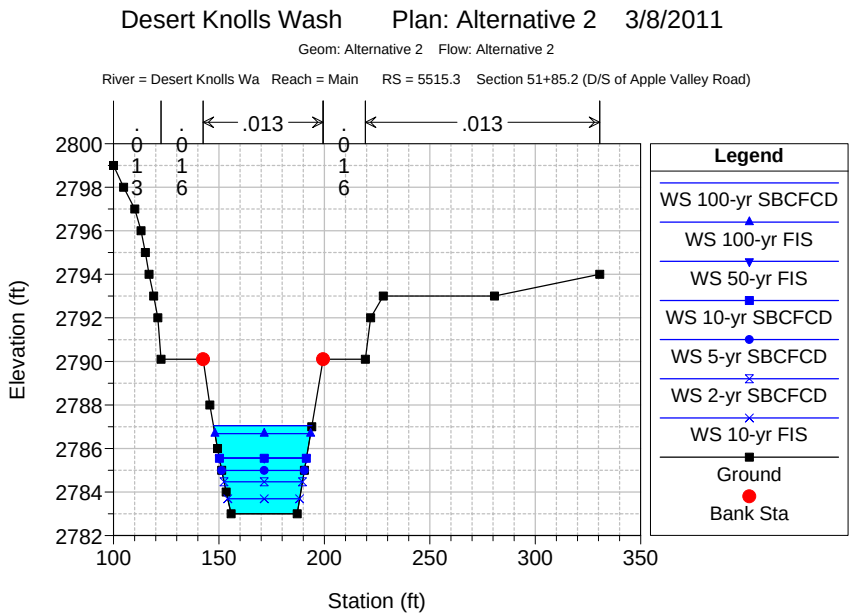
Desert Knolls Wash Plan: Alternative 2 3/8/2011

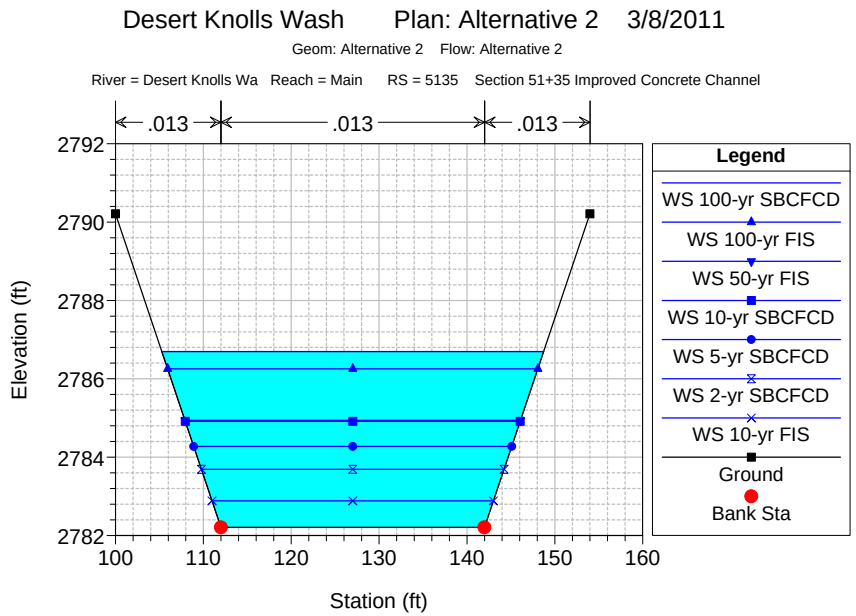
Geom: Alternative 2 Flow: Alternative 2

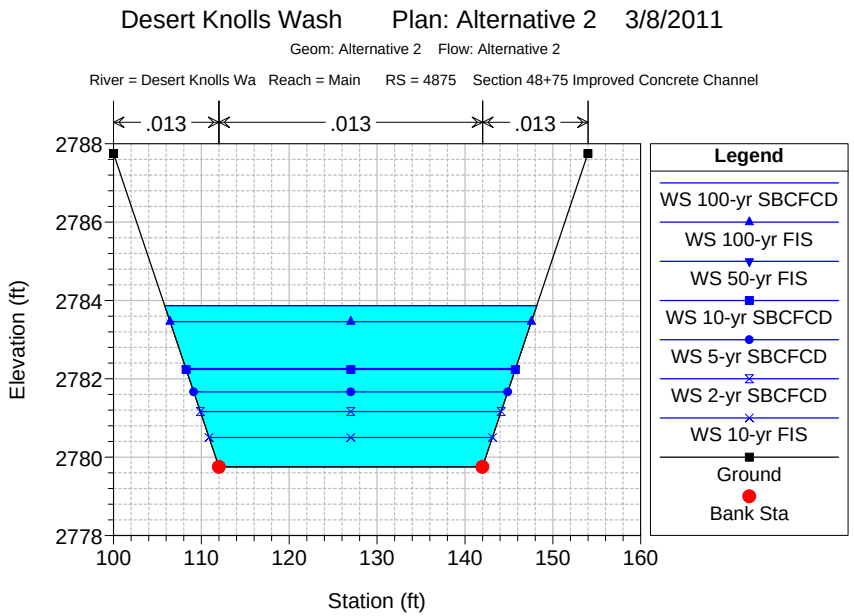
River = Desert Knolls Wa Reach = Main RS = 5742 Section 57+42 (U/S of Apple Valley Road)




Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 5679.8 Culv Apple Valley Road Station 56+79.8
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 5679.8 Culv Apple Valley Road Station 56+79.8
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 5609.6 Section 56+09.6 (D/S of Apple Valley Road)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 5581.3 Section 52+51.2
.035
.016
.013
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 5515.3 Section 51+85.2 (D/S of Apple Valley Road)
.013
.013
.013
.016
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 5135 Section 51+35 Improved Concrete Channel
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta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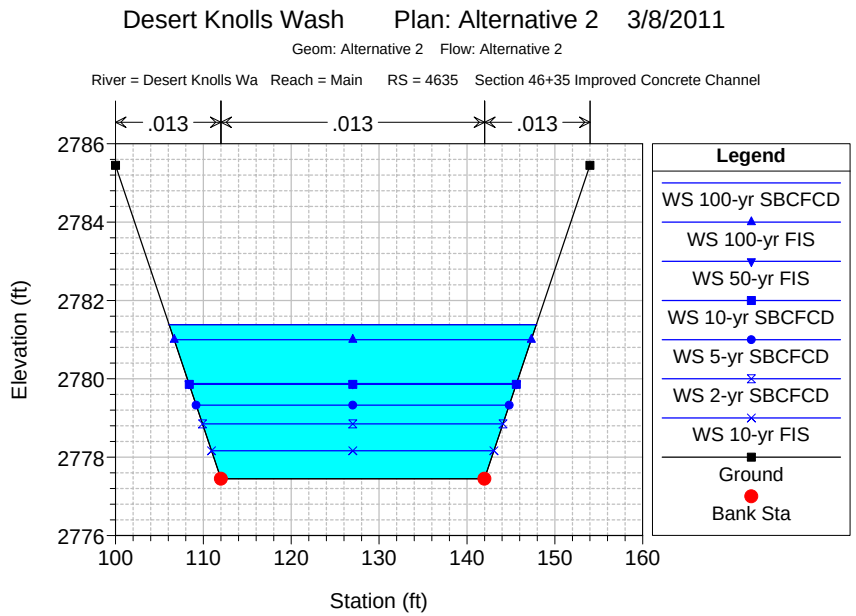
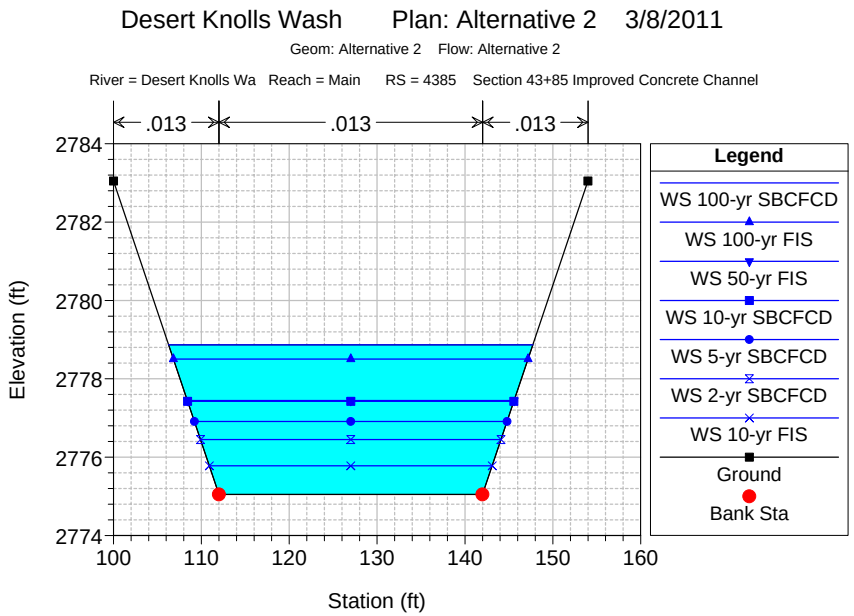
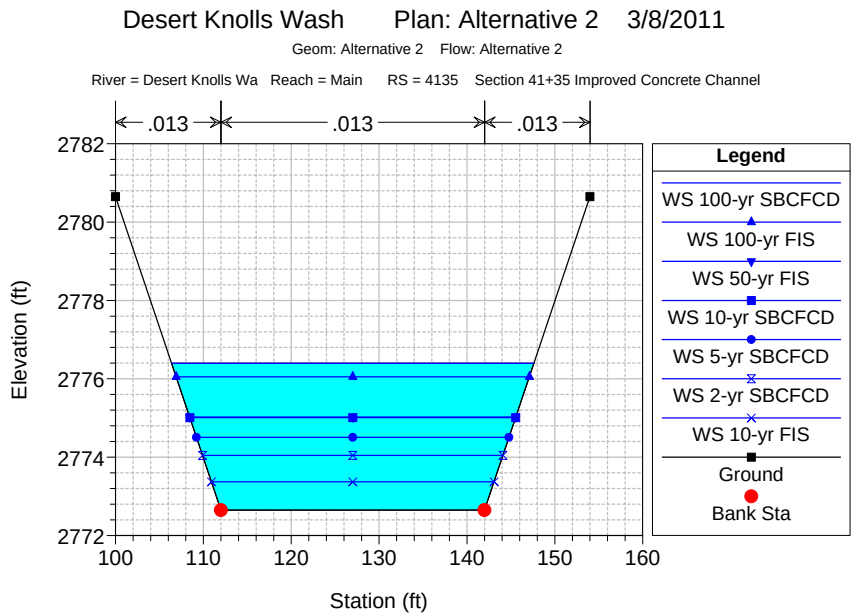
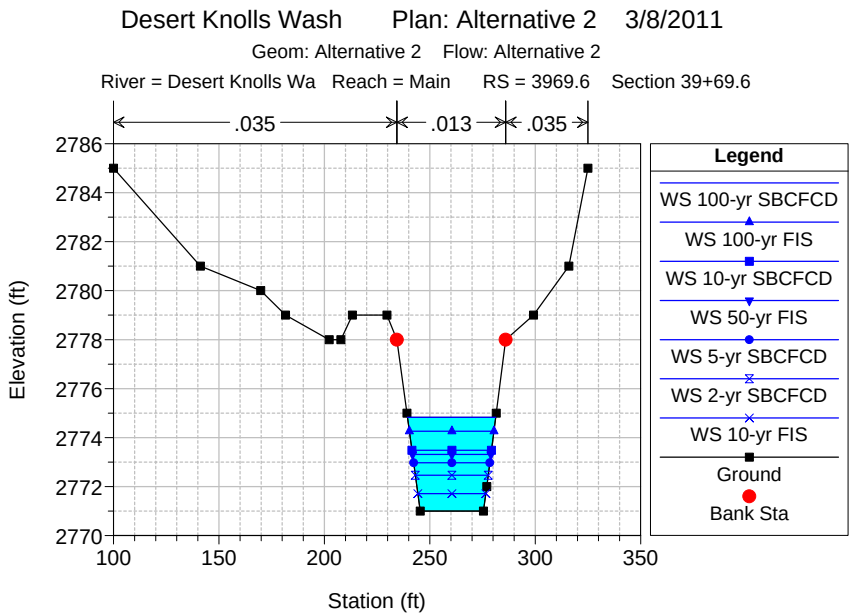
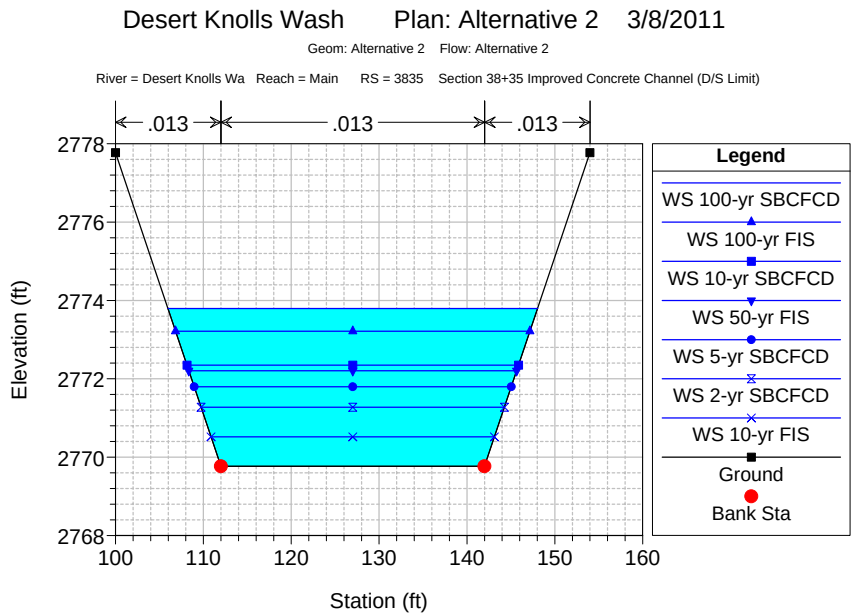
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 4875 Section 48+75 Improved Concrete Channel
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

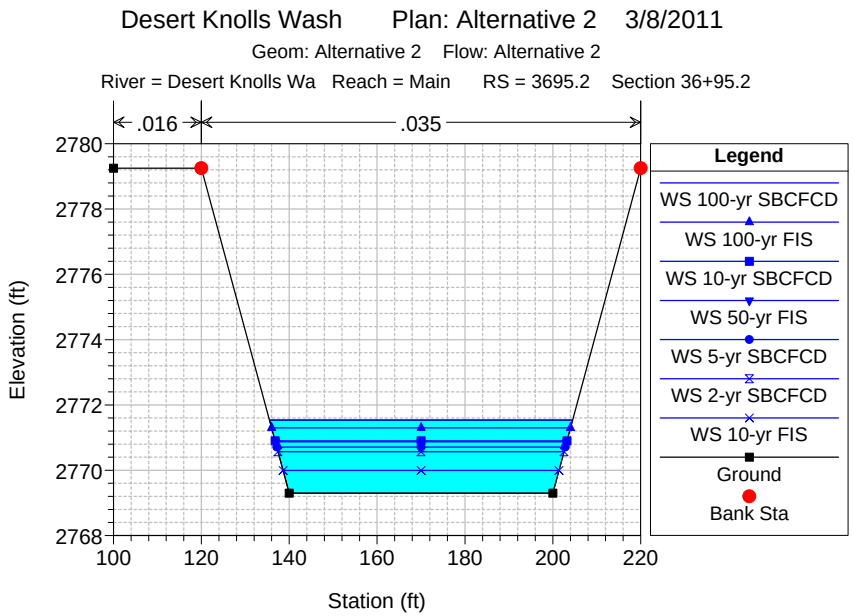

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 4635 Section 46+35 Improved Concrete Channel
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

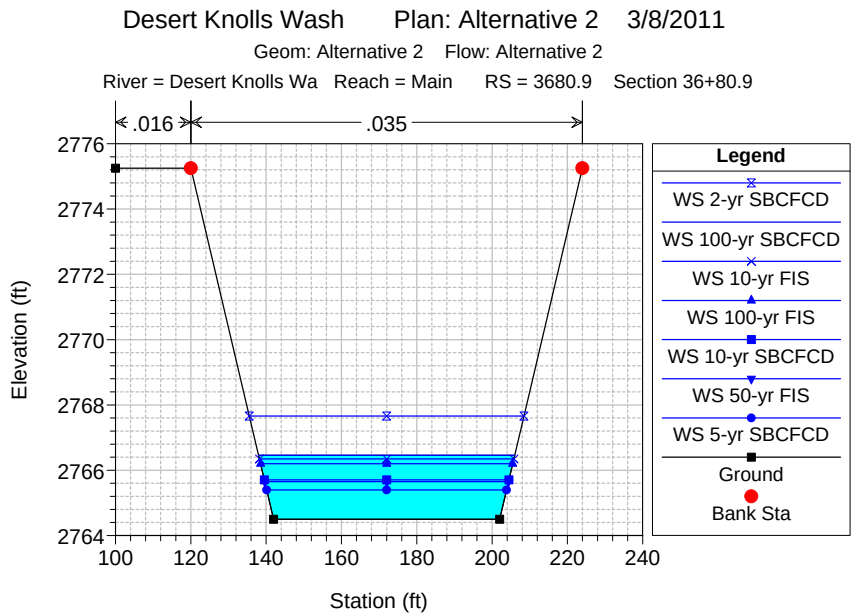

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 4385 Section 43+85 Improved Concrete Channel
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

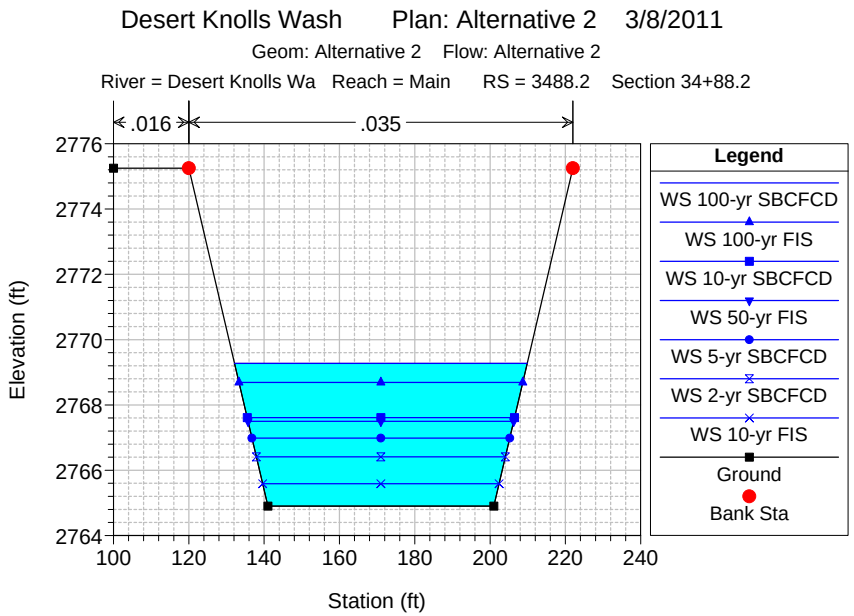

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 4135 Section 41+35 Improved Concrete Channel
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

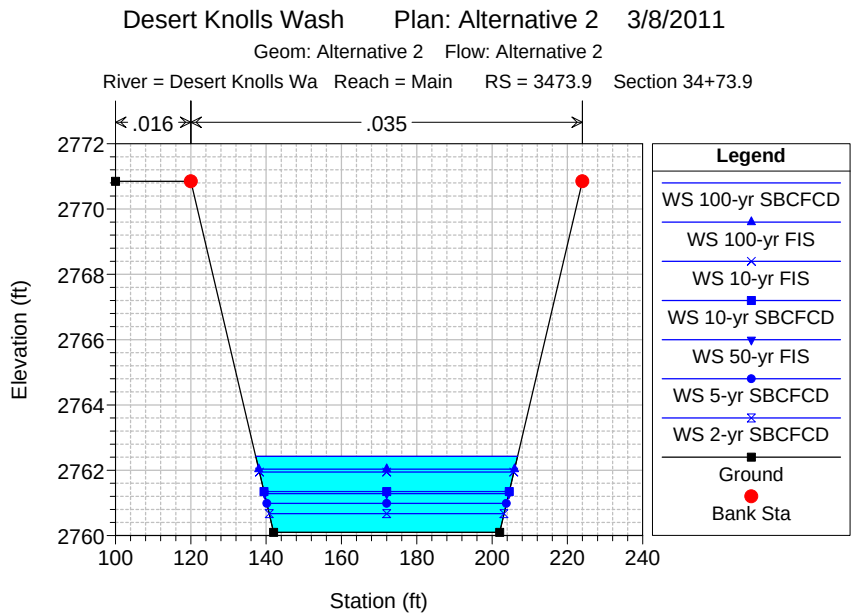

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 3969.6 Section 39+69.6
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

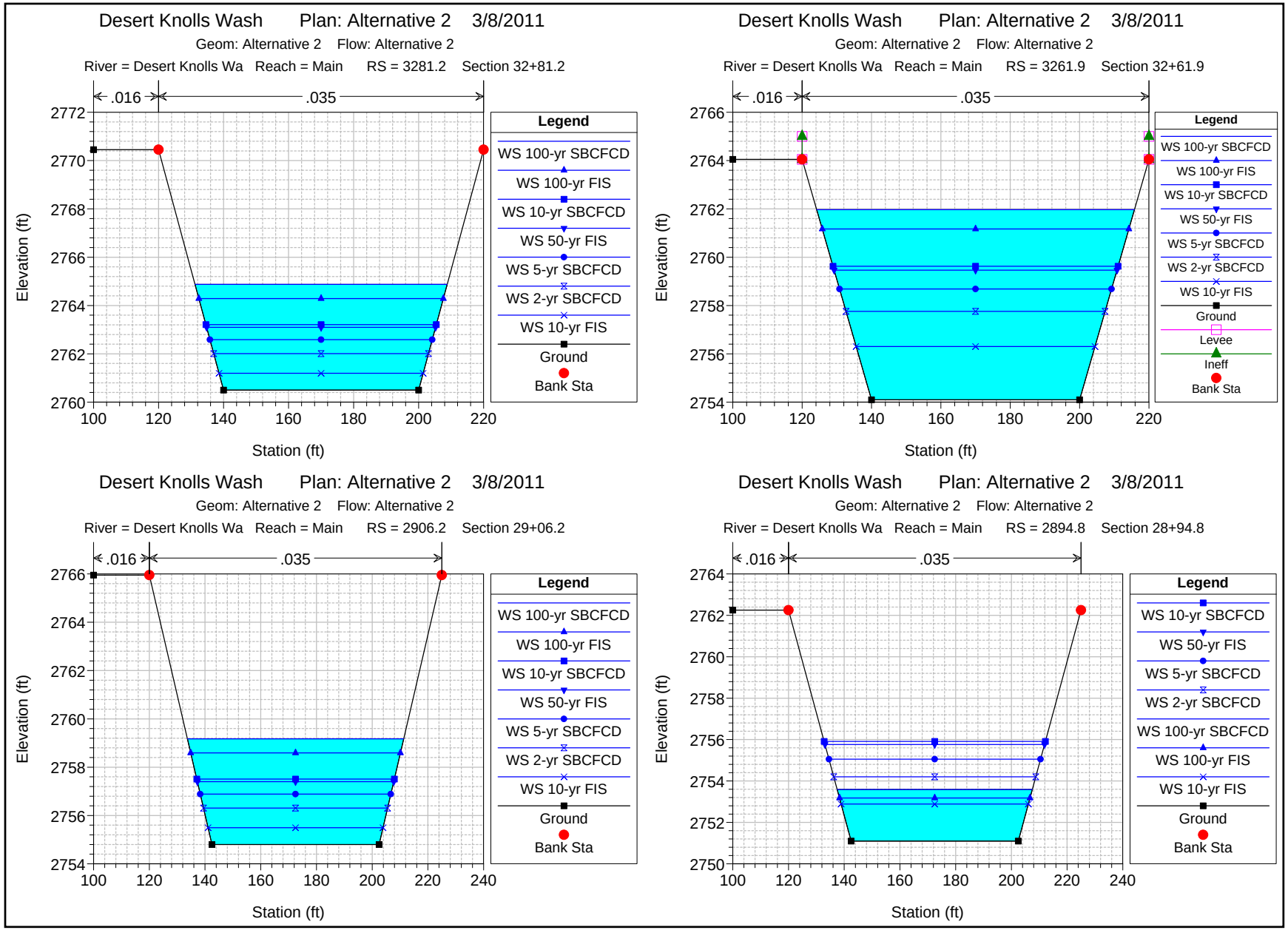

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 3835 Section 38+35 Improved Concrete Channel (D/S Limit)
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

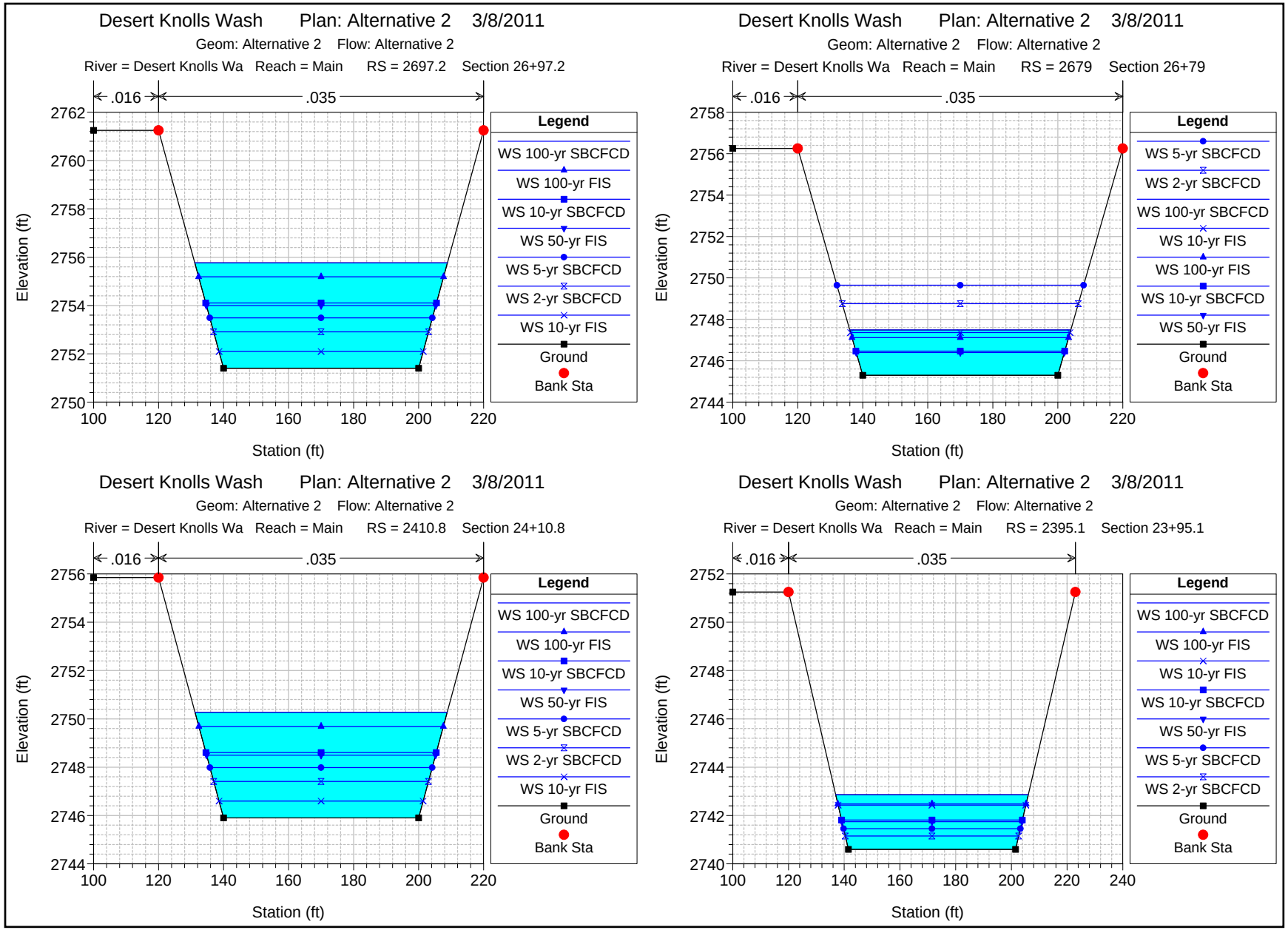

Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 3695.2 Section 36+95.2
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 3680.9 Section 36+80.9
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 10-yr FIS
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 3488.2 Section 34+88.2
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 3473.9 Section 34+73.9
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 3281.2 Section 32+81.2
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 3261.9 Section 32+61.9
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 2906.2 Section 29+06.2
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 2894.8 Section 28+94.8
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 2697.2 Section 26+97.2
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 2679 Section 26+79
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 10-yr FIS
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 2410.8 Section 24+10.8
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 2395.1 Section 23+95.1
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
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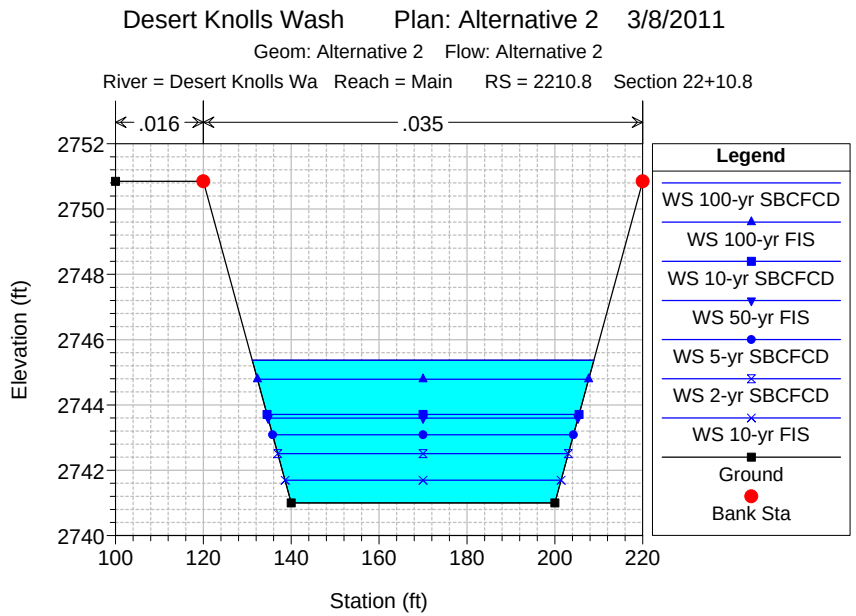
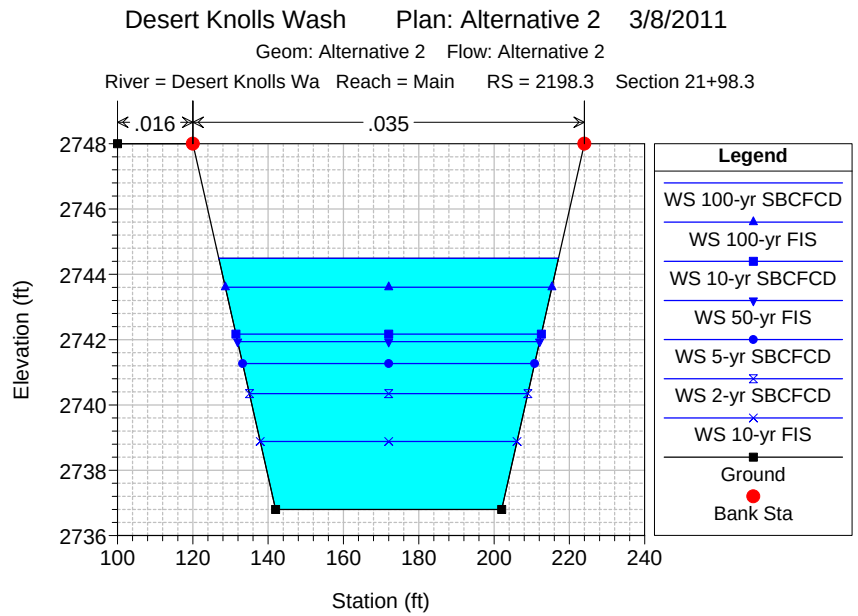
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 2210.8 Section 22+10.8
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta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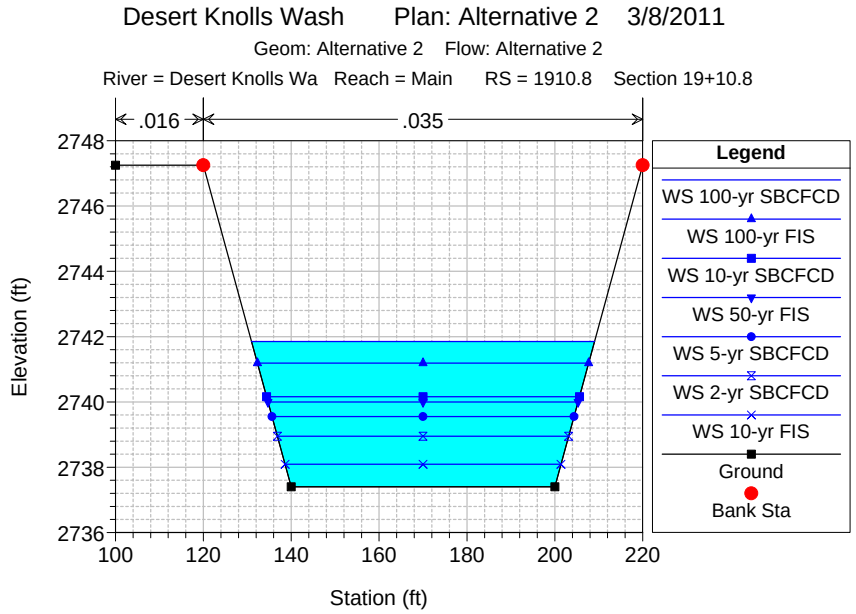
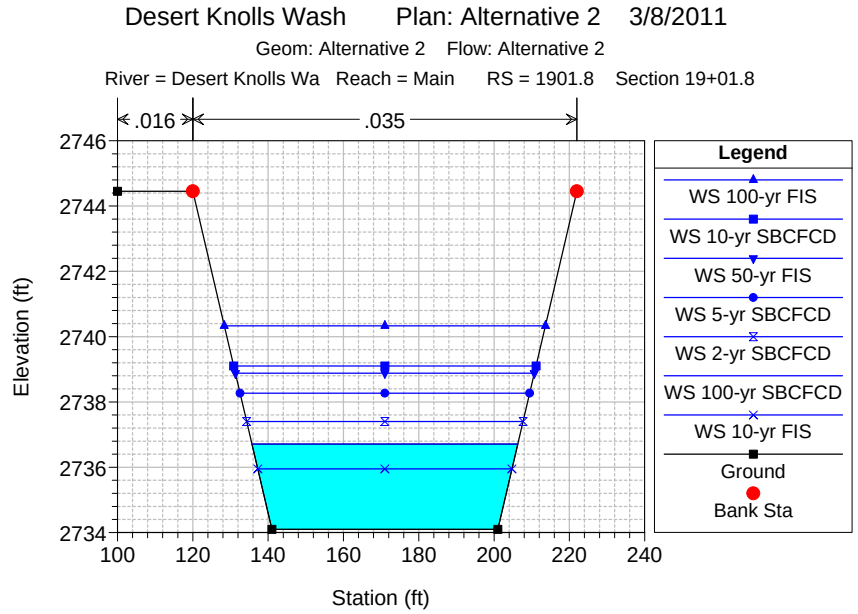
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 2198.3 Section 21+98.3
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 1910.8 Section 19+10.8
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta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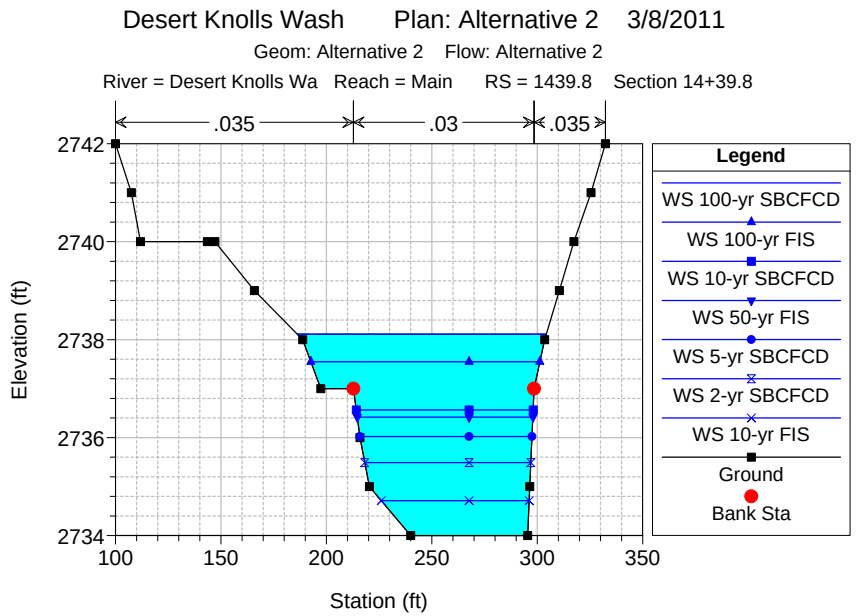
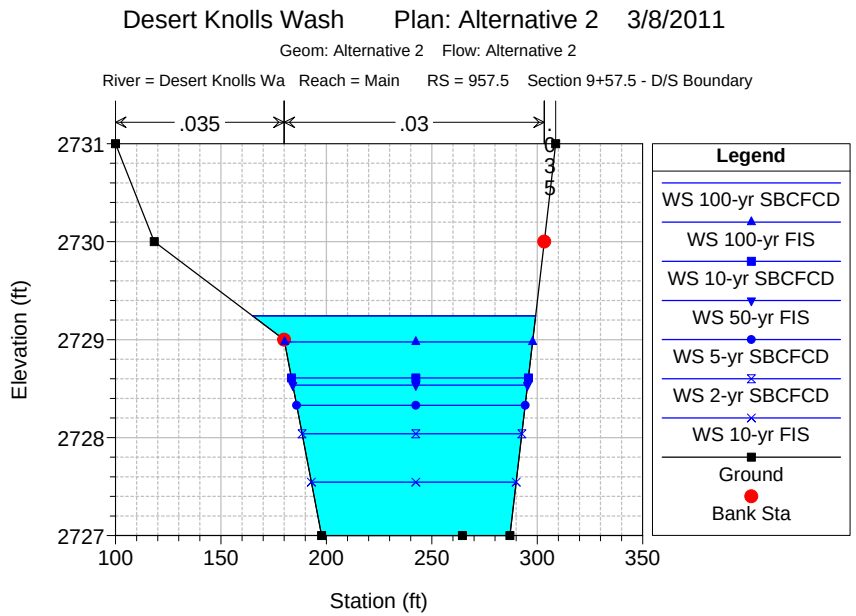
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 1901.8 Section 19+01.8
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 100-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 2 3/8/2011
Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 1439.8 Section 14+39.8
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta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Geom: Alternative 2 Flow: Alternative 2
River = Desert Knolls Wa Reach = Main RS = 957.5 Section 9+57.5 - D/S Boundary
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

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                    HEC-RAS Version 4.1.0 Jan 2010
                 U.S. Army Corps of Engineers
               Hydrologic Engineering Center
                     609 Second Street
                     Davis, California


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PROJECT DATA
Project Title: Desert Knolls Wash
Project File : DesertKnollsWash.prj
Run Date and Time: 3/8/2011 2:55:13 PM

Project in English units

Project Description:
Desert Knolls Wash Hydraulic and Sediment Transport Analysis (2010)
San
Bernardino County, California

Stations 41+65 - 102+28 (upstream limit) =
NGV29
Stations 9+57 --> 39+70 = NGVD29

PLAN DATA

Plan Title: Alternative 2
Plan File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.p04

Geometry Title: Alternative 2
Geometry File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.g05

Flow Title : Alternative 2
Flow File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.f05

Plan Summary Information:

Number of:	Cross Sections	= 90	Multiple Openings	=	0
	Culverts	= 8	Inline Structures	=	0
	Bridges	= 0	Lateral Structures	=	0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance

Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Alternative 2
Flow File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.f05

Flow Data (cfs)

River	Reach	RS	100-yr SBCFCD	100-yr FIS	50-yr FIS	10-yr FIS	10-yr SBCFCD	5-yr SBCFCD	2-yr SBCFCD
Desert Knolls	WaMain	12028.1	1730	700	500	100	810	550	340
Desert Knolls	WaMain	11313.9	1960	1700	1000	150	920	620	380
Desert Knolls	WaMain	10613.9	2590	2700	1500	200	1220	820	500
Desert Knolls	WaMain	9515.2	2620	2700	1500	200	1230	830	510
Desert Knolls	WaMain	7738.6	2970	2700	1500	200	1400	930	570
Desert Knolls	WaMain	7231.3	3150	2700	1500	200	1480	990	610
Desert Knolls	WaMain	3969.6	3380	2700	1500	200	1600	1070	650
Desert Knolls	WaMain	1910.8	3480	2700	1500	200	1650	1120	680
Desert Knolls	WaMain	957.5	3480	2700	1500	200	1650	1120	680

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Desert Knolls	WaMain	100-yr SBCFCD	Critical	Known WS = 2728
Desert Knolls	WaMain	100-yr FIS	Critical	Known WS = 2728
Desert Knolls	WaMain	50-yr FIS	Critical	Normal S = 0.015
Desert Knolls	WaMain	10-yr FIS	Critical	Normal S = 0.015

GEOMETRY DATA

Geometry Title: Alternative 2
Geometry File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.g05

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 12028.1

INPUT
Description: Section 120+28.1 (D/S face Tao Road)
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-39	2861.3	-19	2866	-6.31	2859	25.67	2859	208	2859
222	2859	222	2866	281	2864	410	2865	424	2866
522.7	2866	640.9	2866	655.75	2866	669.11	2866		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-39	.035	-19	.03	222	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-19	222	113	113	113	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-39	-19	2869	T
222	669.11	2869	T

Left Levee Station= -19 Elevation= 2869
Right Levee Station= 222 Elevation= 2869

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2865.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2865.92	Reach Len. (ft)	113.00	113.00	113.00
Crit W.S. (ft)	2860.22	Flow Area (sq ft)		1623.65	
E.G. Slope (ft/ft)	0.000038	Area (sq ft)		1623.65	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	240.86	Top Width (ft)		240.86	
Vel Total (ft/s)	1.07	Avg. Vel. (ft/s)		1.07	
Max Chl Dpth (ft)	6.92	Hydr. Depth (ft)		6.74	
Conv. Total (cfs)	280268.4	Conv. (cfs)		280268.4	
Length Wtd. (ft)	113.00	Wetted Per. (ft)		249.56	
Min Ch El (ft)	2859.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	669.11	-19.00	222.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.60	109.22	0.38
C & E Loss (ft)	0.57	Cum SA (acres)	0.54	21.18	0.23

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2862.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2862.92	Reach Len. (ft)	113.00	113.00	113.00
Crit W.S. (ft)	2859.67	Flow Area (sq ft)		909.23	
E.G. Slope (ft/ft)	0.000041	Area (sq ft)		909.23	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	235.42	Top Width (ft)		235.42	
Vel Total (ft/s)	0.77	Avg. Vel. (ft/s)		0.77	
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		3.86	
Conv. Total (cfs)	109337.1	Conv. (cfs)		109337.1	
Length Wtd. (ft)	113.00	Wetted Per. (ft)		240.35	
Min Ch El (ft)	2859.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	669.11	-19.00	222.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.38	101.71	0.28
C & E Loss (ft)	0.37	Cum SA (acres)	0.37	20.96	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2862.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2862.11	Reach Len. (ft)	113.00	113.00	113.00
Crit W.S. (ft)	2859.53	Flow Area (sq ft)		718.84	
E.G. Slope (ft/ft)	0.000045	Area (sq ft)		718.84	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	233.95	Top Width (ft)		233.95	
Vel Total (ft/s)	0.70	Avg. Vel. (ft/s)		0.70	
Max Chl Dpth (ft)	3.11	Hydr. Depth (ft)		3.07	
Conv. Total (cfs)	74423.6	Conv. (cfs)		74423.6	
Length Wtd. (ft)	113.00	Wetted Per. (ft)		237.86	
Min Ch El (ft)	2859.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	669.11	-19.00	222.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	67.31	0.13
C & E Loss (ft)	0.31	Cum SA (acres)	0.11	19.78	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2859.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.030	
W.S. Elev (ft)	2859.79	Reach Len. (ft)	113.00	113.00	113.00
Crit W.S. (ft)	2859.17	Flow Area (sq ft)		180.10	
E.G. Slope (ft/ft)	0.000175	Area (sq ft)		180.10	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	229.74	Top Width (ft)		229.74	
Vel Total (ft/s)	0.56	Avg. Vel. (ft/s)		0.56	
Max Chl Dpth (ft)	0.79	Hydr. Depth (ft)		0.78	
Conv. Total (cfs)	7562.4	Conv. (cfs)		7562.4	
Length Wtd. (ft)	113.00	Wetted Per. (ft)		230.72	
Min Ch El (ft)	2859.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	669.11	-19.00	222.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.01	17.32	0.01
C & E Loss (ft)	0.12	Cum SA (acres)	0.03	17.83	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2863.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2863.32	Reach Len. (ft)	113.00	113.00	113.00
Crit W.S. (ft)	2859.72	Flow Area (sq ft)		1003.46	
E.G. Slope (ft/ft)	0.000040	Area (sq ft)		1003.46	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	236.14	Top Width (ft)		236.14	
Vel Total (ft/s)	0.81	Avg. Vel. (ft/s)		0.81	
Max Chl Dpth (ft)	4.32	Hydr. Depth (ft)		4.25	
Conv. Total (cfs)	128431.5	Conv. (cfs)		128431.5	
Length Wtd. (ft)	113.00	Wetted Per. (ft)		241.58	
Min Ch El (ft)	2859.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	669.11	-19.00	222.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	64.05	0.13
C & E Loss (ft)	0.40	Cum SA (acres)	0.11	19.69	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2862.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2862.33	Reach Len. (ft)	113.00	113.00	113.00
Crit W.S. (ft)	2859.56	Flow Area (sq ft)		769.14	
E.G. Slope (ft/ft)	0.000044	Area (sq ft)		769.14	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	234.34	Top Width (ft)		234.34	
Vel Total (ft/s)	0.72	Avg. Vel. (ft/s)		0.72	
Max Chl Dpth (ft)	3.32	Hydr. Depth (ft)		3.28	
Conv. Total (cfs)	83151.1	Conv. (cfs)		83151.1	
Length Wtd. (ft)	113.00	Wetted Per. (ft)		238.52	
Min Ch El (ft)	2859.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	669.11	-19.00	222.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.08	48.58	0.08
C & E Loss (ft)	0.32	Cum SA (acres)	0.08	19.14	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2861.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2861.34	Reach Len. (ft)	113.00	113.00	113.00
Crit W.S. (ft)	2859.41	Flow Area (sq ft)		539.40	
E.G. Slope (ft/ft)	0.000054	Area (sq ft)		539.40	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	232.55	Top Width (ft)		232.55	
Vel Total (ft/s)	0.63	Avg. Vel. (ft/s)		0.63	
Max Chl Dpth (ft)	2.34	Hydr. Depth (ft)		2.32	
Conv. Total (cfs)	46423.1	Conv. (cfs)		46423.1	
Length Wtd. (ft)	113.00	Wetted Per. (ft)		235.50	
Min Ch El (ft)	2859.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	669.11	-19.00	222.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.04	34.76	0.04
C & E Loss (ft)	0.25	Cum SA (acres)	0.06	18.61	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11915

INPUT
Description: Section 119+15: Stabilizer #4 (gabion mat inlet)
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
170.5	2866.74	187.5	2858.3	207.5	2858.3	224.5	2866.74	244.5	2866.74
286.05	2866.74	315.27	2866.74	325.57	2866.74				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
170.5	.035	224.5	.016	244.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
170.5	224.5	51	51	51	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2865.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.93	Wt. n-Val.		0.035	
W.S. Elev (ft)	2863.42	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2863.42	Flow Area (sq ft)		155.11	
E.G. Slope (ft/ft)	0.012483	Area (sq ft)		155.11	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	40.62	Top Width (ft)		40.62	
Vel Total (ft/s)	11.15	Avg. Vel. (ft/s)		11.15	
Max Chl Dpth (ft)	5.12	Hydr. Depth (ft)		3.82	
Conv. Total (cfs)	15484.1	Conv. (cfs)		15484.1	

Length Wtd. (ft)	51.00	Wetted Per. (ft)		43.02	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		2.81	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)	0.60	106.91	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.54	20.81	0.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2862.55				
Vel Head (ft)	1.23	Wt. n-Val.		0.035	
W.S. Elev (ft)	2861.31	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2861.31	Flow Area (sq ft)		78.50	
E.G. Slope (ft/ft)	0.014197	Area (sq ft)		78.50	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	32.13	Top Width (ft)		32.13	
Vel Total (ft/s)	8.92	Avg. Vel. (ft/s)		8.92	
Max Chl Dpth (ft)	3.01	Hydr. Depth (ft)		2.44	
Conv. Total (cfs)	5874.8	Conv. (cfs)		5874.8	
Length Wtd. (ft)	51.00	Wetted Per. (ft)		33.55	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		2.07	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.72	Cum Volume (acre-ft)	0.38	100.43	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.37	20.62	0.18

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2861.79				
Vel Head (ft)	1.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2860.75	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2860.75	Flow Area (sq ft)		61.15	
E.G. Slope (ft/ft)	0.015009	Area (sq ft)		61.15	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	29.88	Top Width (ft)		29.88	
Vel Total (ft/s)	8.18	Avg. Vel. (ft/s)		8.18	
Max Chl Dpth (ft)	2.45	Hydr. Depth (ft)		2.05	
Conv. Total (cfs)	4081.3	Conv. (cfs)		4081.3	
Length Wtd. (ft)	51.00	Wetted Per. (ft)		31.03	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		1.85	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	0.13	66.30	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	19.44	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2859.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.035	
W.S. Elev (ft)	2859.19	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2859.19	Flow Area (sq ft)		19.35	
E.G. Slope (ft/ft)	0.019750	Area (sq ft)		19.35	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	23.58	Top Width (ft)		23.58	
Vel Total (ft/s)	5.17	Avg. Vel. (ft/s)		5.17	
Max Chl Dpth (ft)	0.89	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	711.6	Conv. (cfs)		711.6	
Length Wtd. (ft)	51.00	Wetted Per. (ft)		23.99	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.01	Cum Volume (acre-ft)	0.01	17.06	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	17.51	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2862.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.33	Wt. n-Val.		0.035	
W.S. Elev (ft)	2861.58	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2861.58	Flow Area (sq ft)		87.40	
E.G. Slope (ft/ft)	0.013942	Area (sq ft)		87.40	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	33.23	Top Width (ft)		33.23	
Vel Total (ft/s)	9.27	Avg. Vel. (ft/s)		9.27	
Max Chl Dpth (ft)	3.28	Hydr. Depth (ft)		2.63	
Conv. Total (cfs)	6859.9	Conv. (cfs)		6859.9	
Length Wtd. (ft)	51.00	Wetted Per. (ft)		34.77	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		2.19	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	0.13	62.64	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	19.34	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2861.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.		0.035	
W.S. Elev (ft)	2860.90	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2860.90	Flow Area (sq ft)		65.67	
E.G. Slope (ft/ft)	0.014737	Area (sq ft)		65.67	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	30.48	Top Width (ft)		30.48	
Vel Total (ft/s)	8.38	Avg. Vel. (ft/s)		8.38	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		2.15	
Conv. Total (cfs)	4530.7	Conv. (cfs)		4530.7	
Length Wtd. (ft)	51.00	Wetted Per. (ft)		31.70	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		1.91	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)	0.08	47.50	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	18.80	0.08

```
Warning: The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
         for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The program
         defaulted to critical depth.
```

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2861.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.035	
W.S. Elev (ft)	2860.23	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2860.23	Flow Area (sq ft)		46.18	
E.G. Slope (ft/ft)	0.015950	Area (sq ft)		46.18	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	27.79	Top Width (ft)		27.79	
Vel Total (ft/s)	7.36	Avg. Vel. (ft/s)		7.36	
Max Chl Dpth (ft)	1.93	Hydr. Depth (ft)		1.66	
Conv. Total (cfs)	2692.2	Conv. (cfs)		2692.2	
Length Wtd. (ft)	51.00	Wetted Per. (ft)		28.69	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		1.60	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.81	Cum Volume (acre-ft)	0.04	34.00	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	18.27	0.06

```
Warning: The energy equation could not be balanced within the specified number of iterations.  The program used critical depth
         for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The program
         defaulted to critical depth.
```

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11864

INPUT
Description: Section 118+64: Stabilizer #4
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
170.5	2865.14	187.5	2856.7	207.5	2856.7	224.5	2865.14	244.5	2865.14
286.05	2865.14	315.27	2865.14	325.57	2865.14				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
170.5	.035	224.5	.016	244.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
170.5	224.5	23	23	23	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2864.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.48	Wt. n-Val.		0.035	
W.S. Elev (ft)	2860.79	Reach Len. (ft)	23.00	23.00	23.00
Crit W.S. (ft)	2861.82	Flow Area (sq ft)		115.64	
E.G. Slope (ft/ft)	0.028566	Area (sq ft)		115.64	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	36.49	Top Width (ft)		36.49	
Vel Total (ft/s)	14.96	Avg. Vel. (ft/s)		14.96	
Max Chl Dpth (ft)	4.09	Hydr. Depth (ft)		3.17	
Conv. Total (cfs)	10235.8	Conv. (cfs)		10235.8	

Length Wtd. (ft)	23.00	Wetted Per. (ft)		38.41	
Min Ch El (ft)	2856.70	Shear (lb/sq ft)		5.37	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.92	Cum Volume (acre-ft)	0.60	106.75	0.38
C & E Loss (ft)	0.15	Cum SA (acres)	0.54	20.77	0.23

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2861.34	Element			
Vel Head (ft)	2.32	Wt. n-Val.		0.035	
W.S. Elev (ft)	2859.02	Reach Len. (ft)	23.00	23.00	23.00
Crit W.S. (ft)	2859.71	Flow Area (sq ft)		57.21	
E.G. Slope (ft/ft)	0.035787	Area (sq ft)		57.21	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	29.34	Top Width (ft)		29.34	
Vel Total (ft/s)	12.23	Avg. Vel. (ft/s)		12.23	
Max Chl Dpth (ft)	2.32	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	3700.3	Conv. (cfs)		3700.3	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		30.43	
Min Ch El (ft)	2856.70	Shear (lb/sq ft)		4.20	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.09	Cum Volume (acre-ft)	0.38	100.35	0.28
C & E Loss (ft)	0.11	Cum SA (acres)	0.37	20.58	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2860.54	Element			
Vel Head (ft)	1.97	Wt. n-Val.		0.035	
W.S. Elev (ft)	2858.57	Reach Len. (ft)	23.00	23.00	23.00
Crit W.S. (ft)	2859.15	Flow Area (sq ft)		44.41	
E.G. Slope (ft/ft)	0.038748	Area (sq ft)		44.41	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	27.53	Top Width (ft)		27.53	
Vel Total (ft/s)	11.26	Avg. Vel. (ft/s)		11.26	
Max Chl Dpth (ft)	1.87	Hydr. Depth (ft)		1.61	
Conv. Total (cfs)	2540.1	Conv. (cfs)		2540.1	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		28.41	
Min Ch El (ft)	2856.70	Shear (lb/sq ft)		3.78	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.16	Cum Volume (acre-ft)	0.13	66.24	0.13
C & E Loss (ft)	0.09	Cum SA (acres)	0.11	19.41	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4. This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2858.10	Element			
Vel Head (ft)	0.71	Wt. n-Val.		0.035	

W.S. Elev (ft)	2857.39	Reach Len. (ft)	23.00	23.00	23.00
Crit W.S. (ft)	2857.59	Flow Area (sq ft)		14.82	
E.G. Slope (ft/ft)	0.045705	Area (sq ft)		14.82	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	22.79	Top Width (ft)		22.79	
Vel Total (ft/s)	6.75	Avg. Vel. (ft/s)		6.75	
Max Chl Dpth (ft)	0.69	Hydr. Depth (ft)		0.65	
Conv. Total (cfs)	467.8	Conv. (cfs)		467.8	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		23.12	
Min Ch El (ft)	2856.70	Shear (lb/sq ft)		1.83	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.47	Cum Volume (acre-ft)	0.01	17.04	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	17.48	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2861.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.49	Wt. n-Val.		0.035	
W.S. Elev (ft)	2859.25	Reach Len. (ft)	23.00	23.00	23.00
Crit W.S. (ft)	2859.99	Flow Area (sq ft)		63.99	
E.G. Slope (ft/ft)	0.034487	Area (sq ft)		63.99	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	30.26	Top Width (ft)		30.26	
Vel Total (ft/s)	12.66	Avg. Vel. (ft/s)		12.66	
Max Chl Dpth (ft)	2.55	Hydr. Depth (ft)		2.11	
Conv. Total (cfs)	4361.7	Conv. (cfs)		4361.7	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		31.45	
Min Ch El (ft)	2856.70	Shear (lb/sq ft)		4.38	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.06	Cum Volume (acre-ft)	0.13	62.55	0.13
C & E Loss (ft)	0.12	Cum SA (acres)	0.11	19.30	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2860.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2858.69	Reach Len. (ft)	23.00	23.00	23.00
Crit W.S. (ft)	2859.30	Flow Area (sq ft)		47.72	
E.G. Slope (ft/ft)	0.037831	Area (sq ft)		47.72	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	28.01	Top Width (ft)		28.01	
Vel Total (ft/s)	11.53	Avg. Vel. (ft/s)		11.53	
Max Chl Dpth (ft)	1.99	Hydr. Depth (ft)		1.70	
Conv. Total (cfs)	2827.7	Conv. (cfs)		2827.7	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		28.94	
Min Ch El (ft)	2856.70	Shear (lb/sq ft)		3.89	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.14	Cum Volume (acre-ft)	0.08	47.43	0.08
C & E Loss (ft)	0.10	Cum SA (acres)	0.08	18.77	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

```
         This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.
```

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2859.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.59	Wt. n-Val.		0.035	
W.S. Elev (ft)	2858.16	Reach Len. (ft)	23.00	23.00	23.00
Crit W.S. (ft)	2858.63	Flow Area (sq ft)		33.55	
E.G. Slope (ft/ft)	0.041765	Area (sq ft)		33.55	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	25.89	Top Width (ft)		25.89	
Vel Total (ft/s)	10.13	Avg. Vel. (ft/s)		10.13	
Max Chl Dpth (ft)	1.46	Hydr. Depth (ft)		1.30	
Conv. Total (cfs)	1663.7	Conv. (cfs)		1663.7	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		26.58	
Min Ch El (ft)	2856.70	Shear (lb/sq ft)		3.29	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.24	Cum Volume (acre-ft)	0.04	33.95	0.04
C & E Loss (ft)	0.08	Cum SA (acres)	0.06	18.24	0.06

```
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
         This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.
```

CROSS SECTION

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 11841

INPUT
Description: Section 118+41: Stabilizer #4
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2862.5   105.5  2861.5   144.5    2862   164.5    2862   187.5  2850.5
   207.5  2850.5   230.5    2862   250.5    2862  255.04    2862  286.05    2862
  315.27    2862  325.57    2862     333    2862

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035   144.5    .016   164.5    .035   230.5    .016   250.5    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         164.5   230.5               49      49      49             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100   164.5  2862.8       T
   230.5     333  2862.8       T
Left Levee      Station=   164.5      Elevation=  2862.8
Right Levee     Station=   230.5      Elevation=  2862.8
```

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2860.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.035	
W.S. Elev (ft)	2859.66	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2855.66	Flow Area (sq ft)		351.17	
E.G. Slope (ft/ft)	0.001304	Area (sq ft)		351.17	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	56.65	Top Width (ft)		56.65	
Vel Total (ft/s)	4.93	Avg. Vel. (ft/s)		4.93	

Max Chl Dpth (ft)	9.16	Hydr. Depth (ft)		6.20	
Conv. Total (cfs)	47901.3	Conv. (cfs)		47901.3	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		60.98	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)	333.00	164.50	230.50
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.60	106.63	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.54	20.74	0.23

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2858.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.035	
W.S. Elev (ft)	2858.29	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2853.52	Flow Area (sq ft)		276.91	
E.G. Slope (ft/ft)	0.000409	Area (sq ft)		276.91	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	51.14	Top Width (ft)		51.14	
Vel Total (ft/s)	2.53	Avg. Vel. (ft/s)		2.53	
Max Chl Dpth (ft)	7.78	Hydr. Depth (ft)		5.41	
Conv. Total (cfs)	34611.4	Conv. (cfs)		34611.4	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		54.82	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	333.00	164.50	230.50
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.38	100.26	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.37	20.56	0.18

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2856.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.66	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2852.97	Flow Area (sq ft)		198.89	
E.G. Slope (ft/ft)	0.000520	Area (sq ft)		198.89	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	44.62	Top Width (ft)		44.62	
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)		2.51	
Max Chl Dpth (ft)	6.16	Hydr. Depth (ft)		4.46	
Conv. Total (cfs)	21927.3	Conv. (cfs)		21927.3	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		47.53	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	333.00	164.50	230.50
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.13	66.18	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	19.39	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2854.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2854.12	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2851.38	Flow Area (sq ft)		98.63	

E.G. Slope (ft/ft)	0.000150	Area (sq ft)		98.63	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	34.48	Top Width (ft)		34.48	
Vel Total (ft/s)	1.01	Avg. Vel. (ft/s)		1.01	
Max Chl Dpth (ft)	3.62	Hydr. Depth (ft)		2.86	
Conv. Total (cfs)	8169.6	Conv. (cfs)		8169.6	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		36.19	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	333.00	164.50	230.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	17.01	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	17.46	0.03

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2857.62	Element			
Vel Head (ft)	0.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2857.44	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2853.81	Flow Area (sq ft)		234.93	
E.G. Slope (ft/ft)	0.000861	Area (sq ft)		234.93	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	47.74	Top Width (ft)		47.74	
Vel Total (ft/s)	3.45	Avg. Vel. (ft/s)		3.45	
Max Chl Dpth (ft)	6.94	Hydr. Depth (ft)		4.92	
Conv. Total (cfs)	27605.7	Conv. (cfs)		27605.7	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		51.02	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)	333.00	164.50	230.50
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.13	62.47	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	19.28	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2856.66	Element			
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.54	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2853.12	Flow Area (sq ft)		193.70	
E.G. Slope (ft/ft)	0.000677	Area (sq ft)		193.70	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	44.15	Top Width (ft)		44.15	
Vel Total (ft/s)	2.84	Avg. Vel. (ft/s)		2.84	
Max Chl Dpth (ft)	6.04	Hydr. Depth (ft)		4.39	
Conv. Total (cfs)	21137.1	Conv. (cfs)		21137.1	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		47.01	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	333.00	164.50	230.50
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.08	47.37	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	18.75	0.08

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2855.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2855.64	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2852.44	Flow Area (sq ft)		155.44	
E.G. Slope (ft/ft)	0.000478	Area (sq ft)		155.44	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	40.54	Top Width (ft)		40.54	
Vel Total (ft/s)	2.19	Avg. Vel. (ft/s)		2.19	
Max Chl Dpth (ft)	5.14	Hydr. Depth (ft)		3.83	
Conv. Total (cfs)	15551.7	Conv. (cfs)		15551.7	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		42.96	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	333.00	164.50	230.50
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.04	33.90	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	18.22	0.06

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11792

INPUT
Description: Section 117+92: Stabilizer #4
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2862.6	105.5	2862.6	165.5	2862.6	187.5	2850.5	207.5	2850.5
231.5	2862.6	251.5	2862.6	286.05	2862.6	315.27	2862.6	325.57	2862.6

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	165.5	.035	231.5	.016	251.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
165.5	231.5	4	4	4	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2859.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.035	
W.S. Elev (ft)	2859.56	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		337.23	
E.G. Slope (ft/ft)	0.001426	Area (sq ft)		337.23	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	54.44	Top Width (ft)		54.44	
Vel Total (ft/s)	5.13	Avg. Vel. (ft/s)		5.13	
Max Chl Dpth (ft)	9.06	Hydr. Depth (ft)		6.19	
Conv. Total (cfs)	45807.4	Conv. (cfs)		45807.4	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		58.92	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.51	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.60	106.24	0.38
C & E Loss (ft)	0.07	Cum SA (acres)	0.54	20.68	0.23

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2858.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.035	
W.S. Elev (ft)	2858.26	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		269.57	
E.G. Slope (ft/ft)	0.000431	Area (sq ft)		269.57	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	49.49	Top Width (ft)		49.49	
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)		2.60	
Max Chl Dpth (ft)	7.76	Hydr. Depth (ft)		5.45	
Conv. Total (cfs)	33706.7	Conv. (cfs)		33706.7	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		53.33	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.38	99.95	0.28
C & E Loss (ft)	0.01	Cum SA (acres)	0.37	20.50	0.18

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2856.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.62	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		193.74	
E.G. Slope (ft/ft)	0.000548	Area (sq ft)		193.74	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	43.28	Top Width (ft)		43.28	
Vel Total (ft/s)	2.58	Avg. Vel. (ft/s)		2.58	
Max Chl Dpth (ft)	6.12	Hydr. Depth (ft)		4.48	
Conv. Total (cfs)	21355.5	Conv. (cfs)		21355.5	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		46.31	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	65.96	0.13
C & E Loss (ft)	0.02	Cum SA (acres)	0.11	19.34	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2854.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2854.11	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		97.05	
E.G. Slope (ft/ft)	0.000154	Area (sq ft)		97.05	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	33.73	Top Width (ft)		33.73	
Vel Total (ft/s)	1.03	Avg. Vel. (ft/s)		1.03	
Max Chl Dpth (ft)	3.61	Hydr. Depth (ft)		2.88	
Conv. Total (cfs)	8052.6	Conv. (cfs)		8052.6	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		35.52	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	16.90	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	17.43	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2857.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.035	
W.S. Elev (ft)	2857.38	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		227.47	
E.G. Slope (ft/ft)	0.000922	Area (sq ft)		227.47	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	46.15	Top Width (ft)		46.15	
Vel Total (ft/s)	3.56	Avg. Vel. (ft/s)		3.56	
Max Chl Dpth (ft)	6.88	Hydr. Depth (ft)		4.93	
Conv. Total (cfs)	26674.9	Conv. (cfs)		26674.9	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		49.55	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	62.21	0.13
C & E Loss (ft)	0.04	Cum SA (acres)	0.11	19.23	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2856.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.50	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		188.25	
E.G. Slope (ft/ft)	0.000718	Area (sq ft)		188.25	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	42.79	Top Width (ft)		42.79	
Vel Total (ft/s)	2.92	Avg. Vel. (ft/s)		2.92	
Max Chl Dpth (ft)	6.00	Hydr. Depth (ft)		4.40	
Conv. Total (cfs)	20519.5	Conv. (cfs)		20519.5	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		45.76	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.08	47.15	0.08
C & E Loss (ft)	0.04	Cum SA (acres)	0.08	18.70	0.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2855.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.035	
W.S. Elev (ft)	2855.61	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		151.70	
E.G. Slope (ft/ft)	0.000502	Area (sq ft)		151.70	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	39.41	Top Width (ft)		39.41	
Vel Total (ft/s)	2.24	Avg. Vel. (ft/s)		2.24	
Max Chl Dpth (ft)	5.11	Hydr. Depth (ft)		3.85	
Conv. Total (cfs)	15176.4	Conv. (cfs)		15176.4	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		41.94	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	33.73	0.04
C & E Loss (ft)	0.03	Cum SA (acres)	0.06	18.18	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

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RIVER: Desert Knolls Wa
REACH: Main               RS: 11788

INPUT
Description: Section 117+88: Stabilizer #4
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2862.5   105.5  2861.5   170.5 2860.94   187.5  2852.5   207.5  2852.5
   224.5 2860.94   244.5 2860.94  286.05 2860.94  315.27 2860.94  325.57 2860.94

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035   170.5    .035   224.5    .016   244.5    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         170.5   224.5                3       3       3             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100   170.5    2862       T
   224.5  325.57    2862       T
Left Levee      Station=   170.5      Elevation=    2862
Right Levee     Station=   224.5      Elevation=    2862

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2859.89    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.10    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2858.78    Reach Len. (ft)             3.00       3.00       3.00
  Crit W.S. (ft)           2857.65    Flow Area (sq ft)                    205.23
  E.G. Slope (ft/ft)      0.005723    Area (sq ft)                         205.23
  Q Total (cfs)            1730.00    Flow (cfs)                          1730.00
  Top Width (ft)             45.32    Top Width (ft)                        45.32
  Vel Total (ft/s)            8.43    Avg. Vel. (ft/s)                       8.43
  Max Chl Dpth (ft)           6.28    Hydr. Depth (ft)                       4.53
  Conv. Total (cfs)        22868.5    Conv. (cfs)                         22868.5
  Length Wtd. (ft)            3.00    Wetted Per. (ft)                      48.26
  Min Ch El (ft)           2852.50    Shear (lb/sq ft)                       1.52
  Alpha                       1.00    Stream Power (lb/ft s)    325.57     170.50     224.50
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)        0.60     106.22       0.38
  C & E Loss (ft)             0.00    Cum SA (acres)              0.54      20.67       0.23


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2858.35    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.25    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2858.10    Reach Len. (ft)             3.00       3.00       3.00
  Crit W.S. (ft)           2855.54    Flow Area (sq ft)                    175.05
  E.G. Slope (ft/ft)      0.001458    Area (sq ft)                         175.05
  Q Total (cfs)             700.00    Flow (cfs)                           700.00
  Top Width (ft)             42.55    Top Width (ft)                        42.55
  Vel Total (ft/s)            4.00    Avg. Vel. (ft/s)                       4.00
  Max Chl Dpth (ft)           5.60    Hydr. Depth (ft)                       4.11
  Conv. Total (cfs)        18333.9    Conv. (cfs)                         18333.9
  Length Wtd. (ft)            3.00    Wetted Per. (ft)                      45.17
  Min Ch El (ft)           2852.50    Shear (lb/sq ft)                       0.35
  Alpha                       1.00    Stream Power (lb/ft s)    325.57     170.50     224.50
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.38      99.93       0.28
  C & E Loss (ft)             0.00    Cum SA (acres)              0.37      20.50       0.18
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2856.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.36	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2854.96	Flow Area (sq ft)		107.28	
E.G. Slope (ft/ft)	0.002953	Area (sq ft)		107.28	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	35.56	Top Width (ft)		35.56	
Vel Total (ft/s)	4.66	Avg. Vel. (ft/s)		4.66	
Max Chl Dpth (ft)	3.86	Hydr. Depth (ft)		3.02	
Conv. Total (cfs)	9200.4	Conv. (cfs)		9200.4	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		37.37	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)	325.57	170.50	224.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	65.94	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	19.34	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2854.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2853.98	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2853.38	Flow Area (sq ft)		34.05	
E.G. Slope (ft/ft)	0.003454	Area (sq ft)		34.05	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	25.97	Top Width (ft)		25.97	
Vel Total (ft/s)	2.94	Avg. Vel. (ft/s)		2.94	
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)		1.31	
Conv. Total (cfs)	1701.5	Conv. (cfs)		1701.5	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		26.66	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)	325.57	170.50	224.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	16.89	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	17.42	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2857.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.89	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2855.79	Flow Area (sq ft)		126.48	
E.G. Slope (ft/ft)	0.004859	Area (sq ft)		126.48	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	37.67	Top Width (ft)		37.67	
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.40	
Max Chl Dpth (ft)	4.39	Hydr. Depth (ft)		3.36	
Conv. Total (cfs)	11620.2	Conv. (cfs)		11620.2	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		39.73	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)	325.57	170.50	224.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	62.20	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	19.22	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2856.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.10	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2855.11	Flow Area (sq ft)		98.05	
E.G. Slope (ft/ft)	0.004621	Area (sq ft)		98.05	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	34.50	Top Width (ft)		34.50	
Vel Total (ft/s)	5.61	Avg. Vel. (ft/s)		5.61	
Max Chl Dpth (ft)	3.60	Hydr. Depth (ft)		2.84	
Conv. Total (cfs)	8090.7	Conv. (cfs)		8090.7	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		36.18	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)	325.57	170.50	224.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.08	47.14	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	18.70	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2855.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.035	
W.S. Elev (ft)	2855.31	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2854.45	Flow Area (sq ft)		72.01	
E.G. Slope (ft/ft)	0.004303	Area (sq ft)		72.01	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	31.31	Top Width (ft)		31.31	
Vel Total (ft/s)	4.72	Avg. Vel. (ft/s)		4.72	
Max Chl Dpth (ft)	2.81	Hydr. Depth (ft)		2.30	
Conv. Total (cfs)	5183.1	Conv. (cfs)		5183.1	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		32.63	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)	325.57	170.50	224.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.04	33.72	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	18.18	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11785

INPUT
Description: Section 117+85: Stabilizer #4 (exit)
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2862.5	105.5	2861.5	170.5	2860.94	187.5	2852.5	207.5	2852.5
224.5	2860.94	244.5	2860.94	286.05	2860.94	315.27	2860.94	325.57	2860.94

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	170.5	.035	224.5	.016	244.5	.035

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         170.5   224.5            121.1   121.1   121.1             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100   170.5    2862       T
   224.5  325.57    2862       T
Left Levee      Station=   170.5      Elevation=    2862
Right Levee     Station=   224.5      Elevation=    2862
```

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2859.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.12	Wt. n-Val.		0.035	
W.S. Elev (ft)	2858.76	Reach Len. (ft)	121.10	121.10	121.10
Crit W.S. (ft)	2857.65	Flow Area (sq ft)		204.01	
E.G. Slope (ft/ft)	0.005818	Area (sq ft)		204.01	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	45.21	Top Width (ft)		45.21	
Vel Total (ft/s)	8.48	Avg. Vel. (ft/s)		8.48	
Max Chl Dpth (ft)	6.26	Hydr. Depth (ft)		4.51	
Conv. Total (cfs)	22681.1	Conv. (cfs)		22681.1	
Length Wtd. (ft)	121.10	Wetted Per. (ft)		48.14	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		1.54	
Alpha	1.00	Stream Power (lb/ft s)	325.57	170.50	224.50
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	0.60	106.20	0.38
C & E Loss (ft)	0.02	Cum SA (acres)	0.54	20.67	0.23

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2858.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.035	
W.S. Elev (ft)	2858.09	Reach Len. (ft)	121.10	121.10	121.10
Crit W.S. (ft)	2855.54	Flow Area (sq ft)		174.84	
E.G. Slope (ft/ft)	0.001463	Area (sq ft)		174.84	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	42.53	Top Width (ft)		42.53	
Vel Total (ft/s)	4.00	Avg. Vel. (ft/s)		4.00	
Max Chl Dpth (ft)	5.59	Hydr. Depth (ft)		4.11	
Conv. Total (cfs)	18303.6	Conv. (cfs)		18303.6	
Length Wtd. (ft)	121.10	Wetted Per. (ft)		45.15	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)	325.57	170.50	224.50
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.38	99.92	0.28
C & E Loss (ft)	0.01	Cum SA (acres)	0.37	20.50	0.18

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2856.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.35	Reach Len. (ft)	121.10	121.10	121.10
Crit W.S. (ft)	2854.96	Flow Area (sq ft)		106.91	
E.G. Slope (ft/ft)	0.002983	Area (sq ft)		106.91	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	35.52	Top Width (ft)		35.52	
Vel Total (ft/s)	4.68	Avg. Vel. (ft/s)		4.68	
Max Chl Dpth (ft)	3.85	Hydr. Depth (ft)		3.01	
Conv. Total (cfs)	9154.8	Conv. (cfs)		9154.8	

Length Wtd. (ft)	121.10	Wetted Per. (ft)		37.32	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)	325.57	170.50	224.50
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	0.13	65.94	0.13
C & E Loss (ft)	0.02	Cum SA (acres)	0.11	19.33	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2854.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.035	
W.S. Elev (ft)	2853.97	Reach Len. (ft)	121.10	121.10	121.10
Crit W.S. (ft)	2853.38	Flow Area (sq ft)		33.66	
E.G. Slope (ft/ft)	0.003576	Area (sq ft)		33.66	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	25.91	Top Width (ft)		25.91	
Vel Total (ft/s)	2.97	Avg. Vel. (ft/s)		2.97	
Max Chl Dpth (ft)	1.47	Hydr. Depth (ft)		1.30	
Conv. Total (cfs)	1672.3	Conv. (cfs)		1672.3	
Length Wtd. (ft)	121.10	Wetted Per. (ft)		26.60	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)	325.57	170.50	224.50
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	0.01	16.89	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	17.42	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2857.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.86	Reach Len. (ft)	121.10	121.10	121.10
Crit W.S. (ft)	2855.79	Flow Area (sq ft)		125.59	
E.G. Slope (ft/ft)	0.004957	Area (sq ft)		125.59	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	37.57	Top Width (ft)		37.57	
Vel Total (ft/s)	6.45	Avg. Vel. (ft/s)		6.45	
Max Chl Dpth (ft)	4.36	Hydr. Depth (ft)		3.34	
Conv. Total (cfs)	11504.7	Conv. (cfs)		11504.7	
Length Wtd. (ft)	121.10	Wetted Per. (ft)		39.62	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		0.98	
Alpha	1.00	Stream Power (lb/ft s)	325.57	170.50	224.50
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)	0.13	62.19	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	19.22	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2856.57	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.08	Reach Len. (ft)	121.10	121.10	121.10
Crit W.S. (ft)	2855.11	Flow Area (sq ft)		97.29	
E.G. Slope (ft/ft)	0.004725	Area (sq ft)		97.29	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	34.41	Top Width (ft)		34.41	
Vel Total (ft/s)	5.65	Avg. Vel. (ft/s)		5.65	
Max Chl Dpth (ft)	3.58	Hydr. Depth (ft)		2.83	
Conv. Total (cfs)	8001.4	Conv. (cfs)		8001.4	
Length Wtd. (ft)	121.10	Wetted Per. (ft)		36.09	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		0.80	
Alpha	1.00	Stream Power (lb/ft s)	325.57	170.50	224.50
Frctn Loss (ft)	0.83	Cum Volume (acre-ft)	0.08	47.13	0.08
C & E Loss (ft)	0.06	Cum SA (acres)	0.08	18.69	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2855.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.035	
W.S. Elev (ft)	2855.29	Reach Len. (ft)	121.10	121.10	121.10
Crit W.S. (ft)	2854.45	Flow Area (sq ft)		71.39	
E.G. Slope (ft/ft)	0.004414	Area (sq ft)		71.39	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	31.23	Top Width (ft)		31.23	
Vel Total (ft/s)	4.76	Avg. Vel. (ft/s)		4.76	
Max Chl Dpth (ft)	2.79	Hydr. Depth (ft)		2.29	
Conv. Total (cfs)	5117.7	Conv. (cfs)		5117.7	
Length Wtd. (ft)	121.10	Wetted Per. (ft)		32.54	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)	325.57	170.50	224.50
Frctn Loss (ft)	0.82	Cum Volume (acre-ft)	0.04	33.71	0.04
C & E Loss (ft)	0.05	Cum SA (acres)	0.06	18.17	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11663.9

INPUT
Description: Section 116+63.9
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2865	105.5	2864	110.8	2863	116.62	2862	123.73	2861.5
131.28	2861.5	136.36	2861.5	146	2861.5	148	2861.5	168	2861.5
187.5	2852	207.5	2852	227	2861.5	235.5	2861.5	255.04	2861.5
286.05	2861.5	315.27	2861.5	325.57	2861.5				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	148	.016	168	.03	227	.016	235.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
168	227	350	350	350	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2859.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.37	Wt. n-Val.		0.030	
W.S. Elev (ft)	2857.79	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)		Flow Area (sq ft)		184.41	
E.G. Slope (ft/ft)	0.005701	Area (sq ft)		184.41	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	43.75	Top Width (ft)		43.75	
Vel Total (ft/s)	9.38	Avg. Vel. (ft/s)		9.38	
Max Chl Dpth (ft)	5.79	Hydr. Depth (ft)		4.22	
Conv. Total (cfs)	22911.6	Conv. (cfs)		22911.6	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		46.42	
Min Ch El (ft)	2852.00	Shear (lb/sq ft)		1.41	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.60	105.66	0.38
C & E Loss (ft)	0.40	Cum SA (acres)	0.54	20.55	0.23

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2858.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.030	
W.S. Elev (ft)	2858.00	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)		Flow Area (sq ft)		193.68	
E.G. Slope (ft/ft)	0.000815	Area (sq ft)		193.68	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	44.61	Top Width (ft)		44.61	
Vel Total (ft/s)	3.61	Avg. Vel. (ft/s)		3.61	
Max Chl Dpth (ft)	6.00	Hydr. Depth (ft)		4.34	
Conv. Total (cfs)	24526.0	Conv. (cfs)		24526.0	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		47.38	
Min Ch El (ft)	2852.00	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.38	99.41	0.28
C & E Loss (ft)	0.05	Cum SA (acres)	0.37	20.38	0.18

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2856.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.		0.030	
W.S. Elev (ft)	2856.13	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)		Flow Area (sq ft)		117.46	
E.G. Slope (ft/ft)	0.001689	Area (sq ft)		117.46	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	36.94	Top Width (ft)		36.94	
Vel Total (ft/s)	4.26	Avg. Vel. (ft/s)		4.26	
Max Chl Dpth (ft)	4.13	Hydr. Depth (ft)		3.18	

Conv. Total (cfs)	12166.9	Conv. (cfs)		12166.9	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		38.84	
Min Ch El (ft)	2852.00	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.13	65.62	0.13
C & E Loss (ft)	0.08	Cum SA (acres)	0.11	19.23	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2853.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.030	
W.S. Elev (ft)	2852.89	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2852.89	Flow Area (sq ft)		19.42	
E.G. Slope (ft/ft)	0.014390	Area (sq ft)		19.42	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	23.65	Top Width (ft)		23.65	
Vel Total (ft/s)	5.15	Avg. Vel. (ft/s)		5.15	
Max Chl Dpth (ft)	0.89	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	833.6	Conv. (cfs)		833.6	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		24.06	
Min Ch El (ft)	2852.00	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.01	16.82	0.01
C & E Loss (ft)	0.12	Cum SA (acres)	0.03	17.35	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2856.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.33	Wt. n-Val.		0.030	
W.S. Elev (ft)	2855.28	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2855.28	Flow Area (sq ft)		87.59	
E.G. Slope (ft/ft)	0.010245	Area (sq ft)		87.59	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	33.45	Top Width (ft)		33.45	
Vel Total (ft/s)	9.25	Avg. Vel. (ft/s)		9.25	
Max Chl Dpth (ft)	3.28	Hydr. Depth (ft)		2.62	
Conv. Total (cfs)	8002.7	Conv. (cfs)		8002.7	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		34.97	
Min Ch El (ft)	2852.00	Shear (lb/sq ft)		1.60	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.13	61.89	0.13
C & E Loss (ft)	0.39	Cum SA (acres)	0.11	19.12	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2855.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.		0.030	
W.S. Elev (ft)	2854.60	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2854.60	Flow Area (sq ft)		65.74	
E.G. Slope (ft/ft)	0.010859	Area (sq ft)		65.74	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	30.66	Top Width (ft)		30.66	
Vel Total (ft/s)	8.37	Avg. Vel. (ft/s)		8.37	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		2.14	
Conv. Total (cfs)	5277.9	Conv. (cfs)		5277.9	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		31.85	
Min Ch El (ft)	2852.00	Shear (lb/sq ft)		1.40	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.08	46.91	0.08
C & E Loss (ft)	0.32	Cum SA (acres)	0.08	18.60	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2854.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.030	
W.S. Elev (ft)	2853.93	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2853.93	Flow Area (sq ft)		46.24	
E.G. Slope (ft/ft)	0.011731	Area (sq ft)		46.24	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	27.92	Top Width (ft)		27.92	
Vel Total (ft/s)	7.35	Avg. Vel. (ft/s)		7.35	
Max Chl Dpth (ft)	1.93	Hydr. Depth (ft)		1.66	
Conv. Total (cfs)	3139.1	Conv. (cfs)		3139.1	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		28.81	
Min Ch El (ft)	2852.00	Shear (lb/sq ft)		1.18	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.04	33.55	0.04
C & E Loss (ft)	0.25	Cum SA (acres)	0.06	18.09	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

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         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
           This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 11313.9

INPUT
Description: Section 113+13.9
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   14.06    2860   46.61    2860      74    2860      94    2860     112  2851.3
     288  2851.3     306    2860     326    2860  458.56    2860  502.61    2860
  531.37    2860  552.04    2860  571.61    2860  576.94    2860

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
   14.06    .035      74    .016      94     .03     306    .016     326    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
            94     306            143.9   143.9   143.9             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
   14.06      94    2862       T
     306  576.94    2862       T
Left Levee      Station=      94      Elevation=    2862
Right Levee     Station=     306      Elevation=    2862

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2858.69    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.03    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2858.66    Reach Len. (ft)           143.90     143.90     143.90
  Crit W.S. (ft)           2852.86    Flow Area (sq ft)                   1406.50
  E.G. Slope (ft/ft)      0.000063    Area (sq ft)                        1406.50
  Q Total (cfs)            1960.00    Flow (cfs)                          1960.00
  Top Width (ft)            206.44    Top Width (ft)                       206.44
  Vel Total (ft/s)            1.39    Avg. Vel. (ft/s)                       1.39
  Max Chl Dpth (ft)           7.36    Hydr. Depth (ft)                       6.81
  Conv. Total (cfs)       247682.9    Conv. (cfs)                        247682.9
  Length Wtd. (ft)          143.90    Wetted Per. (ft)                     209.81
  Min Ch El (ft)           2851.30    Shear (lb/sq ft)                       0.03
  Alpha                       1.00    Stream Power (lb/ft s)    576.94      94.00     306.00
  Frctn Loss (ft)             0.03    Cum Volume (acre-ft)        0.60      99.27       0.38
  C & E Loss (ft)             0.20    Cum SA (acres)              0.54      19.54       0.23


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
           This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.
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CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2858.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	2858.08	Reach Len. (ft)	143.90	143.90	143.90
Crit W.S. (ft)	2852.72	Flow Area (sq ft)		1289.04	
E.G. Slope (ft/ft)	0.000062	Area (sq ft)		1289.04	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	204.07	Top Width (ft)		204.07	
Vel Total (ft/s)	1.32	Avg. Vel. (ft/s)		1.32	
Max Chl Dpth (ft)	6.78	Hydr. Depth (ft)		6.32	
Conv. Total (cfs)	215986.6	Conv. (cfs)		215986.6	
Length Wtd. (ft)	143.90	Wetted Per. (ft)		207.18	
Min Ch El (ft)	2851.30	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	576.94	94.00	306.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.38	93.45	0.28
C & E Loss (ft)	0.19	Cum SA (acres)	0.37	19.38	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2856.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2856.27	Reach Len. (ft)	143.90	143.90	143.90
Crit W.S. (ft)	2852.30	Flow Area (sq ft)		925.63	
E.G. Slope (ft/ft)	0.000061	Area (sq ft)		925.63	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	196.56	Top Width (ft)		196.56	
Vel Total (ft/s)	1.08	Avg. Vel. (ft/s)		1.08	
Max Chl Dpth (ft)	4.97	Hydr. Depth (ft)		4.71	
Conv. Total (cfs)	127821.2	Conv. (cfs)		127821.2	
Length Wtd. (ft)	143.90	Wetted Per. (ft)		198.84	
Min Ch El (ft)	2851.30	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	576.94	94.00	306.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.13	61.43	0.13
C & E Loss (ft)	0.15	Cum SA (acres)	0.11	18.29	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2852.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2852.68	Reach Len. (ft)	143.90	143.90	143.90
Crit W.S. (ft)	2851.58	Flow Area (sq ft)		246.53	
E.G. Slope (ft/ft)	0.000101	Area (sq ft)		246.53	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	181.70	Top Width (ft)		181.70	
Vel Total (ft/s)	0.61	Avg. Vel. (ft/s)		0.61	

Max Chl Dpth (ft)	1.38	Hydr. Depth (ft)		1.36	
Conv. Total (cfs)	14930.9	Conv. (cfs)		14930.9	
Length Wtd. (ft)	143.90	Wetted Per. (ft)		182.34	
Min Ch El (ft)	2851.30	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	576.94	94.00	306.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.01	15.75	0.01
C & E Loss (ft)	0.05	Cum SA (acres)	0.03	16.53	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2856.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2856.02	Reach Len. (ft)	143.90	143.90	143.90
Crit W.S. (ft)	2852.25	Flow Area (sq ft)		877.62	
E.G. Slope (ft/ft)	0.000061	Area (sq ft)		877.62	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	195.55	Top Width (ft)		195.55	
Vel Total (ft/s)	1.05	Avg. Vel. (ft/s)		1.05	
Max Chl Dpth (ft)	4.72	Hydr. Depth (ft)		4.49	
Conv. Total (cfs)	117407.5	Conv. (cfs)		117407.5	
Length Wtd. (ft)	143.90	Wetted Per. (ft)		197.71	
Min Ch El (ft)	2851.30	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	576.94	94.00	306.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.13	58.01	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	18.20	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2855.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2855.00	Reach Len. (ft)	143.90	143.90	143.90
Crit W.S. (ft)	2852.03	Flow Area (sq ft)		678.67	
E.G. Slope (ft/ft)	0.000064	Area (sq ft)		678.67	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	191.29	Top Width (ft)		191.29	
Vel Total (ft/s)	0.91	Avg. Vel. (ft/s)		0.91	
Max Chl Dpth (ft)	3.70	Hydr. Depth (ft)		3.55	
Conv. Total (cfs)	77737.0	Conv. (cfs)		77737.0	
Length Wtd. (ft)	143.90	Wetted Per. (ft)		192.98	
Min Ch El (ft)	2851.30	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	576.94	94.00	306.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.08	43.92	0.08
C & E Loss (ft)	0.11	Cum SA (acres)	0.08	17.71	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2853.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2853.98	Reach Len. (ft)	143.90	143.90	143.90
Crit W.S. (ft)	2851.83	Flow Area (sq ft)		486.94	
E.G. Slope (ft/ft)	0.000070	Area (sq ft)		486.94	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	187.10	Top Width (ft)		187.10	
Vel Total (ft/s)	0.78	Avg. Vel. (ft/s)		0.78	
Max Chl Dpth (ft)	2.68	Hydr. Depth (ft)		2.60	
Conv. Total (cfs)	45434.9	Conv. (cfs)		45434.9	
Length Wtd. (ft)	143.90	Wetted Per. (ft)		188.33	
Min Ch El (ft)	2851.30	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	576.94	94.00	306.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.04	31.41	0.04
C & E Loss (ft)	0.09	Cum SA (acres)	0.06	17.23	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11170

INPUT
Description: Section 111+70: Stabilizer #3 (Inlet)
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2859.9	137	2859.9	157	2859.9	175	2850.9	195	2850.9
213	2859.9	233	2859.9	283.88	2859.9				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	137	.016	157	.035	213	.016	233	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
157	213	54	54	54	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2858.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.40	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2856.40	Flow Area (sq ft)		170.37	
E.G. Slope (ft/ft)	0.012291	Area (sq ft)		170.37	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	41.99	Top Width (ft)		41.99	
Vel Total (ft/s)	11.50	Avg. Vel. (ft/s)		11.50	
Max Chl Dpth (ft)	5.50	Hydr. Depth (ft)		4.06	
Conv. Total (cfs)	17679.0	Conv. (cfs)		17679.0	

Length Wtd. (ft)	54.00	Wetted Per. (ft)		44.58	
Min Ch El (ft)	2850.90	Shear (lb/sq ft)		2.93	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)	0.60	96.67	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.54	19.13	0.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2857.89	Element			
Vel Head (ft)	1.90	Wt. n-Val.		0.035	
W.S. Elev (ft)	2855.99	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2855.99	Flow Area (sq ft)		153.58	
E.G. Slope (ft/ft)	0.012358	Area (sq ft)		153.58	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	40.36	Top Width (ft)		40.36	
Vel Total (ft/s)	11.07	Avg. Vel. (ft/s)		11.07	
Max Chl Dpth (ft)	5.09	Hydr. Depth (ft)		3.81	
Conv. Total (cfs)	15292.1	Conv. (cfs)		15292.1	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		42.76	
Min Ch El (ft)	2850.90	Shear (lb/sq ft)		2.77	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.67	Cum Volume (acre-ft)	0.38	91.07	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.37	18.97	0.18

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2856.11	Element			
Vel Head (ft)	1.48	Wt. n-Val.		0.035	
W.S. Elev (ft)	2854.63	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2854.63	Flow Area (sq ft)		102.47	
E.G. Slope (ft/ft)	0.013434	Area (sq ft)		102.47	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	34.92	Top Width (ft)		34.92	
Vel Total (ft/s)	9.76	Avg. Vel. (ft/s)		9.76	
Max Chl Dpth (ft)	3.73	Hydr. Depth (ft)		2.93	
Conv. Total (cfs)	8627.8	Conv. (cfs)		8627.8	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		36.69	
Min Ch El (ft)	2850.90	Shear (lb/sq ft)		2.34	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00

Frctn Loss (ft)	0.72	Cum Volume (acre-ft)	0.13	59.73	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	17.91	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2852.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.035	
W.S. Elev (ft)	2852.05	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2852.05	Flow Area (sq ft)		25.71	
E.G. Slope (ft/ft)	0.018333	Area (sq ft)		25.71	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	24.61	Top Width (ft)		24.61	
Vel Total (ft/s)	5.83	Avg. Vel. (ft/s)		5.83	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)		1.04	
Conv. Total (cfs)	1107.8	Conv. (cfs)		1107.8	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		25.16	
Min Ch El (ft)	2850.90	Shear (lb/sq ft)		1.17	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.99	Cum Volume (acre-ft)	0.01	15.30	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	16.19	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2855.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.42	Wt. n-Val.		0.035	
W.S. Elev (ft)	2854.45	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2854.45	Flow Area (sq ft)		96.21	
E.G. Slope (ft/ft)	0.013618	Area (sq ft)		96.21	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	34.20	Top Width (ft)		34.20	
Vel Total (ft/s)	9.56	Avg. Vel. (ft/s)		9.56	
Max Chl Dpth (ft)	3.55	Hydr. Depth (ft)		2.81	
Conv. Total (cfs)	7883.7	Conv. (cfs)		7883.7	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		35.88	
Min Ch El (ft)	2850.90	Shear (lb/sq ft)		2.28	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)	0.13	56.40	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	17.82	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2854.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	2853.70	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2853.70	Flow Area (sq ft)		71.70	
E.G. Slope (ft/ft)	0.014457	Area (sq ft)		71.70	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	31.20	Top Width (ft)		31.20	
Vel Total (ft/s)	8.65	Avg. Vel. (ft/s)		8.65	
Max Chl Dpth (ft)	2.80	Hydr. Depth (ft)		2.30	
Conv. Total (cfs)	5156.5	Conv. (cfs)		5156.5	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		32.53	
Min Ch El (ft)	2850.90	Shear (lb/sq ft)		1.99	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)	0.08	42.68	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	17.34	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2853.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.89	Wt. n-Val.		0.035	
W.S. Elev (ft)	2852.98	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2852.98	Flow Area (sq ft)		50.12	
E.G. Slope (ft/ft)	0.015579	Area (sq ft)		50.12	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	28.30	Top Width (ft)		28.30	
Vel Total (ft/s)	7.58	Avg. Vel. (ft/s)		7.58	
Max Chl Dpth (ft)	2.08	Hydr. Depth (ft)		1.77	
Conv. Total (cfs)	3044.5	Conv. (cfs)		3044.5	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		29.28	
Min Ch El (ft)	2850.90	Shear (lb/sq ft)		1.66	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)	0.04	30.52	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	16.87	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

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         for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 11116

INPUT
Description: Section 111+16: Stabilizer #3
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2858.2     137  2858.2     157  2858.2     175  2849.2     195  2849.2
     213  2858.2     233  2858.2  283.88  2858.2

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     137    .016     157    .035     213    .016     233    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           157     213               33      33      33             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2857.32    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               3.72    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2853.60    Reach Len. (ft)            33.00      33.00      33.00
  Crit W.S. (ft)           2854.70    Flow Area (sq ft)                    126.62
  E.G. Slope (ft/ft)      0.028286    Area (sq ft)                         126.62
  Q Total (cfs)            1960.00    Flow (cfs)                          1960.00
  Top Width (ft)             37.59    Top Width (ft)                        37.59
  Vel Total (ft/s)           15.48    Avg. Vel. (ft/s)                      15.48
  Max Chl Dpth (ft)           4.40    Hydr. Depth (ft)                       3.37
  Conv. Total (cfs)        11653.8    Conv. (cfs)                         11653.8
  Length Wtd. (ft)           33.00    Wetted Per. (ft)                      39.66
  Min Ch El (ft)           2849.20    Shear (lb/sq ft)                       5.64
  Alpha                       1.00    Stream Power (lb/ft s)    283.88       0.00       0.00
  Frctn Loss (ft)             0.96    Cum Volume (acre-ft)        0.60      96.48       0.38
  C & E Loss (ft)             0.17    Cum SA (acres)              0.54      19.08       0.23


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2856.74    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               3.51    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2853.23    Reach Len. (ft)            33.00      33.00      33.00
  Crit W.S. (ft)           2854.27    Flow Area (sq ft)                    113.12
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E.G. Slope (ft/ft)	0.029291	Area (sq ft)		113.12	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	36.12	Top Width (ft)		36.12	
Vel Total (ft/s)	15.03	Avg. Vel. (ft/s)		15.03	
Max Chl Dpth (ft)	4.03	Hydr. Depth (ft)		3.13	
Conv. Total (cfs)	9933.1	Conv. (cfs)		9933.1	
Length Wtd. (ft)	33.00	Wetted Per. (ft)		38.03	
Min Ch El (ft)	2849.20	Shear (lb/sq ft)		5.44	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.99	Cum Volume (acre-ft)	0.38	90.90	0.28
C & E Loss (ft)	0.16	Cum SA (acres)	0.37	18.92	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2854.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.79	Wt. n-Val.		0.035	
W.S. Elev (ft)	2852.09	Reach Len. (ft)	33.00	33.00	33.00
Crit W.S. (ft)	2852.93	Flow Area (sq ft)		74.62	
E.G. Slope (ft/ft)	0.033487	Area (sq ft)		74.62	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	31.58	Top Width (ft)		31.58	
Vel Total (ft/s)	13.40	Avg. Vel. (ft/s)		13.40	
Max Chl Dpth (ft)	2.89	Hydr. Depth (ft)		2.36	
Conv. Total (cfs)	5464.7	Conv. (cfs)		5464.7	
Length Wtd. (ft)	33.00	Wetted Per. (ft)		32.94	
Min Ch El (ft)	2849.20	Shear (lb/sq ft)		4.74	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	1.09	Cum Volume (acre-ft)	0.13	59.62	0.13
C & E Loss (ft)	0.13	Cum SA (acres)	0.11	17.87	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2851.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.97	Wt. n-Val.		0.035	
W.S. Elev (ft)	2850.07	Reach Len. (ft)	33.00	33.00	33.00
Crit W.S. (ft)	2850.35	Flow Area (sq ft)		19.01	
E.G. Slope (ft/ft)	0.046865	Area (sq ft)		19.01	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	23.50	Top Width (ft)		23.50	
Vel Total (ft/s)	7.89	Avg. Vel. (ft/s)		7.89	
Max Chl Dpth (ft)	0.87	Hydr. Depth (ft)		0.81	
Conv. Total (cfs)	692.9	Conv. (cfs)		692.9	
Length Wtd. (ft)	33.00	Wetted Per. (ft)		23.91	

Min Ch El (ft)	2849.20	Shear (lb/sq ft)		2.33	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	1.50	Cum Volume (acre-ft)	0.01	15.27	0.01
C & E Loss (ft)	0.04	Cum SA (acres)	0.03	16.16	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2854.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.69	Wt. n-Val.		0.035	
W.S. Elev (ft)	2851.95	Reach Len. (ft)	33.00	33.00	33.00
Crit W.S. (ft)	2852.75	Flow Area (sq ft)		69.96	
E.G. Slope (ft/ft)	0.034203	Area (sq ft)		69.96	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	30.98	Top Width (ft)		30.98	
Vel Total (ft/s)	13.15	Avg. Vel. (ft/s)		13.15	
Max Chl Dpth (ft)	2.74	Hydr. Depth (ft)		2.26	
Conv. Total (cfs)	4974.6	Conv. (cfs)		4974.6	
Length Wtd. (ft)	33.00	Wetted Per. (ft)		32.27	
Min Ch El (ft)	2849.20	Shear (lb/sq ft)		4.63	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	1.11	Cum Volume (acre-ft)	0.13	56.30	0.13
C & E Loss (ft)	0.13	Cum SA (acres)	0.11	17.78	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2853.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.22	Wt. n-Val.		0.035	
W.S. Elev (ft)	2851.33	Reach Len. (ft)	33.00	33.00	33.00
Crit W.S. (ft)	2852.00	Flow Area (sq ft)		51.80	
E.G. Slope (ft/ft)	0.037591	Area (sq ft)		51.80	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	28.54	Top Width (ft)		28.54	
Vel Total (ft/s)	11.97	Avg. Vel. (ft/s)		11.97	
Max Chl Dpth (ft)	2.13	Hydr. Depth (ft)		1.82	
Conv. Total (cfs)	3197.8	Conv. (cfs)		3197.8	
Length Wtd. (ft)	33.00	Wetted Per. (ft)		29.55	
Min Ch El (ft)	2849.20	Shear (lb/sq ft)		4.11	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)	0.08	42.60	0.08
C & E Loss (ft)	0.11	Cum SA (acres)	0.08	17.31	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2852.48    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.72    Wt. n-Val.                           0.035
  W.S. Elev (ft)           2850.76    Reach Len. (ft)            33.00     33.00      33.00
  Crit W.S. (ft)           2851.28    Flow Area (sq ft)                    36.07
  E.G. Slope (ft/ft)      0.041808    Area (sq ft)                         36.07
  Q Total (cfs)             380.00    Flow (cfs)                          380.00
  Top Width (ft)             26.24    Top Width (ft)                       26.24
  Vel Total (ft/s)           10.54    Avg. Vel. (ft/s)                     10.54
  Max Chl Dpth (ft)           1.56    Hydr. Depth (ft)                      1.37
  Conv. Total (cfs)         1858.5    Conv. (cfs)                         1858.5
  Length Wtd. (ft)           33.00    Wetted Per. (ft)                     26.98
  Min Ch El (ft)           2849.20    Shear (lb/sq ft)                      3.49
  Alpha                       1.00    Stream Power (lb/ft s)    283.88      0.00       0.00
  Frctn Loss (ft)             1.30    Cum Volume (acre-ft)        0.04     30.47       0.04
  C & E Loss (ft)             0.08    Cum SA (acres)              0.06     16.84       0.06


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 11083

INPUT
Description: Section 110+83: Stabilizer #3
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2853     130  2852.5     150  2852.5     175    2840     195    2840
     220  2852.5     240  2852.5  283.88    2853

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     130    .016     150    .035     220    .016     240    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           150     220               52      52      52             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     150    2853       F
     220  283.88    2853       F
Left Levee      Station=     150      Elevation=    2853
Right Levee     Station=     220      Elevation=    2853

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD
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E.G. Elev (ft)	2850.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.035	
W.S. Elev (ft)	2849.84	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2845.54	Flow Area (sq ft)		390.60	
E.G. Slope (ft/ft)	0.001253	Area (sq ft)		390.60	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	59.37	Top Width (ft)		59.37	
Vel Total (ft/s)	5.02	Avg. Vel. (ft/s)		5.02	
Max Chl Dpth (ft)	9.84	Hydr. Depth (ft)		6.58	
Conv. Total (cfs)	55371.5	Conv. (cfs)		55371.5	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		64.02	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)	283.88	150.00	220.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.60	96.29	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.54	19.05	0.23

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2849.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.035	
W.S. Elev (ft)	2849.22	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2845.06	Flow Area (sq ft)		354.18	
E.G. Slope (ft/ft)	0.001231	Area (sq ft)		354.18	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	56.86	Top Width (ft)		56.86	
Vel Total (ft/s)	4.80	Avg. Vel. (ft/s)		4.80	
Max Chl Dpth (ft)	9.22	Hydr. Depth (ft)		6.23	
Conv. Total (cfs)	48461.4	Conv. (cfs)		48461.4	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		61.21	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)	283.88	150.00	220.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.38	90.72	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.37	18.89	0.18

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2847.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.035	
W.S. Elev (ft)	2847.27	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2843.74	Flow Area (sq ft)		250.98	
E.G. Slope (ft/ft)	0.001094	Area (sq ft)		250.98	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	49.07	Top Width (ft)		49.07	
Vel Total (ft/s)	3.98	Avg. Vel. (ft/s)		3.98	
Max Chl Dpth (ft)	7.27	Hydr. Depth (ft)		5.11	
Conv. Total (cfs)	30236.8	Conv. (cfs)		30236.8	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		52.50	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	283.88	150.00	220.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.13	59.50	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	17.84	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2843.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2843.75	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2841.14	Flow Area (sq ft)		103.08	
E.G. Slope (ft/ft)	0.000297	Area (sq ft)		103.08	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	35.00	Top Width (ft)		35.00	
Vel Total (ft/s)	1.46	Avg. Vel. (ft/s)		1.46	
Max Chl Dpth (ft)	3.75	Hydr. Depth (ft)		2.95	
Conv. Total (cfs)	8701.8	Conv. (cfs)		8701.8	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		36.77	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	283.88	150.00	220.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01	15.22	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	16.13	0.03

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2847.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.035	
W.S. Elev (ft)	2847.01	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2843.57	Flow Area (sq ft)		238.57	
E.G. Slope (ft/ft)	0.001064	Area (sq ft)		238.57	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	48.05	Top Width (ft)		48.05	
Vel Total (ft/s)	3.86	Avg. Vel. (ft/s)		3.86	
Max Chl Dpth (ft)	7.01	Hydr. Depth (ft)		4.97	
Conv. Total (cfs)	28198.5	Conv. (cfs)		28198.5	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		51.36	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	283.88	150.00	220.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.13	56.18	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	17.75	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2846.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	2845.99	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2842.82	Flow Area (sq ft)		191.48	
E.G. Slope (ft/ft)	0.000888	Area (sq ft)		191.48	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	43.95	Top Width (ft)		43.95	
Vel Total (ft/s)	3.24	Avg. Vel. (ft/s)		3.24	
Max Chl Dpth (ft)	5.99	Hydr. Depth (ft)		4.36	
Conv. Total (cfs)	20802.1	Conv. (cfs)		20802.1	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		46.78	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	283.88	150.00	220.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.08	42.51	0.08

C & E Loss (ft)	0.00	Cum SA (acres)	0.08	17.28	0.08

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2845.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.035	
W.S. Elev (ft)	2845.03	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2842.08	Flow Area (sq ft)		151.08	
E.G. Slope (ft/ft)	0.000647	Area (sq ft)		151.08	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	40.11	Top Width (ft)		40.11	
Vel Total (ft/s)	2.52	Avg. Vel. (ft/s)		2.52	
Max Chl Dpth (ft)	5.03	Hydr. Depth (ft)		3.77	
Conv. Total (cfs)	14943.6	Conv. (cfs)		14943.6	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		42.48	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	283.88	150.00	220.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.04	30.39	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	16.81	0.06

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11031

INPUT
Description: Section 110+31: Stabilizer #3
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2853	129	2853	149	2853	175	2840	195	2840
221	2853	241	2853	283.88	2853				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	129	.016	149	.035	221	.016	241	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
149	221	4	4	4	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2850.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.035	
W.S. Elev (ft)	2849.77	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		386.08	
E.G. Slope (ft/ft)	0.001293	Area (sq ft)		386.08	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	59.06	Top Width (ft)		59.06	
Vel Total (ft/s)	5.08	Avg. Vel. (ft/s)		5.08	
Max Chl Dpth (ft)	9.77	Hydr. Depth (ft)		6.54	
Conv. Total (cfs)	54500.6	Conv. (cfs)		54500.6	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		63.68	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00

Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.60	95.82	0.38
C & E Loss (ft)	0.06	Cum SA (acres)	0.54	18.97	0.23

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2849.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.035	
W.S. Elev (ft)	2849.14	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		349.94	
E.G. Slope (ft/ft)	0.001272	Area (sq ft)		349.94	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	56.56	Top Width (ft)		56.56	
Vel Total (ft/s)	4.86	Avg. Vel. (ft/s)		4.86	
Max Chl Dpth (ft)	9.14	Hydr. Depth (ft)		6.19	
Conv. Total (cfs)	47672.7	Conv. (cfs)		47672.7	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		60.88	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.46	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.38	90.30	0.28
C & E Loss (ft)	0.06	Cum SA (acres)	0.37	18.82	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2847.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.035	
W.S. Elev (ft)	2847.20	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		247.80	
E.G. Slope (ft/ft)	0.001133	Area (sq ft)		247.80	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	48.81	Top Width (ft)		48.81	
Vel Total (ft/s)	4.04	Avg. Vel. (ft/s)		4.04	
Max Chl Dpth (ft)	7.20	Hydr. Depth (ft)		5.08	
Conv. Total (cfs)	29711.0	Conv. (cfs)		29711.0	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		52.21	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	59.20	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	17.78	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2843.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2843.73	Reach Len. (ft)	4.00	4.00	4.00

Crit W.S. (ft)		Flow Area (sq ft)		102.52	
E.G. Slope (ft/ft)	0.000302	Area (sq ft)		102.52	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	34.93	Top Width (ft)		34.93	
Vel Total (ft/s)	1.46	Avg. Vel. (ft/s)		1.46	
Max Chl Dpth (ft)	3.73	Hydr. Depth (ft)		2.93	
Conv. Total (cfs)	8634.0	Conv. (cfs)		8634.0	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		36.69	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	15.10	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	16.09	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2847.19	Element			
Vel Head (ft)	0.24	Wt. n-Val.		0.035	
W.S. Elev (ft)	2846.95	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		235.57	
E.G. Slope (ft/ft)	0.001102	Area (sq ft)		235.57	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	47.80	Top Width (ft)		47.80	
Vel Total (ft/s)	3.91	Avg. Vel. (ft/s)		3.91	
Max Chl Dpth (ft)	6.95	Hydr. Depth (ft)		4.93	
Conv. Total (cfs)	27709.7	Conv. (cfs)		27709.7	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		51.08	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	55.90	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	17.70	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2846.10	Element			
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2845.94	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		189.24	
E.G. Slope (ft/ft)	0.000918	Area (sq ft)		189.24	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	43.75	Top Width (ft)		43.75	
Vel Total (ft/s)	3.28	Avg. Vel. (ft/s)		3.28	
Max Chl Dpth (ft)	5.94	Hydr. Depth (ft)		4.33	
Conv. Total (cfs)	20463.6	Conv. (cfs)		20463.6	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		46.55	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.08	42.28	0.08
C & E Loss (ft)	0.07	Cum SA (acres)	0.08	17.23	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2845.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.035	
W.S. Elev (ft)	2844.99	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		149.63	
E.G. Slope (ft/ft)	0.000664	Area (sq ft)		149.63	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	39.96	Top Width (ft)		39.96	
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)		2.54	
Max Chl Dpth (ft)	4.99	Hydr. Depth (ft)		3.74	
Conv. Total (cfs)	14743.3	Conv. (cfs)		14743.3	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		42.32	
Min Ch El (ft)	2840.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.04	30.21	0.04
C & E Loss (ft)	0.05	Cum SA (acres)	0.06	16.77	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11027

INPUT
Description: Section 110+27: Stabilizer #3
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2853	135	2852.2	155	2852.2	157	2851	175	2842
195	2842	213	2851	215	2852.2	235	2852.2	283.88	2853

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	135	.016	155	.035	215	.016	235	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
155	215	3	3	3	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2850.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2849.07	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)		Flow Area (sq ft)		241.40	
E.G. Slope (ft/ft)	0.004677	Area (sq ft)		241.40	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	48.28	Top Width (ft)		48.28	
Vel Total (ft/s)	8.12	Avg. Vel. (ft/s)		8.12	
Max Chl Dpth (ft)	7.07	Hydr. Depth (ft)		5.00	
Conv. Total (cfs)	28659.2	Conv. (cfs)		28659.2	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		51.62	
Min Ch El (ft)	2842.00	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.60	95.79	0.38

C & E Loss (ft)	0.00	Cum SA (acres)	0.54	18.97	0.23

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2849.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	2848.43	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)		Flow Area (sq ft)		211.19	
E.G. Slope (ft/ft)	0.005090	Area (sq ft)		211.19	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	45.71	Top Width (ft)		45.71	
Vel Total (ft/s)	8.05	Avg. Vel. (ft/s)		8.05	
Max Chl Dpth (ft)	6.43	Hydr. Depth (ft)		4.62	
Conv. Total (cfs)	23827.5	Conv. (cfs)		23827.5	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		48.75	
Min Ch El (ft)	2842.00	Shear (lb/sq ft)		1.38	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.38	90.28	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.37	18.82	0.18

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2847.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.		0.035	
W.S. Elev (ft)	2846.42	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)		Flow Area (sq ft)		127.40	
E.G. Slope (ft/ft)	0.007236	Area (sq ft)		127.40	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	37.67	Top Width (ft)		37.67	
Vel Total (ft/s)	7.85	Avg. Vel. (ft/s)		7.85	
Max Chl Dpth (ft)	4.42	Hydr. Depth (ft)		3.38	
Conv. Total (cfs)	11755.5	Conv. (cfs)		11755.5	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		39.76	
Min Ch El (ft)	2842.00	Shear (lb/sq ft)		1.45	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	59.19	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	17.78	0.11

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2843.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.035	
W.S. Elev (ft)	2843.37	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2843.16	Flow Area (sq ft)		31.14	
E.G. Slope (ft/ft)	0.010188	Area (sq ft)		31.14	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	25.48	Top Width (ft)		25.48	
Vel Total (ft/s)	4.82	Avg. Vel. (ft/s)		4.82	
Max Chl Dpth (ft)	1.37	Hydr. Depth (ft)		1.22	
Conv. Total (cfs)	1486.1	Conv. (cfs)		1486.1	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		26.12	
Min Ch El (ft)	2842.00	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.01	15.10	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	16.09	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2847.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.95	Wt. n-Val.		0.035	
W.S. Elev (ft)	2846.15	Reach Len. (ft)	3.00	3.00	3.00

Crit W.S. (ft)		Flow Area (sq ft)		117.58	
E.G. Slope (ft/ft)	0.007685	Area (sq ft)		117.58	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	36.62	Top Width (ft)		36.62	
Vel Total (ft/s)	7.82	Avg. Vel. (ft/s)		7.82	
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)		3.21	
Conv. Total (cfs)	10494.5	Conv. (cfs)		10494.5	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		38.58	
Min Ch El (ft)	2842.00	Shear (lb/sq ft)		1.46	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	55.89	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	17.69	0.11

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2846.03	Element			
Vel Head (ft)	0.86	Wt. n-Val.		0.035	
W.S. Elev (ft)	2845.17	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2844.80	Flow Area (sq ft)		83.45	
E.G. Slope (ft/ft)	0.009313	Area (sq ft)		83.45	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	32.67	Top Width (ft)		32.67	
Vel Total (ft/s)	7.43	Avg. Vel. (ft/s)		7.43	
Max Chl Dpth (ft)	3.17	Hydr. Depth (ft)		2.55	
Conv. Total (cfs)	6424.7	Conv. (cfs)		6424.7	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		34.17	
Min Ch El (ft)	2842.00	Shear (lb/sq ft)		1.42	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.08	42.27	0.08
C & E Loss (ft)	0.02	Cum SA (acres)	0.08	17.22	0.08

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2845.03	Element			
Vel Head (ft)	0.64	Wt. n-Val.		0.035	
W.S. Elev (ft)	2844.39	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2844.07	Flow Area (sq ft)		59.32	
E.G. Slope (ft/ft)	0.009460	Area (sq ft)		59.32	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	29.57	Top Width (ft)		29.57	
Vel Total (ft/s)	6.41	Avg. Vel. (ft/s)		6.41	
Max Chl Dpth (ft)	2.39	Hydr. Depth (ft)		2.01	
Conv. Total (cfs)	3906.9	Conv. (cfs)		3906.9	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		30.70	
Min Ch El (ft)	2842.00	Shear (lb/sq ft)		1.14	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.04	30.21	0.04
C & E Loss (ft)	0.03	Cum SA (acres)	0.06	16.76	0.06

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11024

INPUT
Description: Section 110+24 Stabilizer #3 (exit)
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2853	113	2852	135	2852.2	155	2852.2	175	2842
195	2842	215	2852.2	235	2852.2	283.88	2853		

```
Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     135    .016     155     .03     215    .016     235    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           155     215            303.6   303.6   303.6             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2850.08    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.06    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2849.01    Reach Len. (ft)           303.60     303.60     303.60
  Crit W.S. (ft)                      Flow Area (sq ft)                    236.70
  E.G. Slope (ft/ft)      0.003598    Area (sq ft)                         236.70
  Q Total (cfs)            1960.00    Flow (cfs)                          1960.00
  Top Width (ft)             47.50    Top Width (ft)                        47.50
  Vel Total (ft/s)            8.28    Avg. Vel. (ft/s)                       8.28
  Max Chl Dpth (ft)           7.01    Hydr. Depth (ft)                       4.98
  Conv. Total (cfs)        32675.9    Conv. (cfs)                         32675.9
  Length Wtd. (ft)          303.60    Wetted Per. (ft)                      50.87
  Min Ch El (ft)           2842.00    Shear (lb/sq ft)                       1.05
  Alpha                       1.00    Stream Power (lb/ft s)    283.88       0.00       0.00
  Frctn Loss (ft)             0.03    Cum Volume (acre-ft)        0.60      95.78       0.38
  C & E Loss (ft)             0.29    Cum SA (acres)              0.54      18.97       0.23


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2849.42    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.05    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2848.37    Reach Len. (ft)           303.60     303.60     303.60
  Crit W.S. (ft)                      Flow Area (sq ft)                    206.83
  E.G. Slope (ft/ft)      0.003931    Area (sq ft)                         206.83
  Q Total (cfs)            1700.00    Flow (cfs)                          1700.00
  Top Width (ft)             44.97    Top Width (ft)                        44.97
  Vel Total (ft/s)            8.22    Avg. Vel. (ft/s)                       8.22
  Max Chl Dpth (ft)           6.37    Hydr. Depth (ft)                       4.60
  Conv. Total (cfs)        27115.4    Conv. (cfs)                         27115.4
  Length Wtd. (ft)          303.60    Wetted Per. (ft)                      48.03
  Min Ch El (ft)           2842.00    Shear (lb/sq ft)                       1.06
  Alpha                       1.00    Stream Power (lb/ft s)    283.88       0.00       0.00
  Frctn Loss (ft)             0.03    Cum Volume (acre-ft)        0.38      90.26       0.28
  C & E Loss (ft)             0.29    Cum SA (acres)              0.37      18.81       0.18


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2847.35    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.01    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2846.34    Reach Len. (ft)           303.60     303.60     303.60
  Crit W.S. (ft)                      Flow Area (sq ft)                    123.73
  E.G. Slope (ft/ft)      0.005732    Area (sq ft)                         123.73
  Q Total (cfs)            1000.00    Flow (cfs)                          1000.00
```

Top Width (ft)	37.02	Top Width (ft)		37.02	
Vel Total (ft/s)	8.08	Avg. Vel. (ft/s)		8.08	
Max Chl Dpth (ft)	4.34	Hydr. Depth (ft)		3.34	
Conv. Total (cfs)	13207.8	Conv. (cfs)		13207.8	
Length Wtd. (ft)	303.60	Wetted Per. (ft)		39.10	
Min Ch El (ft)	2842.00	Shear (lb/sq ft)		1.13	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.13	59.18	0.13
C & E Loss (ft)	0.29	Cum SA (acres)	0.11	17.78	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2843.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.030	
W.S. Elev (ft)	2843.16	Reach Len. (ft)	303.60	303.60	303.60
Crit W.S. (ft)	2843.16	Flow Area (sq ft)		25.72	
E.G. Slope (ft/ft)	0.013406	Area (sq ft)		25.72	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	24.53	Top Width (ft)		24.53	
Vel Total (ft/s)	5.83	Avg. Vel. (ft/s)		5.83	
Max Chl Dpth (ft)	1.16	Hydr. Depth (ft)		1.05	
Conv. Total (cfs)	1295.5	Conv. (cfs)		1295.5	
Length Wtd. (ft)	303.60	Wetted Per. (ft)		25.09	
Min Ch El (ft)	2842.00	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01	15.09	0.01
C & E Loss (ft)	0.16	Cum SA (acres)	0.03	16.09	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2847.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.		0.030	
W.S. Elev (ft)	2846.07	Reach Len. (ft)	303.60	303.60	303.60
Crit W.S. (ft)		Flow Area (sq ft)		113.86	
E.G. Slope (ft/ft)	0.006143	Area (sq ft)		113.86	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	35.96	Top Width (ft)		35.96	
Vel Total (ft/s)	8.08	Avg. Vel. (ft/s)		8.08	
Max Chl Dpth (ft)	4.07	Hydr. Depth (ft)		3.17	
Conv. Total (cfs)	11738.3	Conv. (cfs)		11738.3	
Length Wtd. (ft)	303.60	Wetted Per. (ft)		37.91	
Min Ch El (ft)	2842.00	Shear (lb/sq ft)		1.15	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00

Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.13	55.88	0.13
C & E Loss (ft)	0.29	Cum SA (acres)	0.11	17.69	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2845.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2844.87	Reach Len. (ft)	303.60	303.60	303.60
Crit W.S. (ft)	2844.81	Flow Area (sq ft)		73.66	
E.G. Slope (ft/ft)	0.009759	Area (sq ft)		73.66	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	31.27	Top Width (ft)		31.27	
Vel Total (ft/s)	8.42	Avg. Vel. (ft/s)		8.42	
Max Chl Dpth (ft)	2.87	Hydr. Depth (ft)		2.36	
Conv. Total (cfs)	6276.1	Conv. (cfs)		6276.1	
Length Wtd. (ft)	303.60	Wetted Per. (ft)		32.65	
Min Ch El (ft)	2842.00	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.08	42.26	0.08
C & E Loss (ft)	0.32	Cum SA (acres)	0.08	17.22	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2844.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.		0.030	
W.S. Elev (ft)	2844.07	Reach Len. (ft)	303.60	303.60	303.60
Crit W.S. (ft)	2844.07	Flow Area (sq ft)		49.92	
E.G. Slope (ft/ft)	0.011518	Area (sq ft)		49.92	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	28.13	Top Width (ft)		28.13	
Vel Total (ft/s)	7.61	Avg. Vel. (ft/s)		7.61	
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)		1.77	
Conv. Total (cfs)	3540.8	Conv. (cfs)		3540.8	
Length Wtd. (ft)	303.60	Wetted Per. (ft)		29.13	
Min Ch El (ft)	2842.00	Shear (lb/sq ft)		1.23	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.04	30.20	0.04
C & E Loss (ft)	0.26	Cum SA (acres)	0.06	16.76	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10720.4

INPUT
Description: U/S Face Private Road
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2853	194.52	2852	262	2852	262	2841	360	2841
360	2852	385.8	2852	435.35	2853				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	262	.013	360	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
262	360	61	61	61	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	262	2853	T
360	435.35	2853	T

Left Levee Station= 262 Elevation= 2853
Right Levee Station= 360 Elevation= 2853

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2849.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2849.67	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2843.32	Flow Area (sq ft)		849.72	
E.G. Slope (ft/ft)	0.000028	Area (sq ft)		849.72	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	98.00	Top Width (ft)		98.00	
Vel Total (ft/s)	2.31	Avg. Vel. (ft/s)		2.31	
Max Chl Dpth (ft)	8.67	Hydr. Depth (ft)		8.67	
Conv. Total (cfs)	367726.7	Conv. (cfs)		367726.7	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		115.34	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	262.00	360.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.60	91.99	0.38
C & E Loss (ft)		Cum SA (acres)	0.54	18.46	0.23

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2849.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2849.02	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2843.11	Flow Area (sq ft)		786.03	
E.G. Slope (ft/ft)	0.000027	Area (sq ft)		786.03	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	98.00	Top Width (ft)		98.00	
Vel Total (ft/s)	2.16	Avg. Vel. (ft/s)		2.16	
Max Chl Dpth (ft)	8.02	Hydr. Depth (ft)		8.02	
Conv. Total (cfs)	325395.7	Conv. (cfs)		325395.7	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		114.04	

Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	262.00	360.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.38	86.80	0.28
C & E Loss (ft)		Cum SA (acres)	0.37	18.32	0.18

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2847.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2846.99	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2842.48	Flow Area (sq ft)		587.31	
E.G. Slope (ft/ft)	0.000024	Area (sq ft)		587.31	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	98.00	Top Width (ft)		98.00	
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)		1.70	
Max Chl Dpth (ft)	5.99	Hydr. Depth (ft)		5.99	
Conv. Total (cfs)	205085.5	Conv. (cfs)		205085.5	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		109.99	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	262.00	360.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	56.70	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	17.30	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2843.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2843.03	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2841.42	Flow Area (sq ft)		198.54	
E.G. Slope (ft/ft)	0.000018	Area (sq ft)		198.54	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	98.00	Top Width (ft)		98.00	
Vel Total (ft/s)	0.76	Avg. Vel. (ft/s)		0.76	
Max Chl Dpth (ft)	2.03	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	35364.8	Conv. (cfs)		35364.8	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		102.05	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	435.35	262.00	360.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	14.31	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	15.66	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2846.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2846.72	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2842.40	Flow Area (sq ft)		560.99	
E.G. Slope (ft/ft)	0.000023	Area (sq ft)		560.99	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	98.00	Top Width (ft)		98.00	
Vel Total (ft/s)	1.64	Avg. Vel. (ft/s)		1.64	
Max Chl Dpth (ft)	5.72	Hydr. Depth (ft)		5.72	
Conv. Total (cfs)	190619.3	Conv. (cfs)		190619.3	

Length Wtd. (ft)	61.00	Wetted Per. (ft)		109.45	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	262.00	360.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	53.53	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	17.22	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2845.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.013	
W.S. Elev (ft)	2845.59	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2842.08	Flow Area (sq ft)		450.26	
E.G. Slope (ft/ft)	0.000021	Area (sq ft)		450.26	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	98.00	Top Width (ft)		98.00	
Vel Total (ft/s)	1.38	Avg. Vel. (ft/s)		1.38	
Max Chl Dpth (ft)	4.59	Hydr. Depth (ft)		4.59	
Conv. Total (cfs)	133985.0	Conv. (cfs)		133985.0	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		107.19	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	435.35	262.00	360.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	40.44	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	16.77	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2844.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.013	
W.S. Elev (ft)	2844.48	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2841.78	Flow Area (sq ft)		341.42	
E.G. Slope (ft/ft)	0.000020	Area (sq ft)		341.42	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	98.00	Top Width (ft)		98.00	
Vel Total (ft/s)	1.11	Avg. Vel. (ft/s)		1.11	
Max Chl Dpth (ft)	3.48	Hydr. Depth (ft)		3.48	
Conv. Total (cfs)	85670.5	Conv. (cfs)		85670.5	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		104.97	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	435.35	262.00	360.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	28.84	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	16.32	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 10694.4

INPUT
Description: Private Road
Distance from Upstream XS = .5
Deck/Roadway Width = 60
Weir Coefficient = 2.6

```
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100    2853           194.5    2853             274    2853
     340    2853             386    2853          453.35    2853

Upstream Bridge Cross Section Data
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2853  194.52    2852     262    2852     262    2841     360    2841
     360    2852   385.8    2852  435.35    2853

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     262    .013     360    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           262     360             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     262    2853       T
     360  435.35    2853       T
Left Levee      Station=     262      Elevation=    2853
Right Levee     Station=     360      Elevation=    2853

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100    2853           194.5    2853             274    2853
     340    2853             386    2853          453.35    2853

Downstream Bridge Cross Section Data
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2853  194.52    2852     262  2851.5     281    2841     341    2841
     360  2851.5   385.8    2852  435.35    2853

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     262     .03     360    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           262     360             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     262    2852       T
     360  435.35    2852       T
Left Levee      Station=     262      Elevation=    2852
Right Levee     Station=     360      Elevation=    2852

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       9      12
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
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Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  1      60     .013     .013        0                   .2                1
Number of Barrels =  3
Upstream   Elevation =  2841
Centerline Stations
    Sta.    Sta.    Sta.
     298     311     324
Downstream Elevation =  2841
Centerline Stations
    Sta.    Sta.    Sta.
     298     311     324

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1960.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          6.93
  Q Barrel (cfs)            653.33    Culv Vel DS (ft/s)          6.98
  E.G. US. (ft)            2849.75    Culv Inv El Up (ft)      2841.00
  W.S. US. (ft)            2849.67    Culv Inv El Dn (ft)      2841.00
  E.G. DS (ft)             2848.98    Culv Frctn Ls (ft)          0.04
  W.S. DS (ft)             2848.81    Culv Exit Loss (ft)         0.58
  Delta EG (ft)               0.77    Culv Entr Loss (ft)         0.15
  Delta WS (ft)               0.87    Q Weir (cfs)
  E.G. IC (ft)             2848.25    Weir Sta Lft (ft)
  E.G. OC (ft)             2849.75    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2848.86    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2848.81    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         4.52    Min El Weir Flow (ft)    2853.01


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1700.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          6.45
  Q Barrel (cfs)            566.67    Culv Vel DS (ft/s)          6.50
  E.G. US. (ft)            2849.09    Culv Inv El Up (ft)      2841.00
  W.S. US. (ft)            2849.02    Culv Inv El Dn (ft)      2841.00
  E.G. DS (ft)             2848.43    Culv Frctn Ls (ft)          0.04
  W.S. DS (ft)             2848.27    Culv Exit Loss (ft)         0.50
  Delta EG (ft)               0.67    Culv Entr Loss (ft)         0.13
  Delta WS (ft)               0.75    Q Weir (cfs)
  E.G. IC (ft)             2847.57    Weir Sta Lft (ft)
  E.G. OC (ft)             2849.09    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2848.32    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2848.27    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         4.11    Min El Weir Flow (ft)    2853.01


CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1000.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          4.98
  Q Barrel (cfs)            333.33    Culv Vel DS (ft/s)          5.01
  E.G. US. (ft)            2847.04    Culv Inv El Up (ft)      2841.00
  W.S. US. (ft)            2846.99    Culv Inv El Dn (ft)      2841.00
  E.G. DS (ft)             2846.65    Culv Frctn Ls (ft)          0.03
  W.S. DS (ft)             2846.54    Culv Exit Loss (ft)         0.29
  Delta EG (ft)               0.39    Culv Entr Loss (ft)         0.08
  Delta WS (ft)               0.45    Q Weir (cfs)
  E.G. IC (ft)             2845.57    Weir Sta Lft (ft)
  E.G. OC (ft)             2847.04    Weir Sta Rgt (ft)
```

Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2846.58	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2846.54	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.88	Min El Weir Flow (ft)	2853.01

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	150.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	2.14
Q Barrel (cfs)	50.00	Culv Vel DS (ft/s)	2.15
E.G. US. (ft)	2843.04	Culv Inv El Up (ft)	2841.00
W.S. US. (ft)	2843.03	Culv Inv El Dn (ft)	2841.00
E.G. DS (ft)	2842.96	Culv Frctn Ls (ft)	0.01
W.S. DS (ft)	2842.94	Culv Exit Loss (ft)	0.05
Delta EG (ft)	0.08	Culv Entr Loss (ft)	0.01
Delta WS (ft)	0.09	Q Weir (cfs)	
E.G. IC (ft)	2842.26	Weir Sta Lft (ft)	
E.G. OC (ft)	2843.04	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2842.95	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2842.94	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.81	Min El Weir Flow (ft)	2853.01

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	920.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	4.79
Q Barrel (cfs)	306.67	Culv Vel DS (ft/s)	4.81
E.G. US. (ft)	2846.77	Culv Inv El Up (ft)	2841.00
W.S. US. (ft)	2846.72	Culv Inv El Dn (ft)	2841.00
E.G. DS (ft)	2846.41	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	2846.31	Culv Exit Loss (ft)	0.26
Delta EG (ft)	0.36	Culv Entr Loss (ft)	0.07
Delta WS (ft)	0.42	Q Weir (cfs)	
E.G. IC (ft)	2845.31	Weir Sta Lft (ft)	
E.G. OC (ft)	2846.77	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2846.34	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2846.31	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.73	Min El Weir Flow (ft)	2853.01

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	620.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	3.98
Q Barrel (cfs)	206.67	Culv Vel DS (ft/s)	4.00
E.G. US. (ft)	2845.62	Culv Inv El Up (ft)	2841.00
W.S. US. (ft)	2845.59	Culv Inv El Dn (ft)	2841.00
E.G. DS (ft)	2845.38	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2845.31	Culv Exit Loss (ft)	0.18
Delta EG (ft)	0.25	Culv Entr Loss (ft)	0.05
Delta WS (ft)	0.29	Q Weir (cfs)	
E.G. IC (ft)	2844.29	Weir Sta Lft (ft)	
E.G. OC (ft)	2845.62	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2845.33	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2845.31	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.10	Min El Weir Flow (ft)	2853.01

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CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        380.00    Culv Full Len (ft)
  # Barrels                       3    Culv Vel US (ft/s)          3.18
  Q Barrel (cfs)            126.67    Culv Vel DS (ft/s)          3.20
  E.G. US. (ft)            2844.50    Culv Inv El Up (ft)      2841.00
  W.S. US. (ft)            2844.48    Culv Inv El Dn (ft)      2841.00
  E.G. DS (ft)             2844.34    Culv Frctn Ls (ft)          0.02
  W.S. DS (ft)             2844.30    Culv Exit Loss (ft)         0.11
  Delta EG (ft)               0.16    Culv Entr Loss (ft)         0.03
  Delta WS (ft)               0.19    Q Weir (cfs)
  E.G. IC (ft)             2843.36    Weir Sta Lft (ft)
  E.G. OC (ft)             2844.50    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2844.31    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2844.30    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.51    Min El Weir Flow (ft)    2853.01


CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 10659.4

INPUT
Description: D/S Face Private Road
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2853  194.52    2852     262  2851.5     281    2841     341    2841
     360  2851.5   385.8    2852  435.35    2853

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     262     .03     360    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           262     360             45.3    45.3    45.3             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     262    2852       T
     360  435.35    2852       T
Left Levee      Station=     262      Elevation=    2852
Right Levee     Station=     360      Elevation=    2852

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2848.98    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.18    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2848.81    Reach Len. (ft)            45.30      45.30      45.30
  Crit W.S. (ft)           2844.12    Flow Area (sq ft)                    578.55
  E.G. Slope (ft/ft)      0.000405    Area (sq ft)                         578.55
  Q Total (cfs)            1960.00    Flow (cfs)                          1960.00
  Top Width (ft)             88.25    Top Width (ft)                        88.25
  Vel Total (ft/s)            3.39    Avg. Vel. (ft/s)                       3.39
  Max Chl Dpth (ft)           7.81    Hydr. Depth (ft)                       6.56
  Conv. Total (cfs)        97436.4    Conv. (cfs)                         97436.4
  Length Wtd. (ft)           45.30    Wetted Per. (ft)                      92.27
  Min Ch El (ft)           2841.00    Shear (lb/sq ft)                       0.16
  Alpha                       1.00    Stream Power (lb/ft s)    435.35     262.00     360.00
  Frctn Loss (ft)             0.05    Cum Volume (acre-ft)        0.60      91.84       0.38
  C & E Loss (ft)             0.51    Cum SA (acres)              0.54      18.33       0.23
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2848.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2848.27	Reach Len. (ft)	45.30	45.30	45.30
Crit W.S. (ft)	2843.84	Flow Area (sq ft)		531.80	
E.G. Slope (ft/ft)	0.000390	Area (sq ft)		531.80	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	86.31	Top Width (ft)		86.31	
Vel Total (ft/s)	3.20	Avg. Vel. (ft/s)		3.20	
Max Chl Dpth (ft)	7.27	Hydr. Depth (ft)		6.16	
Conv. Total (cfs)	86053.3	Conv. (cfs)		86053.3	
Length Wtd. (ft)	45.30	Wetted Per. (ft)		90.06	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	435.35	262.00	360.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.38	86.66	0.28
C & E Loss (ft)	0.48	Cum SA (acres)	0.37	18.19	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2846.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2846.54	Reach Len. (ft)	45.30	45.30	45.30
Crit W.S. (ft)	2843.01	Flow Area (sq ft)		388.16	
E.G. Slope (ft/ft)	0.000345	Area (sq ft)		388.16	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	80.06	Top Width (ft)		80.06	
Vel Total (ft/s)	2.58	Avg. Vel. (ft/s)		2.58	
Max Chl Dpth (ft)	5.54	Hydr. Depth (ft)		4.85	
Conv. Total (cfs)	53799.9	Conv. (cfs)		53799.9	
Length Wtd. (ft)	45.30	Wetted Per. (ft)		82.92	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	435.35	262.00	360.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.13	56.59	0.13
C & E Loss (ft)	0.38	Cum SA (acres)	0.11	17.18	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2842.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2842.94	Reach Len. (ft)	45.30	45.30	45.30
Crit W.S. (ft)	2841.56	Flow Area (sq ft)		122.93	
E.G. Slope (ft/ft)	0.000276	Area (sq ft)		122.93	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	67.01	Top Width (ft)		67.01	
Vel Total (ft/s)	1.22	Avg. Vel. (ft/s)		1.22	
Max Chl Dpth (ft)	1.94	Hydr. Depth (ft)		1.83	
Conv. Total (cfs)	9035.2	Conv. (cfs)		9035.2	
Length Wtd. (ft)	45.30	Wetted Per. (ft)		68.00	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	435.35	262.00	360.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01	14.28	0.01
C & E Loss (ft)	0.15	Cum SA (acres)	0.03	15.55	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2846.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2846.31	Reach Len. (ft)	45.30	45.30	45.30
Crit W.S. (ft)	2842.91	Flow Area (sq ft)		369.53	
E.G. Slope (ft/ft)	0.000339	Area (sq ft)		369.53	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	79.21	Top Width (ft)		79.21	
Vel Total (ft/s)	2.49	Avg. Vel. (ft/s)		2.49	
Max Chl Dpth (ft)	5.31	Hydr. Depth (ft)		4.67	
Conv. Total (cfs)	49955.6	Conv. (cfs)		49955.6	
Length Wtd. (ft)	45.30	Wetted Per. (ft)		81.95	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	435.35	262.00	360.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.13	53.42	0.13
C & E Loss (ft)	0.37	Cum SA (acres)	0.11	17.10	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2845.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	2845.31	Reach Len. (ft)	45.30	45.30	45.30
Crit W.S. (ft)	2842.48	Flow Area (sq ft)		291.83	
E.G. Slope (ft/ft)	0.000316	Area (sq ft)		291.83	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	75.58	Top Width (ft)		75.58	
Vel Total (ft/s)	2.12	Avg. Vel. (ft/s)		2.12	
Max Chl Dpth (ft)	4.30	Hydr. Depth (ft)		3.86	
Conv. Total (cfs)	34895.6	Conv. (cfs)		34895.6	

Length Wtd. (ft)	45.30	Wetted Per. (ft)		77.80	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	435.35	262.00	360.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.08	40.35	0.08
C & E Loss (ft)	0.31	Cum SA (acres)	0.08	16.65	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2844.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2844.30	Reach Len. (ft)	45.30	45.30	45.30
Crit W.S. (ft)	2842.07	Flow Area (sq ft)		217.38	
E.G. Slope (ft/ft)	0.000294	Area (sq ft)		217.38	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	71.93	Top Width (ft)		71.93	
Vel Total (ft/s)	1.75	Avg. Vel. (ft/s)		1.75	
Max Chl Dpth (ft)	3.30	Hydr. Depth (ft)		3.02	
Conv. Total (cfs)	22158.3	Conv. (cfs)		22158.3	
Length Wtd. (ft)	45.30	Wetted Per. (ft)		73.63	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	435.35	262.00	360.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.04	28.77	0.04
C & E Loss (ft)	0.25	Cum SA (acres)	0.06	16.20	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10614.1

INPUT
Description: Section 106+14
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2855	143.02	2854	165.01	2853	183.37	2852	201.27	2851
234.79	2850	245	2849	265	2849	289.55	2841	306.95	2841
325	2849	345	2849	362.58	2849	367.33	2849	443.58	2849
462.06	2850	510.91	2851	529.53	2854				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	245	.016	265	.03	325	.016	345	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
265	325	.2	.2	.2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent

```
     100     265  2849.8       T
     325  529.53  2849.8       T
Left Levee      Station=     265      Elevation=  2849.8
Right Levee     Station=     325      Elevation=  2849.8
```

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2848.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.89	Wt. n-Val.		0.030	
W.S. Elev (ft)	2846.53	Reach Len. (ft)	0.20	0.20	0.20
Crit W.S. (ft)	2846.53	Flow Area (sq ft)		177.66	
E.G. Slope (ft/ft)	0.008883	Area (sq ft)		177.66	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	46.85	Top Width (ft)		46.85	
Vel Total (ft/s)	11.03	Avg. Vel. (ft/s)		11.03	
Max Chl Dpth (ft)	5.53	Hydr. Depth (ft)		3.79	
Conv. Total (cfs)	20796.2	Conv. (cfs)		20796.2	
Length Wtd. (ft)	0.20	Wetted Per. (ft)		48.90	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		2.01	
Alpha	1.00	Stream Power (lb/ft s)	529.53	265.00	325.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.60	91.45	0.38
C & E Loss (ft)	0.05	Cum SA (acres)	0.54	18.26	0.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2847.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.77	Wt. n-Val.		0.030	
W.S. Elev (ft)	2846.13	Reach Len. (ft)	0.20	0.20	0.20
Crit W.S. (ft)	2846.13	Flow Area (sq ft)		159.43	
E.G. Slope (ft/ft)	0.008997	Area (sq ft)		159.43	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	44.73	Top Width (ft)		44.73	
Vel Total (ft/s)	10.66	Avg. Vel. (ft/s)		10.66	
Max Chl Dpth (ft)	5.13	Hydr. Depth (ft)		3.56	
Conv. Total (cfs)	17922.4	Conv. (cfs)		17922.4	
Length Wtd. (ft)	0.20	Wetted Per. (ft)		46.63	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		1.92	
Alpha	1.00	Stream Power (lb/ft s)	529.53	265.00	325.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.38	86.30	0.28
C & E Loss (ft)	0.06	Cum SA (acres)	0.37	18.12	0.18

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2846.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.37	Wt. n-Val.		0.030	
W.S. Elev (ft)	2844.85	Reach Len. (ft)	0.20	0.20	0.20
Crit W.S. (ft)	2844.85	Flow Area (sq ft)		106.27	
E.G. Slope (ft/ft)	0.009580	Area (sq ft)		106.27	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	37.88	Top Width (ft)		37.88	
Vel Total (ft/s)	9.41	Avg. Vel. (ft/s)		9.41	
Max Chl Dpth (ft)	3.85	Hydr. Depth (ft)		2.81	
Conv. Total (cfs)	10216.9	Conv. (cfs)		10216.9	
Length Wtd. (ft)	0.20	Wetted Per. (ft)		39.30	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		1.62	
Alpha	1.00	Stream Power (lb/ft s)	529.53	265.00	325.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	56.34	0.13
C & E Loss (ft)	0.05	Cum SA (acres)	0.11	17.12	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2842.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.030	
W.S. Elev (ft)	2842.25	Reach Len. (ft)	0.20	0.20	0.20
Crit W.S. (ft)	2842.25	Flow Area (sq ft)		25.79	
E.G. Slope (ft/ft)	0.012867	Area (sq ft)		25.79	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	24.03	Top Width (ft)		24.03	
Vel Total (ft/s)	5.82	Avg. Vel. (ft/s)		5.82	
Max Chl Dpth (ft)	1.25	Hydr. Depth (ft)		1.07	
Conv. Total (cfs)	1322.4	Conv. (cfs)		1322.4	
Length Wtd. (ft)	0.20	Wetted Per. (ft)		24.49	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		0.85	
Alpha	1.00	Stream Power (lb/ft s)	529.53	265.00	325.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	14.20	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	15.50	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2845.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.33	Wt. n-Val.		0.030	
W.S. Elev (ft)	2844.66	Reach Len. (ft)	0.20	0.20	0.20
Crit W.S. (ft)	2844.66	Flow Area (sq ft)		99.44	
E.G. Slope (ft/ft)	0.009764	Area (sq ft)		99.44	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	36.90	Top Width (ft)		36.90	
Vel Total (ft/s)	9.25	Avg. Vel. (ft/s)		9.25	
Max Chl Dpth (ft)	3.66	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	9310.3	Conv. (cfs)		9310.3	
Length Wtd. (ft)	0.20	Wetted Per. (ft)		38.26	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		1.58	
Alpha	1.00	Stream Power (lb/ft s)	529.53	265.00	325.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	53.18	0.13
C & E Loss (ft)	0.03	Cum SA (acres)	0.11	17.04	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2845.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2843.93	Reach Len. (ft)	0.20	0.20	0.20
Crit W.S. (ft)	2843.93	Flow Area (sq ft)		73.70	
E.G. Slope (ft/ft)	0.010309	Area (sq ft)		73.70	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	32.98	Top Width (ft)		32.98	
Vel Total (ft/s)	8.41	Avg. Vel. (ft/s)		8.41	
Max Chl Dpth (ft)	2.93	Hydr. Depth (ft)		2.23	
Conv. Total (cfs)	6106.5	Conv. (cfs)		6106.5	
Length Wtd. (ft)	0.20	Wetted Per. (ft)		34.06	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		1.39	

Alpha	1.00	Stream Power (lb/ft s)	529.53	265.00	325.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	40.16	0.08
C & E Loss (ft)	0.03	Cum SA (acres)	0.08	16.59	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2844.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.		0.030	
W.S. Elev (ft)	2843.19	Reach Len. (ft)	0.20	0.20	0.20
Crit W.S. (ft)	2843.19	Flow Area (sq ft)		50.74	
E.G. Slope (ft/ft)	0.011268	Area (sq ft)		50.74	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	29.04	Top Width (ft)		29.04	
Vel Total (ft/s)	7.49	Avg. Vel. (ft/s)		7.49	
Max Chl Dpth (ft)	2.19	Hydr. Depth (ft)		1.75	
Conv. Total (cfs)	3579.7	Conv. (cfs)		3579.7	
Length Wtd. (ft)	0.20	Wetted Per. (ft)		29.85	
Min Ch El (ft)	2841.00	Shear (lb/sq ft)		1.20	
Alpha	1.00	Stream Power (lb/ft s)	529.53	265.00	325.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	28.63	0.04
C & E Loss (ft)	0.02	Cum SA (acres)	0.06	16.15	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10613.9

INPUT
Description: Section 106+13.9
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2855	143.02	2854	165.01	2853	183.37	2852	201.27	2851
234.79	2850	245	2849	265	2849	267.5	2848	289.55	2837
306.95	2837	325	2846	345	2846	362.58	2847	367.33	2848

```
  443.58    2849  462.06    2850  510.91    2851  529.53    2854

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035   267.5     .03     325    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         267.5     325              400     400     400             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2847.99    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               6.19    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2841.80    Reach Len. (ft)           400.00     400.00     400.00
  Crit W.S. (ft)           2843.76    Flow Area (sq ft)                    129.71
  E.G. Slope (ft/ft)      0.032635    Area (sq ft)                         129.71
  Q Total (cfs)            2590.00    Flow (cfs)                          2590.00
  Top Width (ft)             36.65    Top Width (ft)                        36.65
  Vel Total (ft/s)           19.97    Avg. Vel. (ft/s)                      19.97
  Max Chl Dpth (ft)           4.80    Hydr. Depth (ft)                       3.54
  Conv. Total (cfs)        14337.1    Conv. (cfs)                         14337.1
  Length Wtd. (ft)          400.00    Wetted Per. (ft)                      38.91
  Min Ch El (ft)           2837.00    Shear (lb/sq ft)                       6.79
  Alpha                       1.00    Stream Power (lb/ft s)    529.53       0.00       0.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.60      91.45       0.38
  C & E Loss (ft)             0.43    Cum SA (acres)              0.54      18.26       0.23


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2847.54    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               5.30    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2842.24    Reach Len. (ft)           400.00     400.00     400.00
  Crit W.S. (ft)           2843.93    Flow Area (sq ft)                    146.12
  E.G. Slope (ft/ft)      0.025458    Area (sq ft)                         146.12
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             38.40    Top Width (ft)                        38.40
  Vel Total (ft/s)           18.48    Avg. Vel. (ft/s)                      18.48
  Max Chl Dpth (ft)           5.24    Hydr. Depth (ft)                       3.81
  Conv. Total (cfs)        16922.0    Conv. (cfs)                         16922.0
  Length Wtd. (ft)          400.00    Wetted Per. (ft)                      40.87
  Min Ch El (ft)           2837.00    Shear (lb/sq ft)                       5.68
  Alpha                       1.00    Stream Power (lb/ft s)    529.53       0.00       0.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.38      86.30       0.28
  C & E Loss (ft)             0.35    Cum SA (acres)              0.37      18.12       0.18


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2845.81    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               5.49    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2840.32    Reach Len. (ft)           400.00     400.00     400.00
```

Crit W.S. (ft)	2842.01	Flow Area (sq ft)		79.80	
E.G. Slope (ft/ft)	0.043070	Area (sq ft)		79.80	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	30.70	Top Width (ft)		30.70	
Vel Total (ft/s)	18.80	Avg. Vel. (ft/s)		18.80	
Max Chl Dpth (ft)	3.32	Hydr. Depth (ft)		2.60	
Conv. Total (cfs)	7227.7	Conv. (cfs)		7227.7	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		32.27	
Min Ch El (ft)	2837.00	Shear (lb/sq ft)		6.65	
Alpha	1.00	Stream Power (lb/ft s)	529.53	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	56.34	0.13
C & E Loss (ft)	0.41	Cum SA (acres)	0.11	17.12	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2842.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.73	Wt. n-Val.		0.030	
W.S. Elev (ft)	2837.62	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)	2838.50	Flow Area (sq ft)		11.46	
E.G. Slope (ft/ft)	0.263283	Area (sq ft)		11.46	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	19.87	Top Width (ft)		19.87	
Vel Total (ft/s)	17.45	Avg. Vel. (ft/s)		17.45	
Max Chl Dpth (ft)	0.62	Hydr. Depth (ft)		0.58	
Conv. Total (cfs)	389.8	Conv. (cfs)		389.8	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		20.16	
Min Ch El (ft)	2837.00	Shear (lb/sq ft)		9.35	
Alpha	1.00	Stream Power (lb/ft s)	529.53	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	14.20	0.01
C & E Loss (ft)	0.42	Cum SA (acres)	0.03	15.50	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2845.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.79	Wt. n-Val.		0.030	
W.S. Elev (ft)	2839.76	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)	2841.45	Flow Area (sq ft)		63.20	
E.G. Slope (ft/ft)	0.055625	Area (sq ft)		63.20	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	28.45	Top Width (ft)		28.45	
Vel Total (ft/s)	19.30	Avg. Vel. (ft/s)		19.30	
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)		2.22	
Conv. Total (cfs)	5172.8	Conv. (cfs)		5172.8	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		29.75	
Min Ch El (ft)	2837.00	Shear (lb/sq ft)		7.38	
Alpha	1.00	Stream Power (lb/ft s)	529.53	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	53.18	0.13

C & E Loss (ft)	0.45	Cum SA (acres)	0.11	17.04	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2844.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.55	Wt. n-Val.		0.030	
W.S. Elev (ft)	2839.02	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)	2840.54	Flow Area (sq ft)		43.38	
E.G. Slope (ft/ft)	0.075346	Area (sq ft)		43.38	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	25.51	Top Width (ft)		25.51	
Vel Total (ft/s)	18.90	Avg. Vel. (ft/s)		18.90	
Max Chl Dpth (ft)	2.02	Hydr. Depth (ft)		1.70	
Conv. Total (cfs)	2987.3	Conv. (cfs)		2987.3	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		26.46	
Min Ch El (ft)	2837.00	Shear (lb/sq ft)		7.71	
Alpha	1.00	Stream Power (lb/ft s)	529.53	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.08	40.16	0.08
C & E Loss (ft)	0.44	Cum SA (acres)	0.08	16.59	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2843.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.26	Wt. n-Val.		0.030	
W.S. Elev (ft)	2838.35	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)	2839.64	Flow Area (sq ft)		27.17	
E.G. Slope (ft/ft)	0.113482	Area (sq ft)		27.17	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	22.82	Top Width (ft)		22.82	
Vel Total (ft/s)	18.40	Avg. Vel. (ft/s)		18.40	
Max Chl Dpth (ft)	1.35	Hydr. Depth (ft)		1.19	
Conv. Total (cfs)	1484.2	Conv. (cfs)		1484.2	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		23.45	
Min Ch El (ft)	2837.00	Shear (lb/sq ft)		8.21	
Alpha	1.00	Stream Power (lb/ft s)	529.53	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.04	28.63	0.04
C & E Loss (ft)	0.44	Cum SA (acres)	0.06	16.15	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10213.9

INPUT
Description: Section 102+13.9
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2850	105.29	2849	110.43	2848	115.26	2847	123.63	2846
131	2845	151	2845	168	2836.7	270	2836.7	287	2845
307	2845	351.58	2845	411.96	2846	447.34	2847	456.99	2850

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	131	.016	151	.03	287	.016	307	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
151	287	350	350	350	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2841.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.030	
W.S. Elev (ft)	2841.19	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2839.36	Flow Area (sq ft)		498.95	
E.G. Slope (ft/ft)	0.001688	Area (sq ft)		498.95	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	120.38	Top Width (ft)		120.38	
Vel Total (ft/s)	5.19	Avg. Vel. (ft/s)		5.19	
Max Chl Dpth (ft)	4.49	Hydr. Depth (ft)		4.14	
Conv. Total (cfs)	63044.3	Conv. (cfs)		63044.3	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		122.46	
Min Ch El (ft)	2836.70	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00
Frctn Loss (ft)	1.17	Cum Volume (acre-ft)	0.60	88.56	0.38
C & E Loss (ft)	0.11	Cum SA (acres)	0.54	17.54	0.23

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2841.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.43	Wt. n-Val.		0.030	
W.S. Elev (ft)	2841.30	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2839.43	Flow Area (sq ft)		512.61	
E.G. Slope (ft/ft)	0.001686	Area (sq ft)		512.61	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	120.85	Top Width (ft)		120.85	
Vel Total (ft/s)	5.27	Avg. Vel. (ft/s)		5.27	
Max Chl Dpth (ft)	4.60	Hydr. Depth (ft)		4.24	
Conv. Total (cfs)	65763.1	Conv. (cfs)		65763.1	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		122.97	
Min Ch El (ft)	2836.70	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00

Frctn Loss (ft)	1.16	Cum Volume (acre-ft)	0.38	83.28	0.28
C & E Loss (ft)	0.11	Cum SA (acres)	0.37	17.39	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2840.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.		0.030	
W.S. Elev (ft)	2839.95	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2838.56	Flow Area (sq ft)		352.60	
E.G. Slope (ft/ft)	0.001691	Area (sq ft)		352.60	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	115.29	Top Width (ft)		115.29	
Vel Total (ft/s)	4.25	Avg. Vel. (ft/s)		4.25	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		3.06	
Conv. Total (cfs)	36480.6	Conv. (cfs)		36480.6	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		116.79	
Min Ch El (ft)	2836.70	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00
Frctn Loss (ft)	1.21	Cum Volume (acre-ft)	0.13	54.35	0.13
C & E Loss (ft)	0.08	Cum SA (acres)	0.11	16.45	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2837.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	2837.71	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2837.19	Flow Area (sq ft)		105.01	
E.G. Slope (ft/ft)	0.001509	Area (sq ft)		105.01	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	106.13	Top Width (ft)		106.13	
Vel Total (ft/s)	1.90	Avg. Vel. (ft/s)		1.90	
Max Chl Dpth (ft)	1.01	Hydr. Depth (ft)		0.99	
Conv. Total (cfs)	5149.1	Conv. (cfs)		5149.1	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		106.60	
Min Ch El (ft)	2836.70	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00
Frctn Loss (ft)	1.24	Cum Volume (acre-ft)	0.01	13.66	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	14.92	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2839.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.030	
W.S. Elev (ft)	2839.57	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2838.32	Flow Area (sq ft)		309.90	
E.G. Slope (ft/ft)	0.001686	Area (sq ft)		309.90	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	113.77	Top Width (ft)		113.77	
Vel Total (ft/s)	3.94	Avg. Vel. (ft/s)		3.94	
Max Chl Dpth (ft)	2.87	Hydr. Depth (ft)		2.72	
Conv. Total (cfs)	29708.3	Conv. (cfs)		29708.3	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		115.09	
Min Ch El (ft)	2836.70	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00
Frctn Loss (ft)	1.22	Cum Volume (acre-ft)	0.13	51.47	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	16.39	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2839.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.030	
W.S. Elev (ft)	2838.98	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2837.95	Flow Area (sq ft)		242.91	
E.G. Slope (ft/ft)	0.001662	Area (sq ft)		242.91	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	111.33	Top Width (ft)		111.33	
Vel Total (ft/s)	3.38	Avg. Vel. (ft/s)		3.38	
Max Chl Dpth (ft)	2.28	Hydr. Depth (ft)		2.18	
Conv. Total (cfs)	20113.7	Conv. (cfs)		20113.7	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		112.38	
Min Ch El (ft)	2836.70	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00
Frctn Loss (ft)	1.23	Cum Volume (acre-ft)	0.08	38.85	0.08
C & E Loss (ft)	0.06	Cum SA (acres)	0.08	15.96	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2838.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.030	
W.S. Elev (ft)	2838.40	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2837.60	Flow Area (sq ft)		179.77	
E.G. Slope (ft/ft)	0.001634	Area (sq ft)		179.77	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	108.98	Top Width (ft)		108.98	
Vel Total (ft/s)	2.78	Avg. Vel. (ft/s)		2.78	
Max Chl Dpth (ft)	1.70	Hydr. Depth (ft)		1.65	
Conv. Total (cfs)	12371.0	Conv. (cfs)		12371.0	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		109.77	
Min Ch El (ft)	2836.70	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00
Frctn Loss (ft)	1.25	Cum Volume (acre-ft)	0.04	27.68	0.04
C & E Loss (ft)	0.04	Cum SA (acres)	0.06	15.54	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9863.9

INPUT
Description: Section 98+63.9
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2843	110	2843	117	2842	137	2842	150	2835.6
225	2835.6	238	2842	258	2842	265	2843	285	2843
395.97	2843								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	117	.016	137	.03	238	.016	258	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
137	238	13.9	13.9	13.9	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2840.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.51	Wt. n-Val.		0.030	
W.S. Elev (ft)	2838.83	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2838.83	Flow Area (sq ft)		263.01	
E.G. Slope (ft/ft)	0.009405	Area (sq ft)		263.01	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	88.10	Top Width (ft)		88.10	
Vel Total (ft/s)	9.85	Avg. Vel. (ft/s)		9.85	
Max Chl Dpth (ft)	3.23	Hydr. Depth (ft)		2.99	
Conv. Total (cfs)	26706.1	Conv. (cfs)		26706.1	
Length Wtd. (ft)	13.90	Wetted Per. (ft)		89.60	
Min Ch El (ft)	2835.60	Shear (lb/sq ft)		1.72	
Alpha	1.00	Stream Power (lb/ft s)	395.97	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.60	85.50	0.38
C & E Loss (ft)	0.42	Cum SA (acres)	0.54	16.70	0.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2840.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.55	Wt. n-Val.		0.030	
W.S. Elev (ft)	2838.91	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2838.91	Flow Area (sq ft)		270.60	
E.G. Slope (ft/ft)	0.009351	Area (sq ft)		270.60	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	88.45	Top Width (ft)		88.45	
Vel Total (ft/s)	9.98	Avg. Vel. (ft/s)		9.98	
Max Chl Dpth (ft)	3.31	Hydr. Depth (ft)		3.06	
Conv. Total (cfs)	27921.5	Conv. (cfs)		27921.5	
Length Wtd. (ft)	13.90	Wetted Per. (ft)		89.99	
Min Ch El (ft)	2835.60	Shear (lb/sq ft)		1.76	
Alpha	1.00	Stream Power (lb/ft s)	395.97	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.38	80.13	0.28
C & E Loss (ft)	0.43	Cum SA (acres)	0.37	16.55	0.18

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2838.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.		0.030	
W.S. Elev (ft)	2837.86	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2837.86	Flow Area (sq ft)		179.69	
E.G. Slope (ft/ft)	0.010506	Area (sq ft)		179.69	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	84.17	Top Width (ft)		84.17	
Vel Total (ft/s)	8.35	Avg. Vel. (ft/s)		8.35	
Max Chl Dpth (ft)	2.26	Hydr. Depth (ft)		2.13	
Conv. Total (cfs)	14634.5	Conv. (cfs)		14634.5	

Length Wtd. (ft)	13.90	Wetted Per. (ft)		85.22	
Min Ch El (ft)	2835.60	Shear (lb/sq ft)		1.38	
Alpha	1.00	Stream Power (lb/ft s)	395.97	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	52.21	0.13
C & E Loss (ft)	0.29	Cum SA (acres)	0.11	15.65	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2836.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.030	
W.S. Elev (ft)	2836.20	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2836.20	Flow Area (sq ft)		45.55	
E.G. Slope (ft/ft)	0.016019	Area (sq ft)		45.55	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	77.43	Top Width (ft)		77.43	
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)		4.39	
Max Chl Dpth (ft)	0.60	Hydr. Depth (ft)		0.59	
Conv. Total (cfs)	1580.2	Conv. (cfs)		1580.2	
Length Wtd. (ft)	13.90	Wetted Per. (ft)		77.71	
Min Ch El (ft)	2835.60	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)	395.97	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01	13.06	0.01
C & E Loss (ft)	0.05	Cum SA (acres)	0.03	14.18	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2838.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.95	Wt. n-Val.		0.030	
W.S. Elev (ft)	2837.57	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2837.57	Flow Area (sq ft)		155.91	
E.G. Slope (ft/ft)	0.010930	Area (sq ft)		155.91	

Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	83.02	Top Width (ft)		83.02	
Vel Total (ft/s)	7.82	Avg. Vel. (ft/s)		7.82	
Max Chl Dpth (ft)	1.97	Hydr. Depth (ft)		1.88	
Conv. Total (cfs)	11669.5	Conv. (cfs)		11669.5	
Length Wtd. (ft)	13.90	Wetted Per. (ft)		83.94	
Min Ch El (ft)	2835.60	Shear (lb/sq ft)		1.27	
Alpha	1.00	Stream Power (lb/ft s)	395.97	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	49.59	0.13
C & E Loss (ft)	0.26	Cum SA (acres)	0.11	15.59	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2837.86	Element			
Vel Head (ft)	0.74	Wt. n-Val.		0.030	
W.S. Elev (ft)	2837.12	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2837.12	Flow Area (sq ft)		118.69	
E.G. Slope (ft/ft)	0.011859	Area (sq ft)		118.69	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	81.18	Top Width (ft)		81.18	
Vel Total (ft/s)	6.91	Avg. Vel. (ft/s)		6.91	
Max Chl Dpth (ft)	1.52	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	7530.0	Conv. (cfs)		7530.0	
Length Wtd. (ft)	13.90	Wetted Per. (ft)		81.88	
Min Ch El (ft)	2835.60	Shear (lb/sq ft)		1.07	
Alpha	1.00	Stream Power (lb/ft s)	395.97	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.08	37.40	0.08
C & E Loss (ft)	0.19	Cum SA (acres)	0.08	15.19	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2837.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.		0.030	
W.S. Elev (ft)	2836.70	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2836.70	Flow Area (sq ft)		84.97	
E.G. Slope (ft/ft)	0.013023	Area (sq ft)		84.97	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	79.47	Top Width (ft)		79.47	
Vel Total (ft/s)	5.88	Avg. Vel. (ft/s)		5.88	
Max Chl Dpth (ft)	1.10	Hydr. Depth (ft)		1.07	
Conv. Total (cfs)	4381.5	Conv. (cfs)		4381.5	
Length Wtd. (ft)	13.90	Wetted Per. (ft)		79.98	
Min Ch El (ft)	2835.60	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)	395.97	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.04	26.62	0.04
C & E Loss (ft)	0.13	Cum SA (acres)	0.06	14.79	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9850

INPUT
Description: 98+50
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2841	123.58	2840	152.2	2840	184.35	2840	186	2840
206	2840	224	2831	334	2831	352	2840	372	2840
404.83	2840	480.02	2840	529.14	2840				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	186	.016	206	.013	352	.016	372	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
206	352	103	103	103	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	206	2841.8	T
352	529.14	2841.8	T

Left Levee Station= 206 Elevation= 2841.8
Right Levee Station= 352 Elevation= 2841.85

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2838.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.013	

W.S. Elev (ft)	2838.43	Reach Len. (ft)	103.00	103.00	103.00
Crit W.S. (ft)	2833.54	Flow Area (sq ft)		927.43	
E.G. Slope (ft/ft)	0.000049	Area (sq ft)		927.43	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	139.71	Top Width (ft)		139.71	
Vel Total (ft/s)	2.79	Avg. Vel. (ft/s)		2.79	
Max Chl Dpth (ft)	7.43	Hydr. Depth (ft)		6.64	
Conv. Total (cfs)	368285.5	Conv. (cfs)		368285.5	
Length Wtd. (ft)	103.00	Wetted Per. (ft)		143.22	
Min Ch El (ft)	2831.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	529.14	206.00	352.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.60	85.31	0.38
C & E Loss (ft)	0.02	Cum SA (acres)	0.54	16.66	0.23

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2838.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	2838.67	Reach Len. (ft)	103.00	103.00	103.00
Crit W.S. (ft)	2833.63	Flow Area (sq ft)		960.83	
E.G. Slope (ft/ft)	0.000048	Area (sq ft)		960.83	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	140.67	Top Width (ft)		140.67	
Vel Total (ft/s)	2.81	Avg. Vel. (ft/s)		2.81	
Max Chl Dpth (ft)	7.67	Hydr. Depth (ft)		6.83	
Conv. Total (cfs)	388732.4	Conv. (cfs)		388732.4	
Length Wtd. (ft)	103.00	Wetted Per. (ft)		144.28	
Min Ch El (ft)	2831.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	529.14	206.00	352.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.38	79.94	0.28
C & E Loss (ft)	0.02	Cum SA (acres)	0.37	16.51	0.18

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2835.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.013	
W.S. Elev (ft)	2835.85	Reach Len. (ft)	103.00	103.00	103.00
Crit W.S. (ft)	2832.77	Flow Area (sq ft)		580.68	
E.G. Slope (ft/ft)	0.000071	Area (sq ft)		580.68	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	129.40	Top Width (ft)		129.40	
Vel Total (ft/s)	2.58	Avg. Vel. (ft/s)		2.58	
Max Chl Dpth (ft)	4.85	Hydr. Depth (ft)		4.49	
Conv. Total (cfs)	178473.1	Conv. (cfs)		178473.1	
Length Wtd. (ft)	103.00	Wetted Per. (ft)		131.69	
Min Ch El (ft)	2831.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	529.14	206.00	352.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	52.09	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	15.61	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2835.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.35	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.11	Reach Len. (ft)	103.00	103.00	103.00
Crit W.S. (ft)	2831.47	Flow Area (sq ft)		11.95	
E.G. Slope (ft/ft)	0.416349	Area (sq ft)		11.95	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	110.43	Top Width (ft)		110.43	
Vel Total (ft/s)	16.74	Avg. Vel. (ft/s)		16.74	
Max Chl Dpth (ft)	0.11	Hydr. Depth (ft)		0.11	
Conv. Total (cfs)	310.0	Conv. (cfs)		310.0	
Length Wtd. (ft)	103.00	Wetted Per. (ft)		110.48	
Min Ch El (ft)	2831.00	Shear (lb/sq ft)		2.81	
Alpha	1.00	Stream Power (lb/ft s)	529.14	206.00	352.00
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)	0.01	13.05	0.01
C & E Loss (ft)	0.41	Cum SA (acres)	0.03	14.15	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2835.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.013	
W.S. Elev (ft)	2835.10	Reach Len. (ft)	103.00	103.00	103.00
Crit W.S. (ft)	2832.54	Flow Area (sq ft)		484.35	
E.G. Slope (ft/ft)	0.000083	Area (sq ft)		484.35	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	126.39	Top Width (ft)		126.39	
Vel Total (ft/s)	2.52	Avg. Vel. (ft/s)		2.52	
Max Chl Dpth (ft)	4.10	Hydr. Depth (ft)		3.83	
Conv. Total (cfs)	134208.6	Conv. (cfs)		134208.6	
Length Wtd. (ft)	103.00	Wetted Per. (ft)		128.33	
Min Ch El (ft)	2831.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	529.14	206.00	352.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	49.49	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	15.56	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2834.01	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2833.92	Reach Len. (ft)	103.00	103.00	103.00
Crit W.S. (ft)	2832.20	Flow Area (sq ft)		337.71	
E.G. Slope (ft/ft)	0.000117	Area (sq ft)		337.71	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	121.66	Top Width (ft)		121.66	
Vel Total (ft/s)	2.43	Avg. Vel. (ft/s)		2.43	
Max Chl Dpth (ft)	2.92	Hydr. Depth (ft)		2.78	
Conv. Total (cfs)	75670.7	Conv. (cfs)		75670.7	
Length Wtd. (ft)	103.00	Wetted Per. (ft)		123.04	
Min Ch El (ft)	2831.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	529.14	206.00	352.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.08	37.32	0.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.08	15.16	0.08

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2836.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.10	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.25	Reach Len. (ft)	103.00	103.00	103.00
Crit W.S. (ft)	2831.87	Flow Area (sq ft)		27.60	
E.G. Slope (ft/ft)	0.160925	Area (sq ft)		27.60	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	111.00	Top Width (ft)		111.00	
Vel Total (ft/s)	18.12	Avg. Vel. (ft/s)		18.12	
Max Chl Dpth (ft)	0.25	Hydr. Depth (ft)		0.25	
Conv. Total (cfs)	1246.4	Conv. (cfs)		1246.4	
Length Wtd. (ft)	103.00	Wetted Per. (ft)		111.12	
Min Ch El (ft)	2831.00	Shear (lb/sq ft)		2.50	
Alpha	1.00	Stream Power (lb/ft s)	529.14	206.00	352.00
Frctn Loss (ft)	0.44	Cum Volume (acre-ft)	0.04	26.60	0.04
C & E Loss (ft)	0.46	Cum SA (acres)	0.06	14.76	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9747

INPUT
Description: U/S Limit of Rectangular Channel
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2841	123.58	2840	152.2	2839.7	191	2839.7	239	2839.7
239	2830.7	319	2830.7	319	2839.7	366.5	2839.7	480.02	2839.7
529.14	2840								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	239	.013	319	.035

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           239     319            210.9   210.9   210.9             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     239  2841.5       T
     319  529.14  2841.5       T
Left Levee      Station=     239      Elevation=  2841.5
Right Levee     Station=     319      Elevation=  2841.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2838.53    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.29    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2838.24    Reach Len. (ft)           210.90     210.90     210.90
  Crit W.S. (ft)           2833.90    Flow Area (sq ft)                    603.09
  E.G. Slope (ft/ft)      0.000120    Area (sq ft)                         603.09
  Q Total (cfs)            2590.00    Flow (cfs)                          2590.00
  Top Width (ft)             80.00    Top Width (ft)                        80.00
  Vel Total (ft/s)            4.29    Avg. Vel. (ft/s)                       4.29
  Max Chl Dpth (ft)           7.54    Hydr. Depth (ft)                       7.54
  Conv. Total (cfs)       236210.8    Conv. (cfs)                        236210.8
  Length Wtd. (ft)          210.90    Wetted Per. (ft)                      95.08
  Min Ch El (ft)           2830.70    Shear (lb/sq ft)                       0.05
  Alpha                       1.00    Stream Power (lb/ft s)    529.14     239.00     319.00
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)        0.60      83.50       0.38
  C & E Loss (ft)             0.06    Cum SA (acres)              0.54      16.40       0.23


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2838.76    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.29    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2838.47    Reach Len. (ft)           210.90     210.90     210.90
  Crit W.S. (ft)           2834.00    Flow Area (sq ft)                    621.72
  E.G. Slope (ft/ft)      0.000119    Area (sq ft)                         621.72
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             80.00    Top Width (ft)                        80.00
  Vel Total (ft/s)            4.34    Avg. Vel. (ft/s)                       4.34
  Max Chl Dpth (ft)           7.77    Hydr. Depth (ft)                       7.77
  Conv. Total (cfs)       247690.4    Conv. (cfs)                        247690.4
  Length Wtd. (ft)          210.90    Wetted Per. (ft)                      95.54
  Min Ch El (ft)           2830.70    Shear (lb/sq ft)                       0.05
  Alpha                       1.00    Stream Power (lb/ft s)    529.14     239.00     319.00
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)        0.38      78.06       0.28
  C & E Loss (ft)             0.07    Cum SA (acres)              0.37      16.25       0.18


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2835.93    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.22    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2835.72    Reach Len. (ft)           210.90     210.90     210.90
  Crit W.S. (ft)           2832.93    Flow Area (sq ft)                    401.29
```

E.G. Slope (ft/ft)	0.000146	Area (sq ft)		401.29	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	80.00	Top Width (ft)		80.00	
Vel Total (ft/s)	3.74	Avg. Vel. (ft/s)		3.74	
Max Chl Dpth (ft)	5.02	Hydr. Depth (ft)		5.02	
Conv. Total (cfs)	124226.8	Conv. (cfs)		124226.8	
Length Wtd. (ft)	210.90	Wetted Per. (ft)		90.03	
Min Ch El (ft)	2830.70	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	529.14	239.00	319.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	50.93	0.13
C & E Loss (ft)	0.05	Cum SA (acres)	0.11	15.37	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2831.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.48	Reach Len. (ft)	210.90	210.90	210.90
Crit W.S. (ft)	2831.28	Flow Area (sq ft)		62.56	
E.G. Slope (ft/ft)	0.001114	Area (sq ft)		62.56	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	80.00	Top Width (ft)		80.00	
Vel Total (ft/s)	3.20	Avg. Vel. (ft/s)		3.20	
Max Chl Dpth (ft)	0.78	Hydr. Depth (ft)		0.78	
Conv. Total (cfs)	5991.4	Conv. (cfs)		5991.4	
Length Wtd. (ft)	210.90	Wetted Per. (ft)		81.56	
Min Ch El (ft)	2830.70	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	529.14	239.00	319.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01	12.96	0.01
C & E Loss (ft)	0.07	Cum SA (acres)	0.03	13.93	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2835.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.013	
W.S. Elev (ft)	2834.98	Reach Len. (ft)	210.90	210.90	210.90
Crit W.S. (ft)	2832.63	Flow Area (sq ft)		342.21	
E.G. Slope (ft/ft)	0.000160	Area (sq ft)		342.21	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	80.00	Top Width (ft)		80.00	
Vel Total (ft/s)	3.57	Avg. Vel. (ft/s)		3.57	
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)		4.28	
Conv. Total (cfs)	96321.7	Conv. (cfs)		96321.7	
Length Wtd. (ft)	210.90	Wetted Per. (ft)		88.56	
Min Ch El (ft)	2830.70	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	529.14	239.00	319.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	48.51	0.13
C & E Loss (ft)	0.05	Cum SA (acres)	0.11	15.32	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2833.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.013	
W.S. Elev (ft)	2833.82	Reach Len. (ft)	210.90	210.90	210.90
Crit W.S. (ft)	2832.18	Flow Area (sq ft)		249.28	
E.G. Slope (ft/ft)	0.000201	Area (sq ft)		249.28	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	80.00	Top Width (ft)		80.00	
Vel Total (ft/s)	3.29	Avg. Vel. (ft/s)		3.29	
Max Chl Dpth (ft)	3.12	Hydr. Depth (ft)		3.12	
Conv. Total (cfs)	57820.0	Conv. (cfs)		57820.0	
Length Wtd. (ft)	210.90	Wetted Per. (ft)		86.23	
Min Ch El (ft)	2830.70	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	529.14	239.00	319.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.08	36.63	0.08
C & E Loss (ft)	0.05	Cum SA (acres)	0.08	14.92	0.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2832.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.013	
W.S. Elev (ft)	2832.74	Reach Len. (ft)	210.90	210.90	210.90
Crit W.S. (ft)	2831.76	Flow Area (sq ft)		163.36	
E.G. Slope (ft/ft)	0.000296	Area (sq ft)		163.36	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	80.00	Top Width (ft)		80.00	
Vel Total (ft/s)	3.06	Avg. Vel. (ft/s)		3.06	
Max Chl Dpth (ft)	2.04	Hydr. Depth (ft)		2.04	
Conv. Total (cfs)	29072.5	Conv. (cfs)		29072.5	
Length Wtd. (ft)	210.90	Wetted Per. (ft)		84.08	
Min Ch El (ft)	2830.70	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	529.14	239.00	319.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.04	26.38	0.04
C & E Loss (ft)	0.05	Cum SA (acres)	0.06	14.53	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9536.1

INPUT
Description: U/S face of Pohez Rd.

```
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2841  123.58    2840   152.2    2839     191    2839     230    2839
     230    2830     328    2830     328    2839   366.5    2839  480.02    2839
  529.14    2840

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     191    .016     230    .013     328    .016   366.5    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           230     328             20.9    20.9    20.9             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     230  2841.8       T
     328  529.14  2841.8       T
Left Levee      Station=     230      Elevation=  2841.8
Right Levee     Station=     328      Elevation=  2841.8

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2838.44    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.16    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2838.29    Reach Len. (ft)             20.90      20.90      20.90
  Crit W.S. (ft)           2832.78    Flow Area (sq ft)                     812.02
  E.G. Slope (ft/ft)      0.000057    Area (sq ft)                          812.02
  Q Total (cfs)            2590.00    Flow (cfs)                           2590.00
  Top Width (ft)             98.00    Top Width (ft)                         98.00
  Vel Total (ft/s)            3.19    Avg. Vel. (ft/s)                        3.19
  Max Chl Dpth (ft)           8.29    Hydr. Depth (ft)                        8.29
  Conv. Total (cfs)       342459.0    Conv. (cfs)                         342459.0
  Length Wtd. (ft)           20.90    Wetted Per. (ft)                      114.57
  Min Ch El (ft)           2830.00    Shear (lb/sq ft)                        0.03
  Alpha                       1.00    Stream Power (lb/ft s)    529.14     230.00     328.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.60      80.07       0.38
  C & E Loss (ft)                     Cum SA (acres)              0.54      15.97       0.23


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2838.68    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.16    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2838.52    Reach Len. (ft)             20.90      20.90      20.90
  Crit W.S. (ft)           2832.89    Flow Area (sq ft)                     834.94
  E.G. Slope (ft/ft)      0.000057    Area (sq ft)                          834.94
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             98.00    Top Width (ft)                         98.00
  Vel Total (ft/s)            3.23    Avg. Vel. (ft/s)                        3.23
  Max Chl Dpth (ft)           8.52    Hydr. Depth (ft)                        8.52
  Conv. Total (cfs)       357748.2    Conv. (cfs)                         357748.2
  Length Wtd. (ft)           20.90    Wetted Per. (ft)                      115.04
  Min Ch El (ft)           2830.00    Shear (lb/sq ft)                        0.03
  Alpha                       1.00    Stream Power (lb/ft s)    529.14     230.00     328.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.38      74.54       0.28
  C & E Loss (ft)                     Cum SA (acres)              0.37      15.82       0.18


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS
```

E.G. Elev (ft)	2835.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.013	
W.S. Elev (ft)	2835.75	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2831.89	Flow Area (sq ft)		563.52	
E.G. Slope (ft/ft)	0.000061	Area (sq ft)		563.52	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	98.00	Top Width (ft)		98.00	
Vel Total (ft/s)	2.66	Avg. Vel. (ft/s)		2.66	
Max Chl Dpth (ft)	5.75	Hydr. Depth (ft)		5.75	
Conv. Total (cfs)	191997.3	Conv. (cfs)		191997.3	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		109.50	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	529.14	230.00	328.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	48.59	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	14.93	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2831.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.50	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2830.51	Flow Area (sq ft)		147.24	
E.G. Slope (ft/ft)	0.000085	Area (sq ft)		147.24	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	98.00	Top Width (ft)		98.00	
Vel Total (ft/s)	1.36	Avg. Vel. (ft/s)		1.36	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		1.50	
Conv. Total (cfs)	21637.0	Conv. (cfs)		21637.0	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		101.00	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	529.14	230.00	328.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	12.45	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	13.50	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2835.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.013	
W.S. Elev (ft)	2835.01	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2831.70	Flow Area (sq ft)		490.81	
E.G. Slope (ft/ft)	0.000063	Area (sq ft)		490.81	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	98.00	Top Width (ft)		98.00	
Vel Total (ft/s)	2.49	Avg. Vel. (ft/s)		2.49	
Max Chl Dpth (ft)	5.01	Hydr. Depth (ft)		5.01	
Conv. Total (cfs)	153904.8	Conv. (cfs)		153904.8	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		108.02	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	529.14	230.00	328.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	46.50	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	14.89	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2833.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2833.84	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2831.29	Flow Area (sq ft)		376.35	
E.G. Slope (ft/ft)	0.000067	Area (sq ft)		376.35	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	98.00	Top Width (ft)		98.00	
Vel Total (ft/s)	2.18	Avg. Vel. (ft/s)		2.18	
Max Chl Dpth (ft)	3.84	Hydr. Depth (ft)		3.84	
Conv. Total (cfs)	100318.2	Conv. (cfs)		100318.2	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		105.68	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	529.14	230.00	328.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	35.12	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	14.49	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2832.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2832.76	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2830.94	Flow Area (sq ft)		270.53	
E.G. Slope (ft/ft)	0.000073	Area (sq ft)		270.53	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	98.00	Top Width (ft)		98.00	
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)		1.85	
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)		2.76	
Conv. Total (cfs)	58666.3	Conv. (cfs)		58666.3	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		103.52	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	529.14	230.00	328.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	25.33	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	14.10	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 9525.6

INPUT
Description: Pohez Road
Distance from Upstream XS = .3
Deck/Roadway Width = 20.5
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 5

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
125	2840	240	2840	310	2840
405	2840	530	2840		

Upstream Bridge Cross Section Data
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2841	123.58	2840	152.2	2839	191	2839	230	2839
230	2830	328	2830	328	2839	366.5	2839	480.02	2839

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  529.14    2840

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     191    .016     230    .013     328    .016   366.5    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           230     328             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     230  2841.8       T
     328  529.14  2841.8       T
Left Levee      Station=     230      Elevation=  2841.8
Right Levee     Station=     328      Elevation=  2841.8

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     125    2840             240    2840             310    2840
   460.5    2840             530    2840

Downstream Bridge Cross Section Data
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2841  122.95    2840   145.5    2839   180.5    2838     206    2837
  220.26    2837     226    2837     240    2830  285.08    2830     310    2830
     324    2837     344    2837  375.34    2837  424.69    2838  460.03    2839

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     206    .016     226    .013     324    .016     344    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           226     324             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     226  2837.5       T
     324  460.03  2837.5       T
Left Levee      Station=     226      Elevation=  2837.5
Right Levee     Station=     324      Elevation=  2837.5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       8      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  0    20.9     .013     .013        0                   .5                1
Number of Barrels =  3
Upstream   Elevation =  2830
Centerline Stations
    Sta.    Sta.    Sta.
     260     275     290
Downstream Elevation =  2830
Centerline Stations
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    Sta.    Sta.    Sta.
     260     275     290

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2590.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         11.54
  Q Barrel (cfs)            863.33    Culv Vel DS (ft/s)         12.57
  E.G. US. (ft)            2838.45    Culv Inv El Up (ft)      2830.00
  W.S. US. (ft)            2838.29    Culv Inv El Dn (ft)      2830.00
  E.G. DS (ft)             2835.09    Culv Frctn Ls (ft)          0.05
  W.S. DS (ft)             2833.99    Culv Exit Loss (ft)         2.27
  Delta EG (ft)               3.36    Culv Entr Loss (ft)         1.03
  Delta WS (ft)               4.30    Q Weir (cfs)
  E.G. IC (ft)             2837.93    Weir Sta Lft (ft)
  E.G. OC (ft)             2838.45    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2835.35    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2834.91    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         4.91    Min El Weir Flow (ft)    2840.01


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2700.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         11.71
  Q Barrel (cfs)            900.00    Culv Vel DS (ft/s)         12.74
  E.G. US. (ft)            2838.68    Culv Inv El Up (ft)      2830.00
  W.S. US. (ft)            2838.52    Culv Inv El Dn (ft)      2830.00
  E.G. DS (ft)             2835.19    Culv Frctn Ls (ft)          0.05
  W.S. DS (ft)             2834.07    Culv Exit Loss (ft)         2.38
  Delta EG (ft)               3.49    Culv Entr Loss (ft)         1.06
  Delta WS (ft)               4.45    Q Weir (cfs)
  E.G. IC (ft)             2838.16    Weir Sta Lft (ft)
  E.G. OC (ft)             2838.68    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2835.49    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2835.04    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.04    Min El Weir Flow (ft)    2840.01


CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1500.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          9.50
  Q Barrel (cfs)            500.00    Culv Vel DS (ft/s)         10.48
  E.G. US. (ft)            2835.86    Culv Inv El Up (ft)      2830.00
  W.S. US. (ft)            2835.75    Culv Inv El Dn (ft)      2830.00
  E.G. DS (ft)             2833.59    Culv Frctn Ls (ft)          0.05
  W.S. DS (ft)             2832.83    Culv Exit Loss (ft)         1.52
  Delta EG (ft)               2.27    Culv Entr Loss (ft)         0.70
  Delta WS (ft)               2.92    Q Weir (cfs)
  E.G. IC (ft)             2835.44    Weir Sta Lft (ft)
  E.G. OC (ft)             2835.86    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2833.76    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2833.41    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.41    Min El Weir Flow (ft)    2840.01


CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1
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Q Culv Group (cfs)	200.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	4.46
Q Barrel (cfs)	66.67	Culv Vel DS (ft/s)	5.35
E.G. US. (ft)	2831.53	Culv Inv El Up (ft)	2830.00
W.S. US. (ft)	2831.50	Culv Inv El Dn (ft)	2830.00
E.G. DS (ft)	2831.02	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2830.85	Culv Exit Loss (ft)	0.32
Delta EG (ft)	0.52	Culv Entr Loss (ft)	0.15
Delta WS (ft)	0.66	Q Weir (cfs)	
E.G. IC (ft)	2831.38	Weir Sta Lft (ft)	
E.G. OC (ft)	2831.53	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2831.07	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2830.89	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.89	Min El Weir Flow (ft)	2840.01

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	1220.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	8.81
Q Barrel (cfs)	406.67	Culv Vel DS (ft/s)	9.78
E.G. US. (ft)	2835.11	Culv Inv El Up (ft)	2830.00
W.S. US. (ft)	2835.01	Culv Inv El Dn (ft)	2830.00
E.G. DS (ft)	2833.18	Culv Frctn Ls (ft)	0.05
W.S. DS (ft)	2832.52	Culv Exit Loss (ft)	1.28
Delta EG (ft)	1.93	Culv Entr Loss (ft)	0.60
Delta WS (ft)	2.49	Q Weir (cfs)	
E.G. IC (ft)	2834.72	Weir Sta Lft (ft)	
E.G. OC (ft)	2835.11	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2833.30	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2832.97	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.97	Min El Weir Flow (ft)	2840.01

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	820.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	7.62
Q Barrel (cfs)	273.33	Culv Vel DS (ft/s)	8.57
E.G. US. (ft)	2833.92	Culv Inv El Up (ft)	2830.00
W.S. US. (ft)	2833.84	Culv Inv El Dn (ft)	2830.00
E.G. DS (ft)	2832.48	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2831.98	Culv Exit Loss (ft)	0.94
Delta EG (ft)	1.44	Culv Entr Loss (ft)	0.45
Delta WS (ft)	1.86	Q Weir (cfs)	
E.G. IC (ft)	2833.60	Weir Sta Lft (ft)	
E.G. OC (ft)	2833.92	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2832.56	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2832.28	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.28	Min El Weir Flow (ft)	2840.01

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	500.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	6.34
Q Barrel (cfs)	166.67	Culv Vel DS (ft/s)	7.26
E.G. US. (ft)	2832.81	Culv Inv El Up (ft)	2830.00
W.S. US. (ft)	2832.76	Culv Inv El Dn (ft)	2830.00

E.G. DS (ft)	2831.83	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2831.48	Culv Exit Loss (ft)	0.63
Delta EG (ft)	0.99	Culv Entr Loss (ft)	0.31
Delta WS (ft)	1.28	Q Weir (cfs)	
E.G. IC (ft)	2832.57	Weir Sta Lft (ft)	
E.G. OC (ft)	2832.81	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2831.88	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2831.64	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.64	Min El Weir Flow (ft)	2840.01

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9515.2

INPUT
Description: D/S face of Pohez Rd.
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2841	122.95	2840	145.5	2839	180.5	2838	206	2837
220.26	2837	226	2837	240	2830	285.08	2830	310	2830
324	2837	344	2837	375.34	2837	424.69	2838	460.03	2839

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	206	.016	226	.013	324	.016	344	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
226	324	201.3	201.3	201.3	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	226	2837.5	T
324	460.03	2837.5	T

Left Levee Station= 226 Elevation= 2837.5
Right Levee Station= 324 Elevation= 2837.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2835.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.		0.013	
W.S. Elev (ft)	2833.99	Reach Len. (ft)	201.30	201.30	201.30
Crit W.S. (ft)	2833.42	Flow Area (sq ft)		310.80	
E.G. Slope (ft/ft)	0.001009	Area (sq ft)		310.80	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	85.94	Top Width (ft)		85.94	
Vel Total (ft/s)	8.43	Avg. Vel. (ft/s)		8.43	
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)		3.62	
Conv. Total (cfs)	82498.4	Conv. (cfs)		82498.4	
Length Wtd. (ft)	201.30	Wetted Per. (ft)		87.83	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	460.03	226.00	324.00
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	0.60	80.04	0.38
C & E Loss (ft)	0.14	Cum SA (acres)	0.54	15.93	0.23

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2835.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	2834.07	Reach Len. (ft)	201.30	201.30	201.30
Crit W.S. (ft)	2833.48	Flow Area (sq ft)		318.14	
E.G. Slope (ft/ft)	0.000997	Area (sq ft)		318.14	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	86.29	Top Width (ft)		86.29	
Vel Total (ft/s)	8.49	Avg. Vel. (ft/s)		8.49	
Max Chl Dpth (ft)	4.07	Hydr. Depth (ft)		3.69	
Conv. Total (cfs)	85522.7	Conv. (cfs)		85522.7	
Length Wtd. (ft)	201.30	Wetted Per. (ft)		88.21	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	460.03	226.00	324.00
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)	0.38	74.50	0.28
C & E Loss (ft)	0.15	Cum SA (acres)	0.37	15.77	0.18

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2833.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.		0.013	
W.S. Elev (ft)	2832.83	Reach Len. (ft)	201.30	201.30	201.30
Crit W.S. (ft)	2832.37	Flow Area (sq ft)		214.10	
E.G. Slope (ft/ft)	0.001056	Area (sq ft)		214.10	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	81.32	Top Width (ft)		81.32	
Vel Total (ft/s)	7.01	Avg. Vel. (ft/s)		7.01	
Max Chl Dpth (ft)	2.83	Hydr. Depth (ft)		2.63	
Conv. Total (cfs)	46158.0	Conv. (cfs)		46158.0	
Length Wtd. (ft)	201.30	Wetted Per. (ft)		82.66	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	460.03	226.00	324.00
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	0.13	48.57	0.13
C & E Loss (ft)	0.10	Cum SA (acres)	0.11	14.89	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2831.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.013	
W.S. Elev (ft)	2830.85	Reach Len. (ft)	201.30	201.30	201.30
Crit W.S. (ft)	2830.64	Flow Area (sq ft)		60.68	
E.G. Slope (ft/ft)	0.001079	Area (sq ft)		60.68	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	73.39	Top Width (ft)		73.39	
Vel Total (ft/s)	3.30	Avg. Vel. (ft/s)		3.30	
Max Chl Dpth (ft)	0.85	Hydr. Depth (ft)		0.83	
Conv. Total (cfs)	6088.7	Conv. (cfs)		6088.7	
Length Wtd. (ft)	201.30	Wetted Per. (ft)		73.79	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	460.03	226.00	324.00

Frctn Loss (ft)	0.54	Cum Volume (acre-ft)	0.01	12.45	0.01
C & E Loss (ft)	0.04	Cum SA (acres)	0.03	13.45	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2833.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.013	
W.S. Elev (ft)	2832.52	Reach Len. (ft)	201.30	201.30	201.30
Crit W.S. (ft)	2832.07	Flow Area (sq ft)		188.95	
E.G. Slope (ft/ft)	0.001053	Area (sq ft)		188.95	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	80.07	Top Width (ft)		80.07	
Vel Total (ft/s)	6.51	Avg. Vel. (ft/s)		6.51	
Max Chl Dpth (ft)	2.52	Hydr. Depth (ft)		2.36	
Conv. Total (cfs)	37904.7	Conv. (cfs)		37904.7	
Length Wtd. (ft)	201.30	Wetted Per. (ft)		81.26	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	460.03	226.00	324.00
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	0.13	46.48	0.13
C & E Loss (ft)	0.10	Cum SA (acres)	0.11	14.84	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2832.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.98	Reach Len. (ft)	201.30	201.30	201.30
Crit W.S. (ft)	2831.61	Flow Area (sq ft)		146.40	
E.G. Slope (ft/ft)	0.001078	Area (sq ft)		146.40	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	77.92	Top Width (ft)		77.92	
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)		5.67	
Max Chl Dpth (ft)	1.98	Hydr. Depth (ft)		1.88	
Conv. Total (cfs)	25278.4	Conv. (cfs)		25278.4	
Length Wtd. (ft)	201.30	Wetted Per. (ft)		78.85	
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	460.03	226.00	324.00
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	0.08	35.10	0.08
C & E Loss (ft)	0.08	Cum SA (acres)	0.08	14.45	0.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2831.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.48	Reach Len. (ft)	201.30	201.30	201.30

Crit W.S. (ft)	2831.18	Flow Area (sq ft)		107.98		
E.G. Slope (ft/ft)	0.001081	Area (sq ft)		107.98		
Q Total (cfs)	510.00	Flow (cfs)		510.00		
Top Width (ft)	75.92	Top Width (ft)		75.92		
Vel Total (ft/s)	4.72	Avg. Vel. (ft/s)		4.72		
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)		1.42		
Conv. Total (cfs)	15514.2	Conv. (cfs)		15514.2		
Length Wtd. (ft)	201.30	Wetted Per. (ft)		76.62		
Min Ch El (ft)	2830.00	Shear (lb/sq ft)		0.10		
Alpha	1.00	Stream Power (lb/ft s)	460.03	226.00	324.00	
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	0.04	25.31	0.04	
C & E Loss (ft)	0.06	Cum SA (acres)	0.06	14.06	0.06	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9313.9

INPUT
Description: Section 93+13.9
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2840	105.32	2839	107.64	2838	110.04	2837	113.64	2836
128.23	2835	150	2835	170	2835	181	2829.5	250.5	2829.5
260.5	2835	280.5	2835	292	2835	344.15	2836	406.31	2837

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	150	.016	170	.03	260.5	.016	280.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
170	260.5	13.9	13.9	13.9	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	170	2836.5	T
260.5	406.31	2836.5	F

Left Levee Station= 170 Elevation= 2836.5
Right Levee Station= 260.5 Elevation= 2836.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2834.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.56	Wt. n-Val.		0.030	
W.S. Elev (ft)	2832.94	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2832.94	Flow Area (sq ft)		261.28	
E.G. Slope (ft/ft)	0.009071	Area (sq ft)		261.28	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	82.62	Top Width (ft)		82.62	
Vel Total (ft/s)	10.03	Avg. Vel. (ft/s)		10.03	
Max Chl Dpth (ft)	3.44	Hydr. Depth (ft)		3.16	
Conv. Total (cfs)	27509.0	Conv. (cfs)		27509.0	
Length Wtd. (ft)	13.90	Wetted Per. (ft)		84.31	
Min Ch El (ft)	2829.50	Shear (lb/sq ft)		1.76	
Alpha	1.00	Stream Power (lb/ft s)	406.31	170.00	260.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.60	78.72	0.38
C & E Loss (ft)	0.45	Cum SA (acres)	0.54	15.54	0.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2834.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.60	Wt. n-Val.		0.030	
W.S. Elev (ft)	2832.99	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2832.99	Flow Area (sq ft)		265.67	
E.G. Slope (ft/ft)	0.009147	Area (sq ft)		265.67	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	82.82	Top Width (ft)		82.82	
Vel Total (ft/s)	10.16	Avg. Vel. (ft/s)		10.16	
Max Chl Dpth (ft)	3.49	Hydr. Depth (ft)		3.21	
Conv. Total (cfs)	28231.3	Conv. (cfs)		28231.3	
Length Wtd. (ft)	13.90	Wetted Per. (ft)		84.54	
Min Ch El (ft)	2829.50	Shear (lb/sq ft)		1.79	
Alpha	1.00	Stream Power (lb/ft s)	406.31	170.00	260.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.38	73.15	0.28
C & E Loss (ft)	0.46	Cum SA (acres)	0.37	15.38	0.18

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2833.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.030	
W.S. Elev (ft)	2831.90	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2831.90	Flow Area (sq ft)		177.67	
E.G. Slope (ft/ft)	0.010000	Area (sq ft)		177.67	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	78.66	Top Width (ft)		78.66	
Vel Total (ft/s)	8.44	Avg. Vel. (ft/s)		8.44	
Max Chl Dpth (ft)	2.40	Hydr. Depth (ft)		2.26	
Conv. Total (cfs)	15000.2	Conv. (cfs)		15000.2	
Length Wtd. (ft)	13.90	Wetted Per. (ft)		79.84	

Min Ch El (ft)	2829.50	Shear (lb/sq ft)		1.39	
Alpha	1.00	Stream Power (lb/ft s)	406.31	170.00	260.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	47.66	0.13
C & E Loss (ft)	0.32	Cum SA (acres)	0.11	14.52	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2830.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.14	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2830.14	Flow Area (sq ft)		45.10	
E.G. Slope (ft/ft)	0.015030	Area (sq ft)		45.10	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	71.93	Top Width (ft)		71.93	
Vel Total (ft/s)	4.43	Avg. Vel. (ft/s)		4.43	
Max Chl Dpth (ft)	0.64	Hydr. Depth (ft)		0.63	
Conv. Total (cfs)	1631.4	Conv. (cfs)		1631.4	
Length Wtd. (ft)	13.90	Wetted Per. (ft)		72.25	
Min Ch El (ft)	2829.50	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)	406.31	170.00	260.50
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01	12.20	0.01
C & E Loss (ft)	0.08	Cum SA (acres)	0.03	13.12	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2832.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.030	

W.S. Elev (ft)	2831.59	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2831.59	Flow Area (sq ft)		153.88	
E.G. Slope (ft/ft)	0.010619	Area (sq ft)		153.88	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	77.49	Top Width (ft)		77.49	
Vel Total (ft/s)	7.99	Avg. Vel. (ft/s)		7.99	
Max Chl Dpth (ft)	2.09	Hydr. Depth (ft)		1.99	
Conv. Total (cfs)	11935.9	Conv. (cfs)		11935.9	
Length Wtd. (ft)	13.90	Wetted Per. (ft)		78.53	
Min Ch El (ft)	2829.50	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)	406.31	170.00	260.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	45.68	0.13
C & E Loss (ft)	0.28	Cum SA (acres)	0.11	14.48	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2831.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.		0.030	
W.S. Elev (ft)	2831.13	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2831.13	Flow Area (sq ft)		118.35	
E.G. Slope (ft/ft)	0.011210	Area (sq ft)		118.35	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	75.72	Top Width (ft)		75.72	
Vel Total (ft/s)	7.01	Avg. Vel. (ft/s)		7.01	
Max Chl Dpth (ft)	1.63	Hydr. Depth (ft)		1.56	
Conv. Total (cfs)	7839.2	Conv. (cfs)		7839.2	
Length Wtd. (ft)	13.90	Wetted Per. (ft)		76.53	
Min Ch El (ft)	2829.50	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)	406.31	170.00	260.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.08	34.49	0.08
C & E Loss (ft)	0.22	Cum SA (acres)	0.08	14.09	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2831.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.68	Reach Len. (ft)	13.90	13.90	13.90
Crit W.S. (ft)	2830.68	Flow Area (sq ft)		84.86	
E.G. Slope (ft/ft)	0.012397	Area (sq ft)		84.86	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	74.02	Top Width (ft)		74.02	
Vel Total (ft/s)	6.01	Avg. Vel. (ft/s)		6.01	
Max Chl Dpth (ft)	1.18	Hydr. Depth (ft)		1.15	
Conv. Total (cfs)	4580.5	Conv. (cfs)		4580.5	
Length Wtd. (ft)	13.90	Wetted Per. (ft)		74.60	
Min Ch El (ft)	2829.50	Shear (lb/sq ft)		0.88	
Alpha	1.00	Stream Power (lb/ft s)	406.31	170.00	260.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.04	24.87	0.04
C & E Loss (ft)	0.16	Cum SA (acres)	0.06	13.71	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9300

INPUT
Description: Section 93+00
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2835	126.93	2835	152.67	2835	181	2835	201	2835
220	2825.5	350	2825.5	369	2835	389	2835	454.95	2835
480.21	2835	513.02	2835	528.24	2835				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	181	.016	201	.03	369	.016	389	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

```
          201     369            264.2   264.2   264.2             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     201    2837       T
     369  528.24    2837       T
Left Levee      Station=     201      Elevation=    2837
Right Levee     Station=     369      Elevation=    2837

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2833.79    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                             0.030
  W.S. Elev (ft)           2833.72    Reach Len. (ft)            264.20     264.20     264.20
  Crit W.S. (ft)           2827.80    Flow Area (sq ft)                    1203.41
  E.G. Slope (ft/ft)      0.000139    Area (sq ft)                         1203.41
  Q Total (cfs)            2620.00    Flow (cfs)                           2620.00
  Top Width (ft)            162.87    Top Width (ft)                        162.87
  Vel Total (ft/s)            2.18    Avg. Vel. (ft/s)                        2.18
  Max Chl Dpth (ft)           8.22    Hydr. Depth (ft)                        7.39
  Conv. Total (cfs)       222596.3    Conv. (cfs)                         222596.3
  Length Wtd. (ft)          264.20    Wetted Per. (ft)                      166.75
  Min Ch El (ft)           2825.50    Shear (lb/sq ft)                        0.06
  Alpha                       1.00    Stream Power (lb/ft s)     528.24     201.00     369.00
  Frctn Loss (ft)             0.03    Cum Volume (acre-ft)         0.60      78.48       0.38
  C & E Loss (ft)             0.02    Cum SA (acres)               0.54      15.50       0.23


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2833.95    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                             0.030
  W.S. Elev (ft)           2833.88    Reach Len. (ft)            264.20     264.20     264.20
  Crit W.S. (ft)           2827.86    Flow Area (sq ft)                    1229.67
  E.G. Slope (ft/ft)      0.000138    Area (sq ft)                         1229.67
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)            163.52    Top Width (ft)                        163.52
  Vel Total (ft/s)            2.20    Avg. Vel. (ft/s)                        2.20
  Max Chl Dpth (ft)           8.38    Hydr. Depth (ft)                        7.52
  Conv. Total (cfs)       230088.0    Conv. (cfs)                         230088.0
  Length Wtd. (ft)          264.20    Wetted Per. (ft)                      167.47
  Min Ch El (ft)           2825.50    Shear (lb/sq ft)                        0.06
  Alpha                       1.00    Stream Power (lb/ft s)     528.24     201.00     369.00
  Frctn Loss (ft)             0.03    Cum Volume (acre-ft)         0.38      72.91       0.28
  C & E Loss (ft)             0.02    Cum SA (acres)               0.37      15.34       0.18


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2831.26    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.05    Wt. n-Val.                             0.030
  W.S. Elev (ft)           2831.21    Reach Len. (ft)            264.20     264.20     264.20
  Crit W.S. (ft)           2827.10    Flow Area (sq ft)                     806.94
  E.G. Slope (ft/ft)      0.000157    Area (sq ft)                          806.94
  Q Total (cfs)            1500.00    Flow (cfs)                           1500.00
  Top Width (ft)            152.83    Top Width (ft)                        152.83
  Vel Total (ft/s)            1.86    Avg. Vel. (ft/s)                        1.86
  Max Chl Dpth (ft)           5.71    Hydr. Depth (ft)                        5.28
```

Conv. Total (cfs)	119790.4	Conv. (cfs)		119790.4	
Length Wtd. (ft)	264.20	Wetted Per. (ft)		155.52	
Min Ch El (ft)	2825.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	528.24	201.00	369.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.13	47.51	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	14.48	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2826.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2826.76	Reach Len. (ft)	264.20	264.20	264.20
Crit W.S. (ft)	2825.91	Flow Area (sq ft)		167.08	
E.G. Slope (ft/ft)	0.000442	Area (sq ft)		167.08	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	135.04	Top Width (ft)		135.04	
Vel Total (ft/s)	1.20	Avg. Vel. (ft/s)		1.20	
Max Chl Dpth (ft)	1.26	Hydr. Depth (ft)		1.24	
Conv. Total (cfs)	9509.1	Conv. (cfs)		9509.1	
Length Wtd. (ft)	264.20	Wetted Per. (ft)		135.64	
Min Ch El (ft)	2825.50	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	528.24	201.00	369.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.01	12.17	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	13.09	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2830.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.49	Reach Len. (ft)	264.20	264.20	264.20
Crit W.S. (ft)	2826.91	Flow Area (sq ft)		698.86	
E.G. Slope (ft/ft)	0.000166	Area (sq ft)		698.86	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	149.97	Top Width (ft)		149.97	
Vel Total (ft/s)	1.76	Avg. Vel. (ft/s)		1.76	
Max Chl Dpth (ft)	4.99	Hydr. Depth (ft)		4.66	
Conv. Total (cfs)	95575.2	Conv. (cfs)		95575.2	
Length Wtd. (ft)	264.20	Wetted Per. (ft)		152.33	
Min Ch El (ft)	2825.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	528.24	201.00	369.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.13	45.55	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	14.44	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2829.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.030	

W.S. Elev (ft)	2829.30	Reach Len. (ft)	264.20	264.20	264.20
Crit W.S. (ft)	2826.58	Flow Area (sq ft)		523.24	
E.G. Slope (ft/ft)	0.000189	Area (sq ft)		523.24	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	145.21	Top Width (ft)		145.21	
Vel Total (ft/s)	1.59	Avg. Vel. (ft/s)		1.59	
Max Chl Dpth (ft)	3.80	Hydr. Depth (ft)		3.60	
Conv. Total (cfs)	60416.5	Conv. (cfs)		60416.5	
Length Wtd. (ft)	264.20	Wetted Per. (ft)		147.01	
Min Ch El (ft)	2825.50	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	528.24	201.00	369.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.08	34.38	0.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.08	14.06	0.08

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2828.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	2828.17	Reach Len. (ft)	264.20	264.20	264.20
Crit W.S. (ft)	2826.27	Flow Area (sq ft)		361.38	
E.G. Slope (ft/ft)	0.000234	Area (sq ft)		361.38	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	140.68	Top Width (ft)		140.68	
Vel Total (ft/s)	1.41	Avg. Vel. (ft/s)		1.41	
Max Chl Dpth (ft)	2.67	Hydr. Depth (ft)		2.57	
Conv. Total (cfs)	33374.2	Conv. (cfs)		33374.2	
Length Wtd. (ft)	264.20	Wetted Per. (ft)		141.94	
Min Ch El (ft)	2825.50	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	528.24	201.00	369.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.04	24.80	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.06	13.68	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9035.8

INPUT
Description: Section 90+35.8 (u/s face of Mondamon Rd.)
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2835	126.93	2834	152.67	2833	220	2832	220	2825
290	2825	290	2832	454.95	2832	480.21	2833	513.02	2834
528.24	2835								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	220	.013	290	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
220	290	30.8	30.8	30.8	.3	.5

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Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     220  2836.8       T
     290  528.24  2836.8       T
Left Levee      Station=     220      Elevation=  2836.8
Right Levee     Station=     290      Elevation=  2836.8
```

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2833.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.013	
W.S. Elev (ft)	2833.43	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)	2828.53	Flow Area (sq ft)		589.99	
E.G. Slope (ft/ft)	0.000117	Area (sq ft)		589.99	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	4.44	Avg. Vel. (ft/s)		4.44	
Max Chl Dpth (ft)	8.43	Hydr. Depth (ft)		8.43	
Conv. Total (cfs)	241876.2	Conv. (cfs)		241876.2	
Length Wtd. (ft)	30.80	Wetted Per. (ft)		86.86	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	528.24	220.00	290.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.60	73.05	0.38
C & E Loss (ft)		Cum SA (acres)	0.54	14.79	0.23

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2833.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.013	
W.S. Elev (ft)	2833.58	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)	2828.61	Flow Area (sq ft)		600.81	
E.G. Slope (ft/ft)	0.000118	Area (sq ft)		600.81	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	4.49	Avg. Vel. (ft/s)		4.49	
Max Chl Dpth (ft)	8.58	Hydr. Depth (ft)		8.58	
Conv. Total (cfs)	248723.2	Conv. (cfs)		248723.2	
Length Wtd. (ft)	30.80	Wetted Per. (ft)		87.17	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	528.24	220.00	290.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.38	67.36	0.28
C & E Loss (ft)		Cum SA (acres)	0.37	14.64	0.18

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2831.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.01	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)	2827.44	Flow Area (sq ft)		420.97	
E.G. Slope (ft/ft)	0.000110	Area (sq ft)		420.97	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	3.56	Avg. Vel. (ft/s)		3.56	
Max Chl Dpth (ft)	6.01	Hydr. Depth (ft)		6.01	
Conv. Total (cfs)	143164.9	Conv. (cfs)		143164.9	
Length Wtd. (ft)	30.80	Wetted Per. (ft)		82.03	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.04	

Alpha	1.00	Stream Power (lb/ft s)	528.24	220.00	290.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	43.78	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	13.81	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2826.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2826.68	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)	2825.64	Flow Area (sq ft)		117.71	
E.G. Slope (ft/ft)	0.000118	Area (sq ft)		117.71	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)		1.70	
Max Chl Dpth (ft)	1.68	Hydr. Depth (ft)		1.68	
Conv. Total (cfs)	18441.0	Conv. (cfs)		18441.0	
Length Wtd. (ft)	30.80	Wetted Per. (ft)		73.36	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	528.24	220.00	290.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	11.30	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	12.46	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2830.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.013	
W.S. Elev (ft)	2830.32	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)	2827.14	Flow Area (sq ft)		372.70	
E.G. Slope (ft/ft)	0.000108	Area (sq ft)		372.70	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	3.30	Avg. Vel. (ft/s)		3.30	
Max Chl Dpth (ft)	5.32	Hydr. Depth (ft)		5.32	
Conv. Total (cfs)	118189.2	Conv. (cfs)		118189.2	
Length Wtd. (ft)	30.80	Wetted Per. (ft)		80.65	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	528.24	220.00	290.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	42.30	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	13.78	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2829.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.17	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)	2826.65	Flow Area (sq ft)		291.95	
E.G. Slope (ft/ft)	0.000107	Area (sq ft)		291.95	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	2.84	Avg. Vel. (ft/s)		2.84	
Max Chl Dpth (ft)	4.17	Hydr. Depth (ft)		4.17	
Conv. Total (cfs)	80210.0	Conv. (cfs)		80210.0	
Length Wtd. (ft)	30.80	Wetted Per. (ft)		78.34	

Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	528.24	220.00	290.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	31.91	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	13.40	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2828.16	Element			
Vel Head (ft)	0.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2828.07	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)	2826.19	Flow Area (sq ft)		214.72	
E.G. Slope (ft/ft)	0.000108	Area (sq ft)		214.72	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	2.38	Avg. Vel. (ft/s)		2.38	
Max Chl Dpth (ft)	3.07	Hydr. Depth (ft)		3.07	
Conv. Total (cfs)	48989.9	Conv. (cfs)		48989.9	
Length Wtd. (ft)	30.80	Wetted Per. (ft)		76.13	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	528.24	220.00	290.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	23.05	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	13.04	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 9020.4

INPUT
Description: Mondamon Road
Distance from Upstream XS = .5
Deck/Roadway Width = 30
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 5

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
100	2836	220	2836	315	2836
455	2836	529	2836		

Upstream Bridge Cross Section Data
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2835	126.93	2834	152.67	2833	220	2832	220	2825
290	2825	290	2832	454.95	2832	480.21	2833	513.02	2834
528.24	2835								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	220	.013	290	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
220	290	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	220	2836.8	T
290	528.24	2836.8	T

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Left Levee      Station=     220      Elevation=  2836.8
Right Levee     Station=     290      Elevation=  2836.8

Downstream  Deck/Roadway Coordinates
    num=       4
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100    2836             220    2836             315    2836
     420    2836

Downstream Bridge Cross Section Data
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2835   123.1    2834  152.88    2833     220    2832     220    2825
     290    2825     290    2832  417.14  2831.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     220    .013     290    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           220     290             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     220  2835.7       T
     290  417.14  2835.7       T
Left Levee      Station=     220      Elevation=  2835.7
Right Levee     Station=     290      Elevation=  2835.7

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       9      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  0    30.7     .013     .013        0                  .2                1
Number of Barrels =  3
Upstream   Elevation =  2825
Centerline Stations
    Sta.    Sta.    Sta.
     240     255     270
Downstream Elevation =  2825
Centerline Stations
    Sta.    Sta.    Sta.
     240     255     270

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2620.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          8.40
  Q Barrel (cfs)            873.33    Culv Vel DS (ft/s)          8.45
  E.G. US. (ft)            2833.74    Culv Inv El Up (ft)      2825.00
  W.S. US. (ft)            2833.43    Culv Inv El Dn (ft)      2825.00
  E.G. DS (ft)             2832.78    Culv Frctn Ls (ft)          0.03
  W.S. DS (ft)             2832.38    Culv Exit Loss (ft)         0.71
  Delta EG (ft)               0.96    Culv Entr Loss (ft)         0.22
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  Delta WS (ft)               1.05    Q Weir (cfs)
  E.G. IC (ft)             2832.96    Weir Sta Lft (ft)
  E.G. OC (ft)             2833.74    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2832.43    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2832.38    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         4.94    Min El Weir Flow (ft)    2836.01


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2700.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          8.51
  Q Barrel (cfs)            900.00    Culv Vel DS (ft/s)          8.56
  E.G. US. (ft)            2833.90    Culv Inv El Up (ft)      2825.00
  W.S. US. (ft)            2833.58    Culv Inv El Dn (ft)      2825.00
  E.G. DS (ft)             2832.92    Culv Frctn Ls (ft)          0.03
  W.S. DS (ft)             2832.51    Culv Exit Loss (ft)         0.73
  Delta EG (ft)               0.98    Culv Entr Loss (ft)         0.23
  Delta WS (ft)               1.07    Q Weir (cfs)
  E.G. IC (ft)             2833.12    Weir Sta Lft (ft)
  E.G. OC (ft)             2833.90    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2832.55    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2832.51    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.04    Min El Weir Flow (ft)    2836.01


CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1500.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          6.62
  Q Barrel (cfs)            500.00    Culv Vel DS (ft/s)          6.65
  E.G. US. (ft)            2831.21    Culv Inv El Up (ft)      2825.00
  W.S. US. (ft)            2831.01    Culv Inv El Dn (ft)      2825.00
  E.G. DS (ft)             2830.62    Culv Frctn Ls (ft)          0.02
  W.S. DS (ft)             2830.37    Culv Exit Loss (ft)         0.44
  Delta EG (ft)               0.60    Culv Entr Loss (ft)         0.14
  Delta WS (ft)               0.65    Q Weir (cfs)
  E.G. IC (ft)             2830.42    Weir Sta Lft (ft)
  E.G. OC (ft)             2831.21    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2830.40    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2830.37    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.41    Min El Weir Flow (ft)    2836.01


CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)        200.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          3.07
  Q Barrel (cfs)             66.67    Culv Vel DS (ft/s)          3.11
  E.G. US. (ft)            2826.73    Culv Inv El Up (ft)      2825.00
  W.S. US. (ft)            2826.68    Culv Inv El Dn (ft)      2825.00
  E.G. DS (ft)             2826.59    Culv Frctn Ls (ft)          0.02
  W.S. DS (ft)             2826.53    Culv Exit Loss (ft)         0.10
  Delta EG (ft)               0.14    Culv Entr Loss (ft)         0.03
  Delta WS (ft)               0.15    Q Weir (cfs)
  E.G. IC (ft)             2826.38    Weir Sta Lft (ft)
  E.G. OC (ft)             2826.73    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2826.55    Weir Max Depth (ft)
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  Culv WS Outlet (ft)      2826.53    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         0.89    Min El Weir Flow (ft)    2836.01


CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1230.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          6.10
  Q Barrel (cfs)            410.00    Culv Vel DS (ft/s)          6.13
  E.G. US. (ft)            2830.50    Culv Inv El Up (ft)      2825.00
  W.S. US. (ft)            2830.32    Culv Inv El Dn (ft)      2825.00
  E.G. DS (ft)             2829.99    Culv Frctn Ls (ft)          0.02
  W.S. DS (ft)             2829.78    Culv Exit Loss (ft)         0.37
  Delta EG (ft)               0.51    Culv Entr Loss (ft)         0.12
  Delta WS (ft)               0.55    Q Weir (cfs)
  E.G. IC (ft)             2829.73    Weir Sta Lft (ft)
  E.G. OC (ft)             2830.50    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2829.80    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2829.78    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         2.99    Min El Weir Flow (ft)    2836.01


CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        830.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          5.21
  Q Barrel (cfs)            276.67    Culv Vel DS (ft/s)          5.25
  E.G. US. (ft)            2829.30    Culv Inv El Up (ft)      2825.00
  W.S. US. (ft)            2829.17    Culv Inv El Dn (ft)      2825.00
  E.G. DS (ft)             2828.92    Culv Frctn Ls (ft)          0.02
  W.S. DS (ft)             2828.77    Culv Exit Loss (ft)         0.27
  Delta EG (ft)               0.38    Culv Entr Loss (ft)         0.08
  Delta WS (ft)               0.40    Q Weir (cfs)
  E.G. IC (ft)             2828.62    Weir Sta Lft (ft)
  E.G. OC (ft)             2829.30    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2828.79    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2828.77    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         2.30    Min El Weir Flow (ft)    2836.01


CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        510.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          4.33
  Q Barrel (cfs)            170.00    Culv Vel DS (ft/s)          4.36
  E.G. US. (ft)            2828.16    Culv Inv El Up (ft)      2825.00
  W.S. US. (ft)            2828.07    Culv Inv El Dn (ft)      2825.00
  E.G. DS (ft)             2827.89    Culv Frctn Ls (ft)          0.02
  W.S. DS (ft)             2827.79    Culv Exit Loss (ft)         0.19
  Delta EG (ft)               0.26    Culv Entr Loss (ft)         0.06
  Delta WS (ft)               0.28    Q Weir (cfs)
  E.G. IC (ft)             2827.60    Weir Sta Lft (ft)
  E.G. OC (ft)             2828.16    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2827.81    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2827.79    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.66    Min El Weir Flow (ft)    2836.01
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CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9005

INPUT
Description: Section 90+05 (d/s face of Mondamon Rd.)
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2835	123.1	2834	152.88	2833	220	2832	220	2825
290	2825	290	2832	417.14	2831.2				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	220	.013	290	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
220	290	291.2	291.2	291.2	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	220	2835.7	T
290	417.14	2835.7	T

Left Levee Station= 220 Elevation= 2835.7
Right Levee Station= 290 Elevation= 2835.7

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2832.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2832.38	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)	2828.49	Flow Area (sq ft)		516.78	
E.G. Slope (ft/ft)	0.000177	Area (sq ft)		516.78	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	5.07	Avg. Vel. (ft/s)		5.07	
Max Chl Dpth (ft)	7.38	Hydr. Depth (ft)		7.38	
Conv. Total (cfs)	197128.5	Conv. (cfs)		197128.5	
Length Wtd. (ft)	291.20	Wetted Per. (ft)		84.77	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	417.14	220.00	290.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.60	72.97	0.38
C & E Loss (ft)	0.07	Cum SA (acres)	0.54	14.74	0.23

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2832.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.013	
W.S. Elev (ft)	2832.51	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)	2828.58	Flow Area (sq ft)		525.62	
E.G. Slope (ft/ft)	0.000178	Area (sq ft)		525.62	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	5.14	Avg. Vel. (ft/s)		5.14	
Max Chl Dpth (ft)	7.51	Hydr. Depth (ft)		7.51	
Conv. Total (cfs)	202376.1	Conv. (cfs)		202376.1	
Length Wtd. (ft)	291.20	Wetted Per. (ft)		85.02	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	417.14	220.00	290.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.38	67.29	0.28
C & E Loss (ft)	0.07	Cum SA (acres)	0.37	14.59	0.18

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2830.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.013	
W.S. Elev (ft)	2830.37	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)	2827.42	Flow Area (sq ft)		375.72	
E.G. Slope (ft/ft)	0.000157	Area (sq ft)		375.72	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	3.99	Avg. Vel. (ft/s)		3.99	
Max Chl Dpth (ft)	5.37	Hydr. Depth (ft)		5.37	
Conv. Total (cfs)	119706.8	Conv. (cfs)		119706.8	
Length Wtd. (ft)	291.20	Wetted Per. (ft)		80.73	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	417.14	220.00	290.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.13	43.73	0.13
C & E Loss (ft)	0.04	Cum SA (acres)	0.11	13.76	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2826.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2826.53	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)	2825.63	Flow Area (sq ft)		107.19	
E.G. Slope (ft/ft)	0.000160	Area (sq ft)		107.19	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	1.87	Avg. Vel. (ft/s)		1.87	
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)		1.53	
Conv. Total (cfs)	15818.4	Conv. (cfs)		15818.4	
Length Wtd. (ft)	291.20	Wetted Per. (ft)		73.06	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	417.14	220.00	290.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01	11.29	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	12.41	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2829.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.78	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)	2827.12	Flow Area (sq ft)		334.23	
E.G. Slope (ft/ft)	0.000153	Area (sq ft)		334.23	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	3.68	Avg. Vel. (ft/s)		3.68	
Max Chl Dpth (ft)	4.77	Hydr. Depth (ft)		4.77	
Conv. Total (cfs)	99470.6	Conv. (cfs)		99470.6	
Length Wtd. (ft)	291.20	Wetted Per. (ft)		79.55	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	417.14	220.00	290.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.13	42.25	0.13

C & E Loss (ft)	0.03	Cum SA (acres)	0.11	13.73	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2828.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.013	
W.S. Elev (ft)	2828.77	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)	2826.64	Flow Area (sq ft)		263.68	
E.G. Slope (ft/ft)	0.000148	Area (sq ft)		263.68	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	3.15	Avg. Vel. (ft/s)		3.15	
Max Chl Dpth (ft)	3.77	Hydr. Depth (ft)		3.77	
Conv. Total (cfs)	68158.2	Conv. (cfs)		68158.2	
Length Wtd. (ft)	291.20	Wetted Per. (ft)		77.53	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	417.14	220.00	290.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.08	31.88	0.08
C & E Loss (ft)	0.02	Cum SA (acres)	0.08	13.35	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2827.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.013	
W.S. Elev (ft)	2827.79	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)	2826.19	Flow Area (sq ft)		194.96	
E.G. Slope (ft/ft)	0.000148	Area (sq ft)		194.96	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	70.00	Top Width (ft)		70.00	
Vel Total (ft/s)	2.62	Avg. Vel. (ft/s)		2.62	
Max Chl Dpth (ft)	2.79	Hydr. Depth (ft)		2.79	
Conv. Total (cfs)	41917.7	Conv. (cfs)		41917.7	
Length Wtd. (ft)	291.20	Wetted Per. (ft)		75.57	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	417.14	220.00	290.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.04	23.02	0.04
C & E Loss (ft)	0.02	Cum SA (acres)	0.06	12.99	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8713.9

INPUT
Description: Section 87+13.9
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2832	136	2835	156	2835	156	2825	241	2825
241	2835	261	2835	545.86	2833				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

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     100    .035     136    .016     156    .013     241    .016     261    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           156     241            243.9   243.9   243.9             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     156    2836       T
     241  545.86    2836       T
Left Levee      Station=     156      Elevation=    2836
Right Levee     Station=     241      Elevation=    2836

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2832.68    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.27    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2832.41    Reach Len. (ft)           243.90     243.90     243.90
  Crit W.S. (ft)           2828.09    Flow Area (sq ft)                    629.57
  E.G. Slope (ft/ft)      0.000114    Area (sq ft)                         629.57
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             85.00    Top Width (ft)                        85.00
  Vel Total (ft/s)            4.16    Avg. Vel. (ft/s)                       4.16
  Max Chl Dpth (ft)           7.41    Hydr. Depth (ft)                       7.41
  Conv. Total (cfs)       245660.6    Conv. (cfs)                        245660.6
  Length Wtd. (ft)          243.90    Wetted Per. (ft)                      99.81
  Min Ch El (ft)           2825.00    Shear (lb/sq ft)                       0.04
  Alpha                       1.00    Stream Power (lb/ft s)    545.86     156.00     241.00
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)        0.60      69.14       0.38
  C & E Loss (ft)             0.19    Cum SA (acres)              0.54      14.23       0.23


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2832.81    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.28    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2832.54    Reach Len. (ft)           243.90     243.90     243.90
  Crit W.S. (ft)           2828.17    Flow Area (sq ft)                    640.45
  E.G. Slope (ft/ft)      0.000114    Area (sq ft)                         640.45
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             85.00    Top Width (ft)                        85.00
  Vel Total (ft/s)            4.22    Avg. Vel. (ft/s)                       4.22
  Max Chl Dpth (ft)           7.53    Hydr. Depth (ft)                       7.53
  Conv. Total (cfs)       252342.0    Conv. (cfs)                        252342.0
  Length Wtd. (ft)          243.90    Wetted Per. (ft)                     100.07
  Min Ch El (ft)           2825.00    Shear (lb/sq ft)                       0.05
  Alpha                       1.00    Stream Power (lb/ft s)    545.86     156.00     241.00
  Frctn Loss (ft)             0.09    Cum Volume (acre-ft)        0.38      63.39       0.28
  C & E Loss (ft)             0.19    Cum SA (acres)              0.37      14.07       0.18


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.
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CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2830.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.013	
W.S. Elev (ft)	2830.37	Reach Len. (ft)	243.90	243.90	243.90
Crit W.S. (ft)	2827.14	Flow Area (sq ft)		456.50	
E.G. Slope (ft/ft)	0.000103	Area (sq ft)		456.50	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	85.00	Top Width (ft)		85.00	
Vel Total (ft/s)	3.29	Avg. Vel. (ft/s)		3.29	
Max Chl Dpth (ft)	5.37	Hydr. Depth (ft)		5.37	
Conv. Total (cfs)	147816.5	Conv. (cfs)		147816.5	
Length Wtd. (ft)	243.90	Wetted Per. (ft)		95.74	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	545.86	156.00	241.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.13	40.95	0.13
C & E Loss (ft)	0.15	Cum SA (acres)	0.11	13.24	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2826.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2826.50	Reach Len. (ft)	243.90	243.90	243.90
Crit W.S. (ft)	2825.55	Flow Area (sq ft)		127.50	
E.G. Slope (ft/ft)	0.000115	Area (sq ft)		127.50	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	85.00	Top Width (ft)		85.00	
Vel Total (ft/s)	1.57	Avg. Vel. (ft/s)		1.57	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		1.50	
Conv. Total (cfs)	18660.1	Conv. (cfs)		18660.1	
Length Wtd. (ft)	243.90	Wetted Per. (ft)		88.00	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	545.86	156.00	241.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.01	10.50	0.01
C & E Loss (ft)	0.05	Cum SA (acres)	0.03	11.90	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2829.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.77	Reach Len. (ft)	243.90	243.90	243.90
Crit W.S. (ft)	2826.87	Flow Area (sq ft)		405.66	
E.G. Slope (ft/ft)	0.000101	Area (sq ft)		405.66	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	85.00	Top Width (ft)		85.00	
Vel Total (ft/s)	3.03	Avg. Vel. (ft/s)		3.03	
Max Chl Dpth (ft)	4.77	Hydr. Depth (ft)		4.77	
Conv. Total (cfs)	122432.1	Conv. (cfs)		122432.1	
Length Wtd. (ft)	243.90	Wetted Per. (ft)		94.54	

Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	545.86	156.00	241.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.13	39.78	0.13
C & E Loss (ft)	0.13	Cum SA (acres)	0.11	13.21	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2828.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.013	
W.S. Elev (ft)	2828.76	Reach Len. (ft)	243.90	243.90	243.90
Crit W.S. (ft)	2826.43	Flow Area (sq ft)		319.29	
E.G. Slope (ft/ft)	0.000099	Area (sq ft)		319.29	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	85.00	Top Width (ft)		85.00	
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)		2.60	
Max Chl Dpth (ft)	3.76	Hydr. Depth (ft)		3.76	
Conv. Total (cfs)	83347.4	Conv. (cfs)		83347.4	
Length Wtd. (ft)	243.90	Wetted Per. (ft)		92.51	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	545.86	156.00	241.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.08	29.93	0.08
C & E Loss (ft)	0.11	Cum SA (acres)	0.08	12.84	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2827.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2827.77	Reach Len. (ft)	243.90	243.90	243.90
Crit W.S. (ft)	2826.05	Flow Area (sq ft)		235.16	
E.G. Slope (ft/ft)	0.000101	Area (sq ft)		235.16	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	85.00	Top Width (ft)		85.00	
Vel Total (ft/s)	2.17	Avg. Vel. (ft/s)		2.17	
Max Chl Dpth (ft)	2.77	Hydr. Depth (ft)		2.77	
Conv. Total (cfs)	50791.3	Conv. (cfs)		50791.3	
Length Wtd. (ft)	243.90	Wetted Per. (ft)		90.53	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	545.86	156.00	241.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.04	21.59	0.04
C & E Loss (ft)	0.08	Cum SA (acres)	0.06	12.47	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8470

INPUT
Description: Section 84+70: Stabilizer #2 (inlet)
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2833.8	122.57	2833.8	157.17	2833.8	178.66	2833.8	187.75	2833.8
202.5	2833.8	220.5	2824.8	250.5	2824.8	268.5	2833.8	304.18	2833.8
326.76	2833.8	339.6	2833.8						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	202.5	.035	268.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
202.5	268.5	54	54	54	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2832.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.15	Wt. n-Val.		0.035	
W.S. Elev (ft)	2830.24	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2830.24	Flow Area (sq ft)		222.56	
E.G. Slope (ft/ft)	0.011734	Area (sq ft)		222.56	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	51.77	Top Width (ft)		51.77	
Vel Total (ft/s)	11.77	Avg. Vel. (ft/s)		11.77	
Max Chl Dpth (ft)	5.44	Hydr. Depth (ft)		4.30	
Conv. Total (cfs)	24186.8	Conv. (cfs)		24186.8	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		54.34	
Min Ch El (ft)	2824.80	Shear (lb/sq ft)		3.00	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	0.60	66.75	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.54	13.84	0.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2832.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.20	Wt. n-Val.		0.035	
W.S. Elev (ft)	2830.33	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2830.33	Flow Area (sq ft)		226.83	
E.G. Slope (ft/ft)	0.011802	Area (sq ft)		226.83	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	52.10	Top Width (ft)		52.10	
Vel Total (ft/s)	11.90	Avg. Vel. (ft/s)		11.90	

Max Chl Dpth (ft)	5.53	Hydr. Depth (ft)		4.35	
Conv. Total (cfs)	24853.6	Conv. (cfs)		24853.6	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		54.71	
Min Ch El (ft)	2824.80	Shear (lb/sq ft)		3.05	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)	0.38	60.96	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.37	13.68	0.18

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2830.31	Element			
Vel Head (ft)	1.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	2828.68	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2828.68	Flow Area (sq ft)		146.56	
E.G. Slope (ft/ft)	0.012886	Area (sq ft)		146.56	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	45.52	Top Width (ft)		45.52	
Vel Total (ft/s)	10.23	Avg. Vel. (ft/s)		10.23	
Max Chl Dpth (ft)	3.88	Hydr. Depth (ft)		3.22	
Conv. Total (cfs)	13213.8	Conv. (cfs)		13213.8	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		47.36	
Min Ch El (ft)	2824.80	Shear (lb/sq ft)		2.49	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)	0.13	39.26	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	12.88	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2826.40	Element			
Vel Head (ft)	0.51	Wt. n-Val.		0.035	
W.S. Elev (ft)	2825.88	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2825.88	Flow Area (sq ft)		34.74	
E.G. Slope (ft/ft)	0.018460	Area (sq ft)		34.74	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	34.32	Top Width (ft)		34.32	
Vel Total (ft/s)	5.76	Avg. Vel. (ft/s)		5.76	
Max Chl Dpth (ft)	1.08	Hydr. Depth (ft)		1.01	
Conv. Total (cfs)	1472.0	Conv. (cfs)		1472.0	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		34.83	

Min Ch El (ft)	2824.80	Shear (lb/sq ft)		1.15	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	1.00	Cum Volume (acre-ft)	0.01	10.05	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	11.56	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2829.70	Element			
Vel Head (ft)	1.46	Wt. n-Val.		0.035	
W.S. Elev (ft)	2828.24	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2828.24	Flow Area (sq ft)		126.64	
E.G. Slope (ft/ft)	0.013313	Area (sq ft)		126.64	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	43.74	Top Width (ft)		43.74	
Vel Total (ft/s)	9.71	Avg. Vel. (ft/s)		9.71	
Max Chl Dpth (ft)	3.43	Hydr. Depth (ft)		2.90	
Conv. Total (cfs)	10660.1	Conv. (cfs)		10660.1	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		45.36	
Min Ch El (ft)	2824.80	Shear (lb/sq ft)		2.32	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.72	Cum Volume (acre-ft)	0.13	38.29	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	12.85	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2828.67	Element			
Vel Head (ft)	1.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2827.49	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2827.49	Flow Area (sq ft)		95.08	
E.G. Slope (ft/ft)	0.014232	Area (sq ft)		95.08	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	40.75	Top Width (ft)		40.75	
Vel Total (ft/s)	8.73	Avg. Vel. (ft/s)		8.73	
Max Chl Dpth (ft)	2.69	Hydr. Depth (ft)		2.33	
Conv. Total (cfs)	6957.3	Conv. (cfs)		6957.3	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		42.02	
Min Ch El (ft)	2824.80	Shear (lb/sq ft)		2.01	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	0.08	28.77	0.08

C & E Loss (ft)	0.00	Cum SA (acres)	0.08	12.48	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2827.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.		0.035	
W.S. Elev (ft)	2826.78	Reach Len. (ft)	54.00	54.00	54.00
Crit W.S. (ft)	2826.78	Flow Area (sq ft)		67.15	
E.G. Slope (ft/ft)	0.015427	Area (sq ft)		67.15	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	37.91	Top Width (ft)		37.91	
Vel Total (ft/s)	7.60	Avg. Vel. (ft/s)		7.60	
Max Chl Dpth (ft)	1.98	Hydr. Depth (ft)		1.77	
Conv. Total (cfs)	4106.1	Conv. (cfs)		4106.1	
Length Wtd. (ft)	54.00	Wetted Per. (ft)		38.84	
Min Ch El (ft)	2824.80	Shear (lb/sq ft)		1.66	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.83	Cum Volume (acre-ft)	0.04	20.74	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	12.13	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8416

INPUT
Description: Section 84+16: Stabilizer #2
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2832.1	122.57	2832.1	157.17	2832.1	178.66	2832.1	187.75	2832.1
202.5	2832.1	220.5	2823.1	250.5	2823.1	268.5	2832.1	304.18	2832.1
326.76	2832.1	339.6	2832.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	202.5	.035	268.5	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

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         202.5   268.5                34      34      34              .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2831.28    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               3.89    Wt. n-Val.                           0.035
  W.S. Elev (ft)           2827.39    Reach Len. (ft)            34.00      34.00      34.00
  Crit W.S. (ft)           2828.53    Flow Area (sq ft)                    165.57
  E.G. Slope (ft/ft)      0.027543    Area (sq ft)                         165.57
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             47.17    Top Width (ft)                        47.17
  Vel Total (ft/s)           15.82    Avg. Vel. (ft/s)                      15.82
  Max Chl Dpth (ft)           4.29    Hydr. Depth (ft)                       3.51
  Conv. Total (cfs)        15786.8    Conv. (cfs)                         15786.8
  Length Wtd. (ft)           34.00    Wetted Per. (ft)                      49.19
  Min Ch El (ft)           2823.10    Shear (lb/sq ft)                       5.79
  Alpha                       1.00    Stream Power (lb/ft s)    339.60       0.00       0.00
  Frctn Loss (ft)             0.93    Cum Volume (acre-ft)        0.60      66.51       0.38
  C & E Loss (ft)             0.17    Cum SA (acres)              0.54      13.78       0.23


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2831.41    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               3.94    Wt. n-Val.                           0.035
  W.S. Elev (ft)           2827.48    Reach Len. (ft)            34.00      34.00      34.00
  Crit W.S. (ft)           2828.63    Flow Area (sq ft)                    169.52
  E.G. Slope (ft/ft)      0.027313    Area (sq ft)                         169.52
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             47.50    Top Width (ft)                        47.50
  Vel Total (ft/s)           15.93    Avg. Vel. (ft/s)                      15.93
  Max Chl Dpth (ft)           4.37    Hydr. Depth (ft)                       3.57
  Conv. Total (cfs)        16337.3    Conv. (cfs)                         16337.3
  Length Wtd. (ft)           34.00    Wetted Per. (ft)                      49.56
  Min Ch El (ft)           2823.10    Shear (lb/sq ft)                       5.83
  Alpha                       1.00    Stream Power (lb/ft s)    339.60       0.00       0.00
  Frctn Loss (ft)             0.93    Cum Volume (acre-ft)        0.38      60.72       0.28
  C & E Loss (ft)             0.17    Cum SA (acres)              0.37      13.62       0.18


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2829.12    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               3.04    Wt. n-Val.                           0.035
  W.S. Elev (ft)           2826.08    Reach Len. (ft)            34.00      34.00      34.00
  Crit W.S. (ft)           2826.99    Flow Area (sq ft)                    107.16
  E.G. Slope (ft/ft)      0.032501    Area (sq ft)                         107.16
```

Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	41.92	Top Width (ft)		41.92	
Vel Total (ft/s)	14.00	Avg. Vel. (ft/s)		14.00	
Max Chl Dpth (ft)	2.98	Hydr. Depth (ft)		2.56	
Conv. Total (cfs)	8320.4	Conv. (cfs)		8320.4	
Length Wtd. (ft)	34.00	Wetted Per. (ft)		43.33	
Min Ch El (ft)	2823.10	Shear (lb/sq ft)		5.02	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	1.04	Cum Volume (acre-ft)	0.13	39.10	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	12.82	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2824.85	Element			
Vel Head (ft)	0.93	Wt. n-Val.		0.035	
W.S. Elev (ft)	2823.92	Reach Len. (ft)	34.00	34.00	34.00
Crit W.S. (ft)	2824.18	Flow Area (sq ft)		25.84	
E.G. Slope (ft/ft)	0.047263	Area (sq ft)		25.84	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	33.27	Top Width (ft)		33.27	
Vel Total (ft/s)	7.74	Avg. Vel. (ft/s)		7.74	
Max Chl Dpth (ft)	0.82	Hydr. Depth (ft)		0.78	
Conv. Total (cfs)	920.0	Conv. (cfs)		920.0	
Length Wtd. (ft)	34.00	Wetted Per. (ft)		33.65	
Min Ch El (ft)	2823.10	Shear (lb/sq ft)		2.27	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	1.51	Cum Volume (acre-ft)	0.01	10.01	0.01
C & E Loss (ft)	0.04	Cum SA (acres)	0.03	11.52	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2828.48	Element			
Vel Head (ft)	2.76	Wt. n-Val.		0.035	
W.S. Elev (ft)	2825.72	Reach Len. (ft)	34.00	34.00	34.00
Crit W.S. (ft)	2826.54	Flow Area (sq ft)		92.22	
E.G. Slope (ft/ft)	0.034255	Area (sq ft)		92.22	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	40.47	Top Width (ft)		40.47	
Vel Total (ft/s)	13.34	Avg. Vel. (ft/s)		13.34	
Max Chl Dpth (ft)	2.62	Hydr. Depth (ft)		2.28	
Conv. Total (cfs)	6645.8	Conv. (cfs)		6645.8	
Length Wtd. (ft)	34.00	Wetted Per. (ft)		41.71	
Min Ch El (ft)	2823.10	Shear (lb/sq ft)		4.73	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	1.09	Cum Volume (acre-ft)	0.13	38.15	0.13
C & E Loss (ft)	0.13	Cum SA (acres)	0.11	12.80	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2827.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.26	Wt. n-Val.		0.035	
W.S. Elev (ft)	2825.12	Reach Len. (ft)	34.00	34.00	34.00
Crit W.S. (ft)	2825.79	Flow Area (sq ft)		68.80	
E.G. Slope (ft/ft)	0.037933	Area (sq ft)		68.80	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	38.08	Top Width (ft)		38.08	
Vel Total (ft/s)	12.06	Avg. Vel. (ft/s)		12.06	
Max Chl Dpth (ft)	2.02	Hydr. Depth (ft)		1.81	
Conv. Total (cfs)	4261.6	Conv. (cfs)		4261.6	
Length Wtd. (ft)	34.00	Wetted Per. (ft)		39.04	
Min Ch El (ft)	2823.10	Shear (lb/sq ft)		4.17	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	1.18	Cum Volume (acre-ft)	0.08	28.67	0.08
C & E Loss (ft)	0.11	Cum SA (acres)	0.08	12.44	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2826.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.73	Wt. n-Val.		0.035	
W.S. Elev (ft)	2824.57	Reach Len. (ft)	34.00	34.00	34.00
Crit W.S. (ft)	2825.08	Flow Area (sq ft)		48.38	
E.G. Slope (ft/ft)	0.042459	Area (sq ft)		48.38	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	35.88	Top Width (ft)		35.88	
Vel Total (ft/s)	10.54	Avg. Vel. (ft/s)		10.54	
Max Chl Dpth (ft)	1.47	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	2475.1	Conv. (cfs)		2475.1	
Length Wtd. (ft)	34.00	Wetted Per. (ft)		36.57	
Min Ch El (ft)	2823.10	Shear (lb/sq ft)		3.51	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	1.29	Cum Volume (acre-ft)	0.04	20.67	0.04
C & E Loss (ft)	0.08	Cum SA (acres)	0.06	12.08	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8382

INPUT
Description: Section 83+82: Stabilizer #2
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2830	122.57	2829	157.17	2828	178.66	2827	187.75	2826
199.5	2824	220.5	2813.5	250.5	2813.5	271.5	2824	304.18	2824.5
326.76	2825	339.6	2826						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	199.5	.035	271.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
199.5	271.5	52	52	52	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2828.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.44	Wt. n-Val.		0.035	
W.S. Elev (ft)	2816.13	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2818.93	Flow Area (sq ft)		92.56	
E.G. Slope (ft/ft)	0.153731	Area (sq ft)		92.56	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	40.50	Top Width (ft)		40.50	
Vel Total (ft/s)	28.31	Avg. Vel. (ft/s)		28.31	
Max Chl Dpth (ft)	2.63	Hydr. Depth (ft)		2.29	
Conv. Total (cfs)	6682.2	Conv. (cfs)		6682.2	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		41.74	
Min Ch El (ft)	2813.50	Shear (lb/sq ft)		21.28	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	1.85	Cum Volume (acre-ft)	0.60	66.41	0.38
C & E Loss (ft)	0.86	Cum SA (acres)	0.54	13.75	0.23

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2828.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	12.54	Wt. n-Val.		0.035	
W.S. Elev (ft)	2816.19	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2819.03	Flow Area (sq ft)		95.01	
E.G. Slope (ft/ft)	0.150939	Area (sq ft)		95.01	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	40.74	Top Width (ft)		40.74	
Vel Total (ft/s)	28.42	Avg. Vel. (ft/s)		28.42	
Max Chl Dpth (ft)	2.69	Hydr. Depth (ft)		2.33	
Conv. Total (cfs)	6949.7	Conv. (cfs)		6949.7	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		42.01	
Min Ch El (ft)	2813.50	Shear (lb/sq ft)		21.31	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00

Frctn Loss (ft)	1.83	Cum Volume (acre-ft)	0.38	60.61	0.28
C & E Loss (ft)	0.86	Cum SA (acres)	0.37	13.59	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2821.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.035	
W.S. Elev (ft)	2820.91	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2817.40	Flow Area (sq ft)		331.98	
E.G. Slope (ft/ft)	0.001239	Area (sq ft)		331.98	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	59.63	Top Width (ft)		59.63	
Vel Total (ft/s)	4.52	Avg. Vel. (ft/s)		4.52	
Max Chl Dpth (ft)	7.41	Hydr. Depth (ft)		5.57	
Conv. Total (cfs)	42621.7	Conv. (cfs)		42621.7	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		63.13	
Min Ch El (ft)	2813.50	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.13	38.93	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	12.78	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2817.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2817.13	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2814.58	Flow Area (sq ft)		135.17	
E.G. Slope (ft/ft)	0.000290	Area (sq ft)		135.17	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	44.51	Top Width (ft)		44.51	
Vel Total (ft/s)	1.48	Avg. Vel. (ft/s)		1.48	
Max Chl Dpth (ft)	3.63	Hydr. Depth (ft)		3.04	
Conv. Total (cfs)	11735.1	Conv. (cfs)		11735.1	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		46.23	
Min Ch El (ft)	2813.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	9.95	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	11.49	0.03

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2820.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.035	
W.S. Elev (ft)	2820.33	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2816.94	Flow Area (sq ft)		298.36	
E.G. Slope (ft/ft)	0.001125	Area (sq ft)		298.36	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	57.33	Top Width (ft)		57.33	
Vel Total (ft/s)	4.12	Avg. Vel. (ft/s)		4.12	

Max Chl Dpth (ft)	6.83	Hydr. Depth (ft)		5.20	
Conv. Total (cfs)	36675.5	Conv. (cfs)		36675.5	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		60.56	
Min Ch El (ft)	2813.50	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.13	38.00	0.13
C & E Loss (ft)	0.01	Cum SA (acres)	0.11	12.76	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2819.53	Element			
Vel Head (ft)	0.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2819.35	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2816.19	Flow Area (sq ft)		244.09	
E.G. Slope (ft/ft)	0.000905	Area (sq ft)		244.09	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	53.41	Top Width (ft)		53.41	
Vel Total (ft/s)	3.40	Avg. Vel. (ft/s)		3.40	
Max Chl Dpth (ft)	5.85	Hydr. Depth (ft)		4.57	
Conv. Total (cfs)	27594.9	Conv. (cfs)		27594.9	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		56.17	
Min Ch El (ft)	2813.50	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.08	28.54	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	12.40	0.08

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2818.50	Element			
Vel Head (ft)	0.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	2818.39	Reach Len. (ft)	52.00	52.00	52.00
Crit W.S. (ft)	2815.48	Flow Area (sq ft)		194.46	
E.G. Slope (ft/ft)	0.000655	Area (sq ft)		194.46	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	49.55	Top Width (ft)		49.55	
Vel Total (ft/s)	2.62	Avg. Vel. (ft/s)		2.62	
Max Chl Dpth (ft)	4.89	Hydr. Depth (ft)		3.92	
Conv. Total (cfs)	19925.1	Conv. (cfs)		19925.1	
Length Wtd. (ft)	52.00	Wetted Per. (ft)		51.86	
Min Ch El (ft)	2813.50	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.04	20.57	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	12.05	0.06

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8330

INPUT
Description: Section 83+30: Stabilizer #2
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2830	122.57	2829	157.17	2828	165.5	2826	185.5	2826
220.5	2813.5	250.5	2813.5	275.5	2826	304.18	2826	326.76	2826

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   339.6    2826

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035   165.5    .016   185.5    .035   275.5    .016  304.18    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         185.5   275.5                4       4       4             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2823.28    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.45    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2822.83    Reach Len. (ft)             4.00       4.00       4.00
  Crit W.S. (ft)           2818.81    Flow Area (sq ft)                    488.97
  E.G. Slope (ft/ft)      0.001393    Area (sq ft)                         488.97
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             74.79    Top Width (ft)                        74.79
  Vel Total (ft/s)            5.36    Avg. Vel. (ft/s)                       5.36
  Max Chl Dpth (ft)           9.33    Hydr. Depth (ft)                       6.54
  Conv. Total (cfs)        70210.1    Conv. (cfs)                         70210.1
  Length Wtd. (ft)            4.00    Wetted Per. (ft)                      78.61
  Min Ch El (ft)           2813.50    Shear (lb/sq ft)                       0.54
  Alpha                       1.00    Stream Power (lb/ft s)    339.60       0.00       0.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.60      66.07       0.38
  C & E Loss (ft)             0.17    Cum SA (acres)              0.54      13.68       0.23


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2823.41    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.46    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2822.96    Reach Len. (ft)             4.00       4.00       4.00
  Crit W.S. (ft)           2818.90    Flow Area (sq ft)                    498.21
  E.G. Slope (ft/ft)      0.001405    Area (sq ft)                         498.21
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             75.38    Top Width (ft)                        75.38
  Vel Total (ft/s)            5.42    Avg. Vel. (ft/s)                       5.42
  Max Chl Dpth (ft)           9.46    Hydr. Depth (ft)                       6.61
  Conv. Total (cfs)        72044.0    Conv. (cfs)                         72044.0
  Length Wtd. (ft)            4.00    Wetted Per. (ft)                      79.25
  Min Ch El (ft)           2813.50    Shear (lb/sq ft)                       0.55
  Alpha                       1.00    Stream Power (lb/ft s)    339.60       0.00       0.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.38      60.26       0.28
  C & E Loss (ft)             0.17    Cum SA (acres)              0.37      13.52       0.18


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2821.15    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.28    Wt. n-Val.                            0.035
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W.S. Elev (ft)	2820.87	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		351.44	
E.G. Slope (ft/ft)	0.001140	Area (sq ft)		351.44	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	65.37	Top Width (ft)		65.37	
Vel Total (ft/s)	4.27	Avg. Vel. (ft/s)		4.27	
Max Chl Dpth (ft)	7.37	Hydr. Depth (ft)		5.38	
Conv. Total (cfs)	44429.8	Conv. (cfs)		44429.8	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		68.39	
Min Ch El (ft)	2813.50	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	38.52	0.13
C & E Loss (ft)	0.13	Cum SA (acres)	0.11	12.71	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2817.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2817.12	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		139.81	
E.G. Slope (ft/ft)	0.000279	Area (sq ft)		139.81	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	47.35	Top Width (ft)		47.35	
Vel Total (ft/s)	1.43	Avg. Vel. (ft/s)		1.43	
Max Chl Dpth (ft)	3.61	Hydr. Depth (ft)		2.95	
Conv. Total (cfs)	11968.5	Conv. (cfs)		11968.5	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		48.83	
Min Ch El (ft)	2813.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	9.79	0.01
C & E Loss (ft)	0.05	Cum SA (acres)	0.03	11.44	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2820.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.035	
W.S. Elev (ft)	2820.30	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		314.67	
E.G. Slope (ft/ft)	0.001044	Area (sq ft)		314.67	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	62.62	Top Width (ft)		62.62	
Vel Total (ft/s)	3.91	Avg. Vel. (ft/s)		3.91	
Max Chl Dpth (ft)	6.80	Hydr. Depth (ft)		5.03	
Conv. Total (cfs)	38076.0	Conv. (cfs)		38076.0	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		65.40	
Min Ch El (ft)	2813.50	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	37.63	0.13
C & E Loss (ft)	0.12	Cum SA (acres)	0.11	12.69	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2819.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	2819.32	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		255.78	
E.G. Slope (ft/ft)	0.000851	Area (sq ft)		255.78	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	57.93	Top Width (ft)		57.93	
Vel Total (ft/s)	3.24	Avg. Vel. (ft/s)		3.24	
Max Chl Dpth (ft)	5.82	Hydr. Depth (ft)		4.42	
Conv. Total (cfs)	28453.4	Conv. (cfs)		28453.4	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		60.31	
Min Ch El (ft)	2813.50	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.08	28.24	0.08
C & E Loss (ft)	0.10	Cum SA (acres)	0.08	12.33	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2818.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.035	
W.S. Elev (ft)	2818.36	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		202.56	
E.G. Slope (ft/ft)	0.000623	Area (sq ft)		202.56	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	53.33	Top Width (ft)		53.33	
Vel Total (ft/s)	2.52	Avg. Vel. (ft/s)		2.52	
Max Chl Dpth (ft)	4.86	Hydr. Depth (ft)		3.80	
Conv. Total (cfs)	20428.3	Conv. (cfs)		20428.3	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		55.32	
Min Ch El (ft)	2813.50	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.04	20.34	0.04
C & E Loss (ft)	0.08	Cum SA (acres)	0.06	11.99	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8326

INPUT
Description: Section 83+26: Stabilizer #2
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2830	122.57	2829	157.17	2828	178.66	2827	187.75	2826

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   202.5  2824.5   220.5  2815.5   250.5  2815.5   268.5  2824.5   288.5  2824.5
     324  2824.5  326.76    2825   339.6    2826

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035   202.5    .035   268.5    .016   288.5    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         202.5   268.5                3       3       3             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2823.10    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               2.16    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2820.94    Reach Len. (ft)             3.00       3.00       3.00
  Crit W.S. (ft)           2820.94    Flow Area (sq ft)                    222.33
  E.G. Slope (ft/ft)      0.011768    Area (sq ft)                         222.33
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             51.76    Top Width (ft)                        51.76
  Vel Total (ft/s)           11.78    Avg. Vel. (ft/s)                      11.78
  Max Chl Dpth (ft)           5.44    Hydr. Depth (ft)                       4.30
  Conv. Total (cfs)        24151.4    Conv. (cfs)                         24151.4
  Length Wtd. (ft)            3.00    Wetted Per. (ft)                      54.32
  Min Ch El (ft)           2815.50    Shear (lb/sq ft)                       3.01
  Alpha                       1.00    Stream Power (lb/ft s)    339.60       0.00       0.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.60      66.03       0.38
  C & E Loss (ft)             0.54    Cum SA (acres)              0.54      13.67       0.23


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2823.23    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               2.20    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2821.03    Reach Len. (ft)             3.00       3.00       3.00
  Crit W.S. (ft)           2821.03    Flow Area (sq ft)                    226.97
  E.G. Slope (ft/ft)      0.011781    Area (sq ft)                         226.97
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             52.11    Top Width (ft)                        52.11
  Vel Total (ft/s)           11.90    Avg. Vel. (ft/s)                      11.90
  Max Chl Dpth (ft)           5.53    Hydr. Depth (ft)                       4.36
  Conv. Total (cfs)        24875.6    Conv. (cfs)                         24875.6
  Length Wtd. (ft)            3.00    Wetted Per. (ft)                      54.72
  Min Ch El (ft)           2815.50    Shear (lb/sq ft)                       3.05
  Alpha                       1.00    Stream Power (lb/ft s)    339.60       0.00       0.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.38      60.23       0.28
  C & E Loss (ft)             0.55    Cum SA (acres)              0.37      13.51       0.18


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2821.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	2819.38	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2819.38	Flow Area (sq ft)		146.53	
E.G. Slope (ft/ft)	0.012895	Area (sq ft)		146.53	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	45.52	Top Width (ft)		45.52	
Vel Total (ft/s)	10.24	Avg. Vel. (ft/s)		10.24	
Max Chl Dpth (ft)	3.88	Hydr. Depth (ft)		3.22	
Conv. Total (cfs)	13209.4	Conv. (cfs)		13209.4	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		47.35	
Min Ch El (ft)	2815.50	Shear (lb/sq ft)		2.49	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	38.50	0.13
C & E Loss (ft)	0.41	Cum SA (acres)	0.11	12.70	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2817.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.51	Wt. n-Val.		0.035	
W.S. Elev (ft)	2816.58	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2816.58	Flow Area (sq ft)		34.74	
E.G. Slope (ft/ft)	0.018446	Area (sq ft)		34.74	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	34.32	Top Width (ft)		34.32	
Vel Total (ft/s)	5.76	Avg. Vel. (ft/s)		5.76	
Max Chl Dpth (ft)	1.08	Hydr. Depth (ft)		1.01	
Conv. Total (cfs)	1472.6	Conv. (cfs)		1472.6	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		34.83	
Min Ch El (ft)	2815.50	Shear (lb/sq ft)		1.15	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	9.78	0.01
C & E Loss (ft)	0.14	Cum SA (acres)	0.03	11.43	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2820.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.46	Wt. n-Val.		0.035	
W.S. Elev (ft)	2818.94	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2818.94	Flow Area (sq ft)		126.65	
E.G. Slope (ft/ft)	0.013310	Area (sq ft)		126.65	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	43.74	Top Width (ft)		43.74	
Vel Total (ft/s)	9.71	Avg. Vel. (ft/s)		9.71	
Max Chl Dpth (ft)	3.44	Hydr. Depth (ft)		2.90	
Conv. Total (cfs)	10661.4	Conv. (cfs)		10661.4	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		45.36	
Min Ch El (ft)	2815.50	Shear (lb/sq ft)		2.32	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	37.61	0.13
C & E Loss (ft)	0.38	Cum SA (acres)	0.11	12.68	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2819.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2818.19	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2818.19	Flow Area (sq ft)		95.16	
E.G. Slope (ft/ft)	0.014197	Area (sq ft)		95.16	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	40.76	Top Width (ft)		40.76	
Vel Total (ft/s)	8.72	Avg. Vel. (ft/s)		8.72	
Max Chl Dpth (ft)	2.69	Hydr. Depth (ft)		2.33	
Conv. Total (cfs)	6966.0	Conv. (cfs)		6966.0	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		42.03	
Min Ch El (ft)	2815.50	Shear (lb/sq ft)		2.01	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.08	28.23	0.08
C & E Loss (ft)	0.31	Cum SA (acres)	0.08	12.33	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2818.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.89	Wt. n-Val.		0.035	
W.S. Elev (ft)	2817.48	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2817.48	Flow Area (sq ft)		67.25	
E.G. Slope (ft/ft)	0.015356	Area (sq ft)		67.25	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	37.92	Top Width (ft)		37.92	
Vel Total (ft/s)	7.58	Avg. Vel. (ft/s)		7.58	
Max Chl Dpth (ft)	1.98	Hydr. Depth (ft)		1.77	
Conv. Total (cfs)	4115.6	Conv. (cfs)		4115.6	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		38.86	
Min Ch El (ft)	2815.50	Shear (lb/sq ft)		1.66	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.04	20.32	0.04
C & E Loss (ft)	0.23	Cum SA (acres)	0.06	11.98	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8323

INPUT
Description: Section 83+23 (exit)
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2830	122.57	2829	157.17	2828	170	2825.5	190	2825.5
210	2815.5	284	2815.5	304.18	2825.5	324.2	2825.5	339.6	2826

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	170	.016	190	.03	304.18	.016	324.2	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
190	304.18	209.1	209.1	209.1	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2822.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.030	
W.S. Elev (ft)	2821.78	Reach Len. (ft)	209.10	209.10	209.10
Crit W.S. (ft)	2818.77	Flow Area (sq ft)		543.57	
E.G. Slope (ft/ft)	0.001020	Area (sq ft)		543.57	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	99.22	Top Width (ft)		99.22	
Vel Total (ft/s)	4.82	Avg. Vel. (ft/s)		4.82	
Max Chl Dpth (ft)	6.28	Hydr. Depth (ft)		5.48	
Conv. Total (cfs)	82051.0	Conv. (cfs)		82051.0	
Length Wtd. (ft)	209.10	Wetted Per. (ft)		102.17	
Min Ch El (ft)	2815.50	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	0.60	66.01	0.38
C & E Loss (ft)	0.15	Cum SA (acres)	0.54	13.67	0.23

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2822.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.030	
W.S. Elev (ft)	2821.89	Reach Len. (ft)	209.10	209.10	209.10
Crit W.S. (ft)	2818.84	Flow Area (sq ft)		554.37	
E.G. Slope (ft/ft)	0.001021	Area (sq ft)		554.37	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	99.65	Top Width (ft)		99.65	
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)		4.87	
Max Chl Dpth (ft)	6.38	Hydr. Depth (ft)		5.56	
Conv. Total (cfs)	84518.1	Conv. (cfs)		84518.1	
Length Wtd. (ft)	209.10	Wetted Per. (ft)		102.66	
Min Ch El (ft)	2815.50	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	0.38	60.20	0.28
C & E Loss (ft)	0.16	Cum SA (acres)	0.37	13.51	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2820.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.030	
W.S. Elev (ft)	2820.04	Reach Len. (ft)	209.10	209.10	209.10
Crit W.S. (ft)	2817.78	Flow Area (sq ft)		377.24	
E.G. Slope (ft/ft)	0.001016	Area (sq ft)		377.24	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	92.24	Top Width (ft)		92.24	
Vel Total (ft/s)	3.98	Avg. Vel. (ft/s)		3.98	
Max Chl Dpth (ft)	4.54	Hydr. Depth (ft)		4.09	
Conv. Total (cfs)	47062.5	Conv. (cfs)		47062.5	
Length Wtd. (ft)	209.10	Wetted Per. (ft)		94.37	
Min Ch El (ft)	2815.50	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)	0.13	38.48	0.13

C & E Loss (ft)	0.12	Cum SA (acres)	0.11	12.70	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2816.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	2816.84	Reach Len. (ft)	209.10	209.10	209.10
Crit W.S. (ft)	2816.11	Flow Area (sq ft)		102.37	
E.G. Slope (ft/ft)	0.001120	Area (sq ft)		102.37	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	79.36	Top Width (ft)		79.36	
Vel Total (ft/s)	1.95	Avg. Vel. (ft/s)		1.95	
Max Chl Dpth (ft)	1.33	Hydr. Depth (ft)		1.29	
Conv. Total (cfs)	5976.5	Conv. (cfs)		5976.5	
Length Wtd. (ft)	209.10	Wetted Per. (ft)		79.99	
Min Ch El (ft)	2815.50	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	0.01	9.77	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	11.43	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2819.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.030	
W.S. Elev (ft)	2819.54	Reach Len. (ft)	209.10	209.10	209.10
Crit W.S. (ft)	2817.50	Flow Area (sq ft)		331.40	
E.G. Slope (ft/ft)	0.001019	Area (sq ft)		331.40	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	90.22	Top Width (ft)		90.22	
Vel Total (ft/s)	3.71	Avg. Vel. (ft/s)		3.71	
Max Chl Dpth (ft)	4.04	Hydr. Depth (ft)		3.67	
Conv. Total (cfs)	38539.8	Conv. (cfs)		38539.8	
Length Wtd. (ft)	209.10	Wetted Per. (ft)		92.12	
Min Ch El (ft)	2815.50	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	339.60	0.00	0.00
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)	0.13	37.60	0.13
C & E Loss (ft)	0.10	Cum SA (acres)	0.11	12.68	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2818.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2818.69	Reach Len. (ft)	209.10	209.10	209.10
Crit W.S. (ft)	2817.05	Flow Area (sq ft)		256.75	
E.G. Slope (ft/ft)	0.001027	Area (sq ft)		256.75	
Q Total (cfs)	830.00	Flow (cfs)		830.00	

```
  Top Width (ft)             86.83    Top Width (ft)                        86.83
  Vel Total (ft/s)            3.23    Avg. Vel. (ft/s)                       3.23
  Max Chl Dpth (ft)           3.19    Hydr. Depth (ft)                       2.96
  Conv. Total (cfs)        25901.6    Conv. (cfs)                         25901.6
  Length Wtd. (ft)          209.10    Wetted Per. (ft)                      88.33
  Min Ch El (ft)           2815.50    Shear (lb/sq ft)                       0.19
  Alpha                       1.00    Stream Power (lb/ft s)    339.60       0.00       0.00
  Frctn Loss (ft)             0.50    Cum Volume (acre-ft)        0.08      28.22       0.08
  C & E Loss (ft)             0.09    Cum SA (acres)              0.08      12.32       0.08


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2818.00    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.11    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2817.88    Reach Len. (ft)           209.10     209.10     209.10
  Crit W.S. (ft)           2816.63    Flow Area (sq ft)                    187.57
  E.G. Slope (ft/ft)      0.001044    Area (sq ft)                         187.57
  Q Total (cfs)             510.00    Flow (cfs)                           510.00
  Top Width (ft)             83.57    Top Width (ft)                        83.57
  Vel Total (ft/s)            2.72    Avg. Vel. (ft/s)                       2.72
  Max Chl Dpth (ft)           2.38    Hydr. Depth (ft)                       2.24
  Conv. Total (cfs)        15786.2    Conv. (cfs)                         15786.2
  Length Wtd. (ft)          209.10    Wetted Per. (ft)                      84.69
  Min Ch El (ft)           2815.50    Shear (lb/sq ft)                       0.14
  Alpha                       1.00    Stream Power (lb/ft s)    339.60       0.00       0.00
  Frctn Loss (ft)             0.52    Cum Volume (acre-ft)        0.04      20.31       0.04
  C & E Loss (ft)             0.06    Cum SA (acres)              0.06      11.98       0.06


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 8113.9

INPUT
Description: Section 81+13.9
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2826  103.75  2825.5     124  2825.5     155    2815     195    2815
     216  2825.5     236  2825.5  270.86  2825.5  289.26  2825.5  307.62    2826

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  103.75    .016     124     .03     216    .016     236    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           124     216            313.9   313.9   313.9              .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2821.51    Element                   Left OB    Channel   Right OB
```

Vel Head (ft)	1.90	Wt. n-Val.		0.030	
W.S. Elev (ft)	2819.61	Reach Len. (ft)	313.90	313.90	313.90
Crit W.S. (ft)	2819.61	Flow Area (sq ft)		236.71	
E.G. Slope (ft/ft)	0.008849	Area (sq ft)		236.71	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	62.81	Top Width (ft)		62.81	
Vel Total (ft/s)	11.07	Avg. Vel. (ft/s)		11.07	
Max Chl Dpth (ft)	4.60	Hydr. Depth (ft)		3.77	
Conv. Total (cfs)	27851.4	Conv. (cfs)		27851.4	
Length Wtd. (ft)	313.90	Wetted Per. (ft)		64.65	
Min Ch El (ft)	2815.00	Shear (lb/sq ft)		2.02	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.60	64.13	0.38
C & E Loss (ft)	0.51	Cum SA (acres)	0.54	13.28	0.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2821.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.93	Wt. n-Val.		0.030	
W.S. Elev (ft)	2819.69	Reach Len. (ft)	313.90	313.90	313.90
Crit W.S. (ft)	2819.69	Flow Area (sq ft)		242.06	
E.G. Slope (ft/ft)	0.008805	Area (sq ft)		242.06	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	63.23	Top Width (ft)		63.23	
Vel Total (ft/s)	11.15	Avg. Vel. (ft/s)		11.15	
Max Chl Dpth (ft)	4.69	Hydr. Depth (ft)		3.83	
Conv. Total (cfs)	28774.4	Conv. (cfs)		28774.4	
Length Wtd. (ft)	313.90	Wetted Per. (ft)		65.11	
Min Ch El (ft)	2815.00	Shear (lb/sq ft)		2.04	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.38	58.29	0.28
C & E Loss (ft)	0.52	Cum SA (acres)	0.37	13.12	0.18

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2819.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.41	Wt. n-Val.		0.030	
W.S. Elev (ft)	2818.27	Reach Len. (ft)	313.90	313.90	313.90
Crit W.S. (ft)	2818.27	Flow Area (sq ft)		157.39	
E.G. Slope (ft/ft)	0.009673	Area (sq ft)		157.39	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	56.20	Top Width (ft)		56.20	
Vel Total (ft/s)	9.53	Avg. Vel. (ft/s)		9.53	
Max Chl Dpth (ft)	3.27	Hydr. Depth (ft)		2.80	
Conv. Total (cfs)	15251.3	Conv. (cfs)		15251.3	
Length Wtd. (ft)	313.90	Wetted Per. (ft)		57.52	
Min Ch El (ft)	2815.00	Shear (lb/sq ft)		1.65	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	0.13	37.20	0.13
C & E Loss (ft)	0.33	Cum SA (acres)	0.11	12.34	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2816.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.030	
W.S. Elev (ft)	2816.00	Reach Len. (ft)	313.90	313.90	313.90
Crit W.S. (ft)	2815.90	Flow Area (sq ft)		42.60	
E.G. Slope (ft/ft)	0.009773	Area (sq ft)		42.60	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	44.97	Top Width (ft)		44.97	
Vel Total (ft/s)	4.70	Avg. Vel. (ft/s)		4.70	
Max Chl Dpth (ft)	1.00	Hydr. Depth (ft)		0.95	
Conv. Total (cfs)	2023.1	Conv. (cfs)		2023.1	
Length Wtd. (ft)	313.90	Wetted Per. (ft)		45.37	
Min Ch El (ft)	2815.00	Shear (lb/sq ft)		0.57	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00
Frctn Loss (ft)	1.66	Cum Volume (acre-ft)	0.01	9.43	0.01
C & E Loss (ft)	0.04	Cum SA (acres)	0.03	11.13	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2819.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.		0.030	
W.S. Elev (ft)	2817.89	Reach Len. (ft)	313.90	313.90	313.90
Crit W.S. (ft)	2817.89	Flow Area (sq ft)		136.39	
E.G. Slope (ft/ft)	0.009991	Area (sq ft)		136.39	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	54.32	Top Width (ft)		54.32	
Vel Total (ft/s)	9.02	Avg. Vel. (ft/s)		9.02	
Max Chl Dpth (ft)	2.89	Hydr. Depth (ft)		2.51	
Conv. Total (cfs)	12305.6	Conv. (cfs)		12305.6	
Length Wtd. (ft)	313.90	Wetted Per. (ft)		55.48	
Min Ch El (ft)	2815.00	Shear (lb/sq ft)		1.53	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)	0.13	36.48	0.13
C & E Loss (ft)	0.24	Cum SA (acres)	0.11	12.33	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2818.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2817.25	Reach Len. (ft)	313.90	313.90	313.90
Crit W.S. (ft)	2817.25	Flow Area (sq ft)		102.54	
E.G. Slope (ft/ft)	0.010814	Area (sq ft)		102.54	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	51.14	Top Width (ft)		51.14	
Vel Total (ft/s)	8.09	Avg. Vel. (ft/s)		8.09	
Max Chl Dpth (ft)	2.25	Hydr. Depth (ft)		2.00	
Conv. Total (cfs)	7981.4	Conv. (cfs)		7981.4	
Length Wtd. (ft)	313.90	Wetted Per. (ft)		52.04	
Min Ch El (ft)	2815.00	Shear (lb/sq ft)		1.33	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00
Frctn Loss (ft)	1.40	Cum Volume (acre-ft)	0.08	27.35	0.08
C & E Loss (ft)	0.14	Cum SA (acres)	0.08	11.99	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2817.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.		0.030	
W.S. Elev (ft)	2816.65	Reach Len. (ft)	313.90	313.90	313.90
Crit W.S. (ft)	2816.65	Flow Area (sq ft)		72.80	
E.G. Slope (ft/ft)	0.011751	Area (sq ft)		72.80	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	48.18	Top Width (ft)		48.18	
Vel Total (ft/s)	7.01	Avg. Vel. (ft/s)		7.01	
Max Chl Dpth (ft)	1.65	Hydr. Depth (ft)		1.51	
Conv. Total (cfs)	4704.8	Conv. (cfs)		4704.8	
Length Wtd. (ft)	313.90	Wetted Per. (ft)		48.84	
Min Ch El (ft)	2815.00	Shear (lb/sq ft)		1.09	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00
Frctn Loss (ft)	1.55	Cum Volume (acre-ft)	0.04	19.69	0.04
C & E Loss (ft)	0.11	Cum SA (acres)	0.06	11.66	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7800

INPUT
Description: Section 78+00 (u/s face of Olalee Rd.)
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2825	109.97	2824	122.81	2823	148	2822.5	168	2822.5
185	2814	309	2814	326	2822.5	346	2822.5	414.35	2822.5
606.63	2825								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	148	.016	168	.013	326	.016	346	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
168	326	38.9	38.9	38.9	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2819.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.013	

W.S. Elev (ft)	2819.29	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2816.36	Flow Area (sq ft)		712.11	
E.G. Slope (ft/ft)	0.000127	Area (sq ft)		712.11	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	145.17	Top Width (ft)		145.17	
Vel Total (ft/s)	3.68	Avg. Vel. (ft/s)		3.68	
Max Chl Dpth (ft)	5.29	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	232336.0	Conv. (cfs)		232336.0	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		147.66	
Min Ch El (ft)	2814.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.60	60.72	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.54	12.53	0.23

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2819.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2819.47	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2816.41	Flow Area (sq ft)		738.69	
E.G. Slope (ft/ft)	0.000120	Area (sq ft)		738.69	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	145.90	Top Width (ft)		145.90	
Vel Total (ft/s)	3.66	Avg. Vel. (ft/s)		3.66	
Max Chl Dpth (ft)	5.47	Hydr. Depth (ft)		5.06	
Conv. Total (cfs)	246060.0	Conv. (cfs)		246060.0	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		148.48	
Min Ch El (ft)	2814.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.38	54.76	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.37	12.36	0.18

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2816.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.013	
W.S. Elev (ft)	2816.60	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2815.64	Flow Area (sq ft)		335.67	
E.G. Slope (ft/ft)	0.000457	Area (sq ft)		335.67	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	134.39	Top Width (ft)		134.39	
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)		4.47	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		2.50	
Conv. Total (cfs)	70203.7	Conv. (cfs)		70203.7	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		135.62	
Min Ch El (ft)	2814.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	35.42	0.13
C & E Loss (ft)	0.04	Cum SA (acres)	0.11	11.65	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2814.65	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.22	Wt. n-Val.		0.013	
W.S. Elev (ft)	2814.43	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2814.43	Flow Area (sq ft)		53.74	
E.G. Slope (ft/ft)	0.003299	Area (sq ft)		53.74	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	125.72	Top Width (ft)		125.72	
Vel Total (ft/s)	3.72	Avg. Vel. (ft/s)		3.72	
Max Chl Dpth (ft)	0.43	Hydr. Depth (ft)		0.43	
Conv. Total (cfs)	3482.1	Conv. (cfs)		3482.1	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		125.92	
Min Ch El (ft)	2814.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01	9.08	0.01
C & E Loss (ft)	0.05	Cum SA (acres)	0.03	10.51	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2816.47	Element			
Vel Head (ft)	1.46	Wt. n-Val.		0.013	
W.S. Elev (ft)	2815.01	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2815.44	Flow Area (sq ft)		126.88	
E.G. Slope (ft/ft)	0.007317	Area (sq ft)		126.88	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	128.03	Top Width (ft)		128.03	
Vel Total (ft/s)	9.69	Avg. Vel. (ft/s)		9.69	
Max Chl Dpth (ft)	1.01	Hydr. Depth (ft)		0.99	
Conv. Total (cfs)	14379.3	Conv. (cfs)		14379.3	
Length Wtd. (ft)	38.90	Wetted Per. (ft)		128.50	
Min Ch El (ft)	2814.00	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)	2.67	Cum Volume (acre-ft)	0.13	35.53	0.13
C & E Loss (ft)	0.02	Cum SA (acres)	0.11	11.67	0.11

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2815.79	Element			
Vel Head (ft)	0.94	Wt. n-Val.		0.013	
W.S. Elev (ft)	2814.85	Reach Len. (ft)	38.90	38.90	38.90
Crit W.S. (ft)	2815.11	Flow Area (sq ft)		106.48	
E.G. Slope (ft/ft)	0.005931	Area (sq ft)		106.48	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	127.39	Top Width (ft)		127.39	
Vel Total (ft/s)	7.79	Avg. Vel. (ft/s)		7.79	
Max Chl Dpth (ft)	0.85	Hydr. Depth (ft)		0.84	

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  Conv. Total (cfs)        10777.9    Conv. (cfs)                        10777.9
  Length Wtd. (ft)           38.90    Wetted Per. (ft)                    127.79
  Min Ch El (ft)           2814.00    Shear (lb/sq ft)                      0.31
  Alpha                       1.00    Stream Power (lb/ft s)    606.63      0.00       0.00
  Frctn Loss (ft)             2.46    Cum Volume (acre-ft)        0.08     26.60       0.08
  C & E Loss (ft)             0.02    Cum SA (acres)              0.08     11.35       0.08


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2815.23    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.53    Wt. n-Val.                           0.013
  W.S. Elev (ft)           2814.69    Reach Len. (ft)            38.90     38.90      38.90
  Crit W.S. (ft)           2814.80    Flow Area (sq ft)                    86.94
  E.G. Slope (ft/ft)      0.004371    Area (sq ft)                         86.94
  Q Total (cfs)             510.00    Flow (cfs)                          510.00
  Top Width (ft)            126.77    Top Width (ft)                      126.77
  Vel Total (ft/s)            5.87    Avg. Vel. (ft/s)                      5.87
  Max Chl Dpth (ft)           0.69    Hydr. Depth (ft)                      0.69
  Conv. Total (cfs)         7714.4    Conv. (cfs)                        7714.4
  Length Wtd. (ft)           38.90    Wetted Per. (ft)                    127.10
  Min Ch El (ft)           2814.00    Shear (lb/sq ft)                      0.19
  Alpha                       1.00    Stream Power (lb/ft s)    606.63      0.00       0.00
  Frctn Loss (ft)             2.12    Cum Volume (acre-ft)        0.04     19.11       0.04
  C & E Loss (ft)             0.07    Cum SA (acres)              0.06     11.03       0.06


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 7761.1

INPUT
Description: Section 747+61.1 (u/s face of Olalee Rd.)
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2825  109.97    2824  122.81    2823  139.34  2822.5     172  2822.5
     192  2822.5     215    2811     285    2811     308  2822.5     321  2822.5
  414.35  2822.5  606.63    2825

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     172    .016     192    .013     308    .016     321    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           192     308             22.5    22.5    22.5             .3       .5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2819.50    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.21    Wt. n-Val.                           0.013
  W.S. Elev (ft)           2819.29    Reach Len. (ft)            22.50     22.50      22.50
  Crit W.S. (ft)           2814.39    Flow Area (sq ft)                   717.70
```

E.G. Slope (ft/ft)	0.000081	Area (sq ft)		717.70	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	103.16	Top Width (ft)		103.16	
Vel Total (ft/s)	3.65	Avg. Vel. (ft/s)		3.65	
Max Chl Dpth (ft)	8.29	Hydr. Depth (ft)		6.96	
Conv. Total (cfs)	291636.2	Conv. (cfs)		291636.2	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		107.07	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.60	60.08	0.38
C & E Loss (ft)		Cum SA (acres)	0.54	12.42	0.23

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2819.68	Element			
Vel Head (ft)	0.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2819.47	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2814.46	Flow Area (sq ft)		736.23	
E.G. Slope (ft/ft)	0.000080	Area (sq ft)		736.23	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	103.87	Top Width (ft)		103.87	
Vel Total (ft/s)	3.67	Avg. Vel. (ft/s)		3.67	
Max Chl Dpth (ft)	8.47	Hydr. Depth (ft)		7.09	
Conv. Total (cfs)	302782.6	Conv. (cfs)		302782.6	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		107.87	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.38	54.10	0.28
C & E Loss (ft)		Cum SA (acres)	0.37	12.25	0.18

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2816.86	Element			
Vel Head (ft)	0.16	Wt. n-Val.		0.013	
W.S. Elev (ft)	2816.69	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2813.36	Flow Area (sq ft)		463.45	
E.G. Slope (ft/ft)	0.000098	Area (sq ft)		463.45	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	92.78	Top Width (ft)		92.78	
Vel Total (ft/s)	3.24	Avg. Vel. (ft/s)		3.24	
Max Chl Dpth (ft)	5.69	Hydr. Depth (ft)		5.00	
Conv. Total (cfs)	151879.2	Conv. (cfs)		151879.2	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		95.47	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	35.07	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	11.55	0.11

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2812.53	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.48	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2811.63	Flow Area (sq ft)		107.79	
E.G. Slope (ft/ft)	0.000167	Area (sq ft)		107.79	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	75.91	Top Width (ft)		75.91	
Vel Total (ft/s)	1.86	Avg. Vel. (ft/s)		1.86	
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)		1.42	
Conv. Total (cfs)	15471.3	Conv. (cfs)		15471.3	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		76.61	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.01	

Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	9.01	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	10.42	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2816.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.013	
W.S. Elev (ft)	2815.98	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2813.08	Flow Area (sq ft)		398.29	
E.G. Slope (ft/ft)	0.000104	Area (sq ft)		398.29	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	89.92	Top Width (ft)		89.92	
Vel Total (ft/s)	3.09	Avg. Vel. (ft/s)		3.09	
Max Chl Dpth (ft)	4.98	Hydr. Depth (ft)		4.43	
Conv. Total (cfs)	120685.2	Conv. (cfs)		120685.2	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		92.28	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	35.29	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	11.58	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2814.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	2814.82	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2812.61	Flow Area (sq ft)		296.74	
E.G. Slope (ft/ft)	0.000117	Area (sq ft)		296.74	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	85.29	Top Width (ft)		85.29	
Vel Total (ft/s)	2.80	Avg. Vel. (ft/s)		2.80	
Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)		3.48	
Conv. Total (cfs)	76798.5	Conv. (cfs)		76798.5	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		87.09	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	26.42	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	11.25	0.08

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2813.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2813.76	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2812.17	Flow Area (sq ft)		208.16	
E.G. Slope (ft/ft)	0.000133	Area (sq ft)		208.16	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	81.03	Top Width (ft)		81.03	
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)		2.45	
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)		2.57	
Conv. Total (cfs)	44158.3	Conv. (cfs)		44158.3	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		82.33	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	18.98	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	10.94	0.06

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Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CULVERT


RIVER: Desert Knolls Wa
REACH: Main               RS: 7749.9

INPUT
Description: Olalee Road
Distance from Upstream XS =      .4
Deck/Roadway Width        =      22
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     120    2822             200    2822             215    2822
     285    2822             350    2822             530    2822

Upstream Bridge Cross Section Data
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2825  109.97    2824  122.81    2823  139.34  2822.5     172  2822.5
     192  2822.5     215    2811     285    2811     308  2822.5     321  2822.5
  414.35  2822.5  606.63    2825

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     172    .016     192    .013     308    .016     321    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           192     308             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     120    2822             200    2822             215    2822
     285    2822             350    2822             530    2822

Downstream Bridge Cross Section Data
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2825  109.97    2824  122.81    2823  139.34    2822  150.37    2821
  167.82    2820  185.05    2819     203    2819     219    2811     312    2811
     328    2819     348    2819  414.35    2820  606.63    2825

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     203    .013     328    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           203     328             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     203    2820       T
     328  606.63    2820       T
Left Levee      Station=     203      Elevation=    2820
Right Levee     Station=     328      Elevation=    2820

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
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Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       9      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  0    22.5     .013     .013        0                  .5                1
Number of Barrels =  3
Upstream   Elevation =  2811
Centerline Stations
    Sta.    Sta.    Sta.
     235     250     265
Downstream Elevation =  2811
Centerline Stations
    Sta.    Sta.    Sta.
     250     265     280

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2620.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         10.63
  Q Barrel (cfs)            873.33    Culv Vel DS (ft/s)         10.84
  E.G. US. (ft)            2819.50    Culv Inv El Up (ft)      2811.00
  W.S. US. (ft)            2819.29    Culv Inv El Dn (ft)      2811.00
  E.G. DS (ft)             2817.14    Culv Frctn Ls (ft)          0.04
  W.S. DS (ft)             2816.76    Culv Exit Loss (ft)         1.45
  Delta EG (ft)               2.37    Culv Entr Loss (ft)         0.88
  Delta WS (ft)               2.53    Q Weir (cfs)
  E.G. IC (ft)             2818.96    Weir Sta Lft (ft)
  E.G. OC (ft)             2819.50    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2816.87    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2816.76    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         4.94    Min El Weir Flow (ft)    2822.01


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2700.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         11.67
  Q Barrel (cfs)            900.00    Culv Vel DS (ft/s)         12.74
  E.G. US. (ft)            2819.68    Culv Inv El Up (ft)      2811.00
  W.S. US. (ft)            2819.47    Culv Inv El Dn (ft)      2811.00
  E.G. DS (ft)             2816.46    Culv Frctn Ls (ft)          0.06
  W.S. DS (ft)             2816.04    Culv Exit Loss (ft)         2.11
  Delta EG (ft)               3.22    Culv Entr Loss (ft)         1.06
  Delta WS (ft)               3.43    Q Weir (cfs)
  E.G. IC (ft)             2819.12    Weir Sta Lft (ft)
  E.G. OC (ft)             2819.68    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2816.51    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2816.04    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.04    Min El Weir Flow (ft)    2822.01


CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1500.00    Culv Full Len (ft)
```

# Barrels	3	Culv Vel US (ft/s)	9.46
Q Barrel (cfs)	500.00	Culv Vel DS (ft/s)	10.48
E.G. US. (ft)	2816.86	Culv Inv El Up (ft)	2811.00
W.S. US. (ft)	2816.69	Culv Inv El Dn (ft)	2811.00
E.G. DS (ft)	2814.04	Culv Frctn Ls (ft)	0.05
W.S. DS (ft)	2813.42	Culv Exit Loss (ft)	2.07
Delta EG (ft)	2.82	Culv Entr Loss (ft)	0.70
Delta WS (ft)	3.28	Q Weir (cfs)	
E.G. IC (ft)	2816.42	Weir Sta Lft (ft)	
E.G. OC (ft)	2816.86	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2814.77	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2814.41	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.41	Min El Weir Flow (ft)	2822.01

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	200.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	4.43
Q Barrel (cfs)	66.67	Culv Vel DS (ft/s)	5.35
E.G. US. (ft)	2812.53	Culv Inv El Up (ft)	2811.00
W.S. US. (ft)	2812.48	Culv Inv El Dn (ft)	2811.00
E.G. DS (ft)	2811.78	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2811.51	Culv Exit Loss (ft)	0.55
Delta EG (ft)	0.75	Culv Entr Loss (ft)	0.15
Delta WS (ft)	0.97	Q Weir (cfs)	
E.G. IC (ft)	2812.38	Weir Sta Lft (ft)	
E.G. OC (ft)	2812.53	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2812.07	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2811.89	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.89	Min El Weir Flow (ft)	2822.01

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	1230.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	8.81
Q Barrel (cfs)	410.00	Culv Vel DS (ft/s)	9.81
E.G. US. (ft)	2816.13	Culv Inv El Up (ft)	2811.00
W.S. US. (ft)	2815.98	Culv Inv El Dn (ft)	2811.00
E.G. DS (ft)	2813.86	Culv Frctn Ls (ft)	0.05
W.S. DS (ft)	2813.20	Culv Exit Loss (ft)	1.62
Delta EG (ft)	2.27	Culv Entr Loss (ft)	0.60
Delta WS (ft)	2.78	Q Weir (cfs)	
E.G. IC (ft)	2815.73	Weir Sta Lft (ft)	
E.G. OC (ft)	2816.13	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2814.33	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2813.99	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.99	Min El Weir Flow (ft)	2822.01

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	830.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	7.63
Q Barrel (cfs)	276.67	Culv Vel DS (ft/s)	8.60
E.G. US. (ft)	2814.95	Culv Inv El Up (ft)	2811.00
W.S. US. (ft)	2814.82	Culv Inv El Dn (ft)	2811.00
E.G. DS (ft)	2813.15	Culv Frctn Ls (ft)	0.05

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  W.S. DS (ft)             2812.45    Culv Exit Loss (ft)         1.30
  Delta EG (ft)               1.80    Culv Entr Loss (ft)         0.45
  Delta WS (ft)               2.37    Q Weir (cfs)
  E.G. IC (ft)             2814.62    Weir Sta Lft (ft)
  E.G. OC (ft)             2814.95    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2813.59    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2813.30    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         2.30    Min El Weir Flow (ft)    2822.01


CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        510.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          6.36
  Q Barrel (cfs)            170.00    Culv Vel DS (ft/s)          7.31
  E.G. US. (ft)            2813.85    Culv Inv El Up (ft)      2811.00
  W.S. US. (ft)            2813.76    Culv Inv El Dn (ft)      2811.00
  E.G. DS (ft)             2812.56    Culv Frctn Ls (ft)          0.05
  W.S. DS (ft)             2812.04    Culv Exit Loss (ft)         0.94
  Delta EG (ft)               1.30    Culv Entr Loss (ft)         0.31
  Delta WS (ft)               1.72    Q Weir (cfs)
  E.G. IC (ft)             2813.60    Weir Sta Lft (ft)
  E.G. OC (ft)             2813.85    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2812.91    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2812.66    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.66    Min El Weir Flow (ft)    2822.01


CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 7738.6

INPUT
Description: Section 77+38.6 (d/s face of Olalee Rd.)
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2825  109.97    2824  122.81    2823  139.34    2822  150.37    2821
  167.82    2820  185.05    2819     203    2819     219    2811     312    2811
     328    2819     348    2819  414.35    2820  606.63    2825

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     203    .013     328    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           203     328            281.8   281.8   281.8             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     203    2820       T
     328  606.63    2820       T
Left Levee      Station=     203      Elevation=    2820
Right Levee     Station=     328      Elevation=    2820

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2817.14    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.38    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2816.76    Reach Len. (ft)           281.80     281.80     281.80
  Crit W.S. (ft)           2814.08    Flow Area (sq ft)                    601.58
```

E.G. Slope (ft/ft)	0.000214	Area (sq ft)		601.58	
Q Total (cfs)	2970.00	Flow (cfs)		2970.00	
Top Width (ft)	116.02	Top Width (ft)		116.02	
Vel Total (ft/s)	4.94	Avg. Vel. (ft/s)		4.94	
Max Chl Dpth (ft)	5.76	Hydr. Depth (ft)		5.18	
Conv. Total (cfs)	202834.3	Conv. (cfs)		202834.3	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		118.74	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	606.63	203.00	328.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.60	60.04	0.38
C & E Loss (ft)	0.04	Cum SA (acres)	0.54	12.36	0.23

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2816.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.013	
W.S. Elev (ft)	2816.04	Reach Len. (ft)	281.80	281.80	281.80
Crit W.S. (ft)	2813.90	Flow Area (sq ft)		519.17	
E.G. Slope (ft/ft)	0.000279	Area (sq ft)		519.17	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	113.15	Top Width (ft)		113.15	
Vel Total (ft/s)	5.20	Avg. Vel. (ft/s)		5.20	
Max Chl Dpth (ft)	5.04	Hydr. Depth (ft)		4.59	
Conv. Total (cfs)	161602.1	Conv. (cfs)		161602.1	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		115.53	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	606.63	203.00	328.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.38	54.06	0.28
C & E Loss (ft)	0.05	Cum SA (acres)	0.37	12.20	0.18

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2814.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.013	
W.S. Elev (ft)	2813.42	Reach Len. (ft)	281.80	281.80	281.80
Crit W.S. (ft)	2812.99	Flow Area (sq ft)		236.41	
E.G. Slope (ft/ft)	0.001028	Area (sq ft)		236.41	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	102.67	Top Width (ft)		102.67	
Vel Total (ft/s)	6.34	Avg. Vel. (ft/s)		6.34	
Max Chl Dpth (ft)	2.42	Hydr. Depth (ft)		2.30	
Conv. Total (cfs)	46775.9	Conv. (cfs)		46775.9	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		103.81	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	606.63	203.00	328.00
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	0.13	35.04	0.13
C & E Loss (ft)	0.16	Cum SA (acres)	0.11	11.50	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2811.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.51	Reach Len. (ft)	281.80	281.80	281.80
Crit W.S. (ft)	2811.51	Flow Area (sq ft)		47.60	
E.G. Slope (ft/ft)	0.003407	Area (sq ft)		47.60	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	95.03	Top Width (ft)		95.03	
Vel Total (ft/s)	4.20	Avg. Vel. (ft/s)		4.20	
Max Chl Dpth (ft)	0.51	Hydr. Depth (ft)		0.50	
Conv. Total (cfs)	3426.3	Conv. (cfs)		3426.3	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		95.26	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	606.63	203.00	328.00
Frctn Loss (ft)	1.79	Cum Volume (acre-ft)	0.01	9.00	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	10.38	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2813.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.013	
W.S. Elev (ft)	2813.20	Reach Len. (ft)	281.80	281.80	281.80
Crit W.S. (ft)	2812.89	Flow Area (sq ft)		214.32	
E.G. Slope (ft/ft)	0.001227	Area (sq ft)		214.32	
Q Total (cfs)	1400.00	Flow (cfs)		1400.00	
Top Width (ft)	101.80	Top Width (ft)		101.80	
Vel Total (ft/s)	6.53	Avg. Vel. (ft/s)		6.53	
Max Chl Dpth (ft)	2.20	Hydr. Depth (ft)		2.11	
Conv. Total (cfs)	39969.5	Conv. (cfs)		39969.5	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		102.84	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	606.63	203.00	328.00
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	0.13	35.27	0.13
C & E Loss (ft)	0.18	Cum SA (acres)	0.11	11.53	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2813.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.69	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.45	Reach Len. (ft)	281.80	281.80	281.80
Crit W.S. (ft)	2812.45	Flow Area (sq ft)		139.07	

E.G. Slope (ft/ft)	0.002190	Area (sq ft)		139.07	
Q Total (cfs)	930.00	Flow (cfs)		930.00	
Top Width (ft)	98.80	Top Width (ft)		98.80	
Vel Total (ft/s)	6.69	Avg. Vel. (ft/s)		6.69	
Max Chl Dpth (ft)	1.45	Hydr. Depth (ft)		1.41	
Conv. Total (cfs)	19874.2	Conv. (cfs)		19874.2	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		99.49	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	606.63	203.00	328.00
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)	0.08	26.40	0.08
C & E Loss (ft)	0.20	Cum SA (acres)	0.08	11.21	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2812.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.04	Reach Len. (ft)	281.80	281.80	281.80
Crit W.S. (ft)	2812.04	Flow Area (sq ft)		98.60	
E.G. Slope (ft/ft)	0.002525	Area (sq ft)		98.60	
Q Total (cfs)	570.00	Flow (cfs)		570.00	
Top Width (ft)	97.15	Top Width (ft)		97.15	
Vel Total (ft/s)	5.78	Avg. Vel. (ft/s)		5.78	
Max Chl Dpth (ft)	1.04	Hydr. Depth (ft)		1.01	
Conv. Total (cfs)	11344.5	Conv. (cfs)		11344.5	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		97.64	
Min Ch El (ft)	2811.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	606.63	203.00	328.00
Frctn Loss (ft)	0.93	Cum Volume (acre-ft)	0.04	18.97	0.04
C & E Loss (ft)	0.10	Cum SA (acres)	0.06	10.89	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7456.8

```
INPUT
Description: Section 74+56.8 (confluence w/trib.)
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2821  111.92    2820  119.07    2820     133    2820     153    2820
   175.5    2809     247    2809     269    2820     289    2820  289.47    2820
  368.26    2820   418.2    2820   461.9    2822

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     133    .016     153     .03     269    .016     289    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           153     269            189.8   189.8   189.8             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2817.00    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.31    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2816.69    Reach Len. (ft)           189.80     189.80     189.80
  Crit W.S. (ft)                      Flow Area (sq ft)                    669.77
  E.G. Slope (ft/ft)      0.000688    Area (sq ft)                         669.77
  Q Total (cfs)            2970.00    Flow (cfs)                          2970.00
  Top Width (ft)            102.62    Top Width (ft)                       102.62
  Vel Total (ft/s)            4.43    Avg. Vel. (ft/s)                       4.43
  Max Chl Dpth (ft)           7.69    Hydr. Depth (ft)                       6.53
  Conv. Total (cfs)       113227.5    Conv. (cfs)                        113227.5
  Length Wtd. (ft)          189.80    Wetted Per. (ft)                     106.22
  Min Ch El (ft)           2809.00    Shear (lb/sq ft)                       0.27
  Alpha                       1.00    Stream Power (lb/ft s)    461.90       0.00       0.00
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)        0.60      55.92       0.38
  C & E Loss (ft)             0.06    Cum SA (acres)              0.54      11.66       0.23


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2816.28    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.32    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2815.96    Reach Len. (ft)           189.80     189.80     189.80
  Crit W.S. (ft)                      Flow Area (sq ft)                    595.91
  E.G. Slope (ft/ft)      0.000805    Area (sq ft)                         595.91
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             99.67    Top Width (ft)                        99.67
  Vel Total (ft/s)            4.53    Avg. Vel. (ft/s)                       4.53
  Max Chl Dpth (ft)           6.96    Hydr. Depth (ft)                       5.98
  Conv. Total (cfs)        95170.8    Conv. (cfs)                         95170.8
  Length Wtd. (ft)          189.80    Wetted Per. (ft)                     102.92
  Min Ch El (ft)           2809.00    Shear (lb/sq ft)                       0.29
  Alpha                       1.00    Stream Power (lb/ft s)    461.90       0.00       0.00
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)        0.38      50.45       0.28
  C & E Loss (ft)             0.07    Cum SA (acres)              0.37      11.51       0.18


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2813.55    Element                   Left OB    Channel   Right OB
```

Vel Head (ft)	0.30	Wt. n-Val.		0.030	
W.S. Elev (ft)	2813.25	Reach Len. (ft)	189.80	189.80	189.80
Crit W.S. (ft)		Flow Area (sq ft)		340.09	
E.G. Slope (ft/ft)	0.001361	Area (sq ft)		340.09	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	88.68	Top Width (ft)		88.68	
Vel Total (ft/s)	4.41	Avg. Vel. (ft/s)		4.41	
Max Chl Dpth (ft)	4.25	Hydr. Depth (ft)		3.84	
Conv. Total (cfs)	40666.2	Conv. (cfs)		40666.2	
Length Wtd. (ft)	189.80	Wetted Per. (ft)		90.66	
Min Ch El (ft)	2809.00	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)	461.90	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	33.18	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	10.88	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2809.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.030	
W.S. Elev (ft)	2809.60	Reach Len. (ft)	189.80	189.80	189.80
Crit W.S. (ft)	2809.62	Flow Area (sq ft)		43.74	
E.G. Slope (ft/ft)	0.017242	Area (sq ft)		43.74	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	73.93	Top Width (ft)		73.93	
Vel Total (ft/s)	4.57	Avg. Vel. (ft/s)		4.57	
Max Chl Dpth (ft)	0.60	Hydr. Depth (ft)		0.59	
Conv. Total (cfs)	1523.1	Conv. (cfs)		1523.1	
Length Wtd. (ft)	189.80	Wetted Per. (ft)		74.21	
Min Ch El (ft)	2809.00	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)	461.90	0.00	0.00
Frctn Loss (ft)	1.84	Cum Volume (acre-ft)	0.01	8.70	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	9.83	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2813.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.030	
W.S. Elev (ft)	2813.01	Reach Len. (ft)	189.80	189.80	189.80
Crit W.S. (ft)		Flow Area (sq ft)		319.07	
E.G. Slope (ft/ft)	0.001443	Area (sq ft)		319.07	
Q Total (cfs)	1400.00	Flow (cfs)		1400.00	
Top Width (ft)	87.71	Top Width (ft)		87.71	
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)		4.39	
Max Chl Dpth (ft)	4.01	Hydr. Depth (ft)		3.64	
Conv. Total (cfs)	36856.8	Conv. (cfs)		36856.8	
Length Wtd. (ft)	189.80	Wetted Per. (ft)		89.59	
Min Ch El (ft)	2809.00	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)	461.90	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	33.54	0.13

C & E Loss (ft)	0.07	Cum SA (acres)	0.11	10.91	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2812.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.030	
W.S. Elev (ft)	2811.78	Reach Len. (ft)	189.80	189.80	189.80
Crit W.S. (ft)	2810.70	Flow Area (sq ft)		214.71	
E.G. Slope (ft/ft)	0.002190	Area (sq ft)		214.71	
Q Total (cfs)	930.00	Flow (cfs)		930.00	
Top Width (ft)	82.76	Top Width (ft)		82.76	
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)		4.33	
Max Chl Dpth (ft)	2.78	Hydr. Depth (ft)		2.59	
Conv. Total (cfs)	19871.0	Conv. (cfs)		19871.0	
Length Wtd. (ft)	189.80	Wetted Per. (ft)		84.06	
Min Ch El (ft)	2809.00	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)	461.90	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.08	25.26	0.08
C & E Loss (ft)	0.07	Cum SA (acres)	0.08	10.62	0.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2811.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.030	
W.S. Elev (ft)	2810.68	Reach Len. (ft)	189.80	189.80	189.80
Crit W.S. (ft)	2810.24	Flow Area (sq ft)		125.69	
E.G. Slope (ft/ft)	0.004519	Area (sq ft)		125.69	
Q Total (cfs)	570.00	Flow (cfs)		570.00	
Top Width (ft)	78.29	Top Width (ft)		78.29	
Vel Total (ft/s)	4.53	Avg. Vel. (ft/s)		4.53	
Max Chl Dpth (ft)	1.68	Hydr. Depth (ft)		1.61	
Conv. Total (cfs)	8479.2	Conv. (cfs)		8479.2	
Length Wtd. (ft)	189.80	Wetted Per. (ft)		79.07	
Min Ch El (ft)	2809.00	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)	461.90	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.04	18.24	0.04
C & E Loss (ft)	0.08	Cum SA (acres)	0.06	10.33	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7267

INPUT
Description: Section 72+67 (u/s face Kasota Rd.)
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2821	113.66	2820	128.71	2819	142.71	2818	156.74	2817
170	2817	188	2808	311	2808	329	2817	720	2817

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     170    .013     329    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           170     329             35.7    35.7    35.7             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     170    2820       T
     329     720    2820       T
Left Levee      Station=     170      Elevation=    2820
Right Levee     Station=     329      Elevation=    2820

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2816.92    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.09    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2816.83    Reach Len. (ft)             35.70      35.70      35.70
  Crit W.S. (ft)           2810.60    Flow Area (sq ft)                    1241.89
  E.G. Slope (ft/ft)      0.000029    Area (sq ft)                         1241.89
  Q Total (cfs)            2970.00    Flow (cfs)                           2970.00
  Top Width (ft)            158.32    Top Width (ft)                        158.32
  Vel Total (ft/s)            2.39    Avg. Vel. (ft/s)                        2.39
  Max Chl Dpth (ft)           8.83    Hydr. Depth (ft)                        7.84
  Conv. Total (cfs)       550781.0    Conv. (cfs)                         550781.0
  Length Wtd. (ft)           35.70    Wetted Per. (ft)                      162.49
  Min Ch El (ft)           2808.00    Shear (lb/sq ft)                        0.01
  Alpha                       1.00    Stream Power (lb/ft s)    720.00     170.00     329.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.60      51.76       0.38
  C & E Loss (ft)                     Cum SA (acres)              0.54      11.09       0.23


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2816.20    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.09    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2816.11    Reach Len. (ft)             35.70      35.70      35.70
  Crit W.S. (ft)           2810.44    Flow Area (sq ft)                    1128.52
  E.G. Slope (ft/ft)      0.000032    Area (sq ft)                         1128.52
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)            155.43    Top Width (ft)                        155.43
  Vel Total (ft/s)            2.39    Avg. Vel. (ft/s)                        2.39
  Max Chl Dpth (ft)           8.11    Hydr. Depth (ft)                        7.26
  Conv. Total (cfs)       475893.4    Conv. (cfs)                         475893.4
  Length Wtd. (ft)           35.70    Wetted Per. (ft)                      159.25
  Min Ch El (ft)           2808.00    Shear (lb/sq ft)                        0.01
  Alpha                       1.00    Stream Power (lb/ft s)    720.00     170.00     329.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.38      46.69       0.28
  C & E Loss (ft)                     Cum SA (acres)              0.37      10.95       0.18


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2813.46    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2813.39    Reach Len. (ft)             35.70      35.70      35.70
  Crit W.S. (ft)           2809.66    Flow Area (sq ft)                     720.88
  E.G. Slope (ft/ft)      0.000040    Area (sq ft)                          720.88
```

Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	144.55	Top Width (ft)		144.55	
Vel Total (ft/s)	2.08	Avg. Vel. (ft/s)		2.08	
Max Chl Dpth (ft)	5.39	Hydr. Depth (ft)		4.99	
Conv. Total (cfs)	237731.1	Conv. (cfs)		237731.1	
Length Wtd. (ft)	35.70	Wetted Per. (ft)		147.10	
Min Ch El (ft)	2808.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	720.00	170.00	329.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	30.86	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	10.38	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2809.46	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.44	Reach Len. (ft)	35.70	35.70	35.70
Crit W.S. (ft)	2808.43	Flow Area (sq ft)		180.91	
E.G. Slope (ft/ft)	0.000060	Area (sq ft)		180.91	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	128.75	Top Width (ft)		128.75	
Vel Total (ft/s)	1.11	Avg. Vel. (ft/s)		1.11	
Max Chl Dpth (ft)	1.44	Hydr. Depth (ft)		1.41	
Conv. Total (cfs)	25851.6	Conv. (cfs)		25851.6	
Length Wtd. (ft)	35.70	Wetted Per. (ft)		129.43	
Min Ch El (ft)	2808.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	720.00	170.00	329.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	8.21	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	9.39	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2813.21	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2813.15	Reach Len. (ft)	35.70	35.70	35.70
Crit W.S. (ft)	2809.58	Flow Area (sq ft)		686.41	
E.G. Slope (ft/ft)	0.000040	Area (sq ft)		686.41	
Q Total (cfs)	1400.00	Flow (cfs)		1400.00	
Top Width (ft)	143.60	Top Width (ft)		143.60	
Vel Total (ft/s)	2.04	Avg. Vel. (ft/s)		2.04	
Max Chl Dpth (ft)	5.15	Hydr. Depth (ft)		4.78	
Conv. Total (cfs)	220157.2	Conv. (cfs)		220157.2	
Length Wtd. (ft)	35.70	Wetted Per. (ft)		146.03	
Min Ch El (ft)	2808.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	720.00	170.00	329.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	31.35	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	10.41	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2811.98	Element			
Vel Head (ft)	0.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.93	Reach Len. (ft)	35.70	35.70	35.70

Crit W.S. (ft)	2809.20	Flow Area (sq ft)		513.73		
E.G. Slope (ft/ft)	0.000045	Area (sq ft)		513.73		
Q Total (cfs)	930.00	Flow (cfs)		930.00		
Top Width (ft)	138.70	Top Width (ft)		138.70		
Vel Total (ft/s)	1.81	Avg. Vel. (ft/s)		1.81		
Max Chl Dpth (ft)	3.93	Hydr. Depth (ft)		3.70		
Conv. Total (cfs)	139327.9	Conv. (cfs)		139327.9		
Length Wtd. (ft)	35.70	Wetted Per. (ft)		140.56		
Min Ch El (ft)	2808.00	Shear (lb/sq ft)		0.01		
Alpha	1.00	Stream Power (lb/ft s)	720.00	170.00	329.00	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	23.67	0.08	
C & E Loss (ft)		Cum SA (acres)	0.08	10.14	0.08	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2810.88	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.84	Reach Len. (ft)	35.70	35.70	35.70
Crit W.S. (ft)	2808.88	Flow Area (sq ft)		365.82	
E.G. Slope (ft/ft)	0.000050	Area (sq ft)		365.82	
Q Total (cfs)	570.00	Flow (cfs)		570.00	
Top Width (ft)	134.37	Top Width (ft)		134.37	
Vel Total (ft/s)	1.56	Avg. Vel. (ft/s)		1.56	
Max Chl Dpth (ft)	2.84	Hydr. Depth (ft)		2.72	
Conv. Total (cfs)	80988.6	Conv. (cfs)		80988.6	
Length Wtd. (ft)	35.70	Wetted Per. (ft)		135.71	
Min Ch El (ft)	2808.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	720.00	170.00	329.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	17.17	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	9.86	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 7249.1

INPUT
Description: Kasota Road
Distance from Upstream XS = .6
Deck/Roadway Width = 35
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 8

Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord	Sta Hi Cord	Lo Cord
128	2819	180	2819	245	2819
250	2819	315	2819	320	2819
380	2819	720	2819		

Upstream Bridge Cross Section Data
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2821	113.66	2820	128.71	2819	142.71	2818	156.74	2817
170	2817	188	2808	311	2808	329	2817	720	2817

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
     100    .035     170    .013     329    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           170     329             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     170    2820       T
     329     720    2820       T
Left Levee      Station=     170      Elevation=    2820
Right Levee     Station=     329      Elevation=    2820

Downstream  Deck/Roadway Coordinates
    num=       8
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     128    2819             180    2819             245    2819
     250    2819             315    2819             320    2819
     380    2819             720    2819

Downstream Bridge Cross Section Data
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2821  113.66    2820  128.71    2819  142.71    2818     150    2817
     170    2817     188    2808     311    2808     329    2817     349    2817
     720    2817

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     150    .016     170    .013     329    .016     349    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           170     329             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     170    2819       T
     329     720    2819       T
Left Levee      Station=     170      Elevation=    2819
Right Levee     Station=     329      Elevation=    2819

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       9      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  0    35.7     .013     .013        0                   .2                1
Number of Barrels =  3
Upstream   Elevation =  2808
Centerline Stations
    Sta.    Sta.    Sta.
     235     250     265
Downstream Elevation =  2808
Centerline Stations
    Sta.    Sta.    Sta.
     235     250     265
```

CULVERT OUTPUT Profile #100-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	2970.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	10.05
Q Barrel (cfs)	990.00	Culv Vel DS (ft/s)	10.19
E.G. US. (ft)	2816.92	Culv Inv El Up (ft)	2808.00
W.S. US. (ft)	2816.83	Culv Inv El Dn (ft)	2808.00
E.G. DS (ft)	2815.11	Culv Frctn Ls (ft)	0.05
W.S. DS (ft)	2814.94	Culv Exit Loss (ft)	1.44
Delta EG (ft)	1.81	Culv Entr Loss (ft)	0.31
Delta WS (ft)	1.89	Q Weir (cfs)	
E.G. IC (ft)	2816.68	Weir Sta Lft (ft)	
E.G. OC (ft)	2816.92	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2815.04	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2814.94	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.38	Min El Weir Flow (ft)	2819.01

CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	2700.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	10.40
Q Barrel (cfs)	900.00	Culv Vel DS (ft/s)	10.65
E.G. US. (ft)	2816.20	Culv Inv El Up (ft)	2808.00
W.S. US. (ft)	2816.11	Culv Inv El Dn (ft)	2808.00
E.G. DS (ft)	2814.21	Culv Frctn Ls (ft)	0.06
W.S. DS (ft)	2814.04	Culv Exit Loss (ft)	1.59
Delta EG (ft)	1.99	Culv Entr Loss (ft)	0.34
Delta WS (ft)	2.07	Q Weir (cfs)	
E.G. IC (ft)	2816.12	Weir Sta Lft (ft)	
E.G. OC (ft)	2816.20	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2814.18	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2814.04	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.04	Min El Weir Flow (ft)	2819.01

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	1500.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	9.24
Q Barrel (cfs)	500.00	Culv Vel DS (ft/s)	10.48
E.G. US. (ft)	2813.46	Culv Inv El Up (ft)	2808.00
W.S. US. (ft)	2813.39	Culv Inv El Dn (ft)	2808.00
E.G. DS (ft)	2811.58	Culv Frctn Ls (ft)	0.08
W.S. DS (ft)	2811.40	Culv Exit Loss (ft)	1.54
Delta EG (ft)	1.88	Culv Entr Loss (ft)	0.27
Delta WS (ft)	1.99	Q Weir (cfs)	
E.G. IC (ft)	2813.42	Weir Sta Lft (ft)	
E.G. OC (ft)	2813.46	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2811.87	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2811.41	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.41	Min El Weir Flow (ft)	2819.01

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	200.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	4.26
Q Barrel (cfs)	66.67	Culv Vel DS (ft/s)	5.35

```
  E.G. US. (ft)            2809.46    Culv Inv El Up (ft)      2808.00
  W.S. US. (ft)            2809.44    Culv Inv El Dn (ft)      2808.00
  E.G. DS (ft)             2808.65    Culv Frctn Ls (ft)          0.07
  W.S. DS (ft)             2808.43    Culv Exit Loss (ft)         0.69
  Delta EG (ft)               0.81    Culv Entr Loss (ft)         0.06
  Delta WS (ft)               1.01    Q Weir (cfs)
  E.G. IC (ft)             2809.38    Weir Sta Lft (ft)
  E.G. OC (ft)             2809.46    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2809.12    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2808.89    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         0.89    Min El Weir Flow (ft)    2819.01


CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1400.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          8.99
  Q Barrel (cfs)            466.67    Culv Vel DS (ft/s)          9.96
  E.G. US. (ft)            2813.21    Culv Inv El Up (ft)      2808.00
  W.S. US. (ft)            2813.15    Culv Inv El Dn (ft)      2808.00
  E.G. DS (ft)             2811.53    Culv Frctn Ls (ft)          0.08
  W.S. DS (ft)             2811.35    Culv Exit Loss (ft)         1.36
  Delta EG (ft)               1.69    Culv Entr Loss (ft)         0.25
  Delta WS (ft)               1.80    Q Weir (cfs)
  E.G. IC (ft)             2813.17    Weir Sta Lft (ft)
  E.G. OC (ft)             2813.21    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2811.71    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2811.35    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.26    Min El Weir Flow (ft)    2819.01


CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        930.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          7.74
  Q Barrel (cfs)            310.00    Culv Vel DS (ft/s)          8.93
  E.G. US. (ft)            2811.98    Culv Inv El Up (ft)      2808.00
  W.S. US. (ft)            2811.93    Culv Inv El Dn (ft)      2808.00
  E.G. DS (ft)             2810.31    Culv Frctn Ls (ft)          0.07
  W.S. DS (ft)             2810.09    Culv Exit Loss (ft)         1.41
  Delta EG (ft)               1.67    Culv Entr Loss (ft)         0.19
  Delta WS (ft)               1.83    Q Weir (cfs)
  E.G. IC (ft)             2811.91    Weir Sta Lft (ft)
  E.G. OC (ft)             2811.98    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2810.86    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2810.48    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         2.48    Min El Weir Flow (ft)    2819.01


CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        570.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          6.43
  Q Barrel (cfs)            190.00    Culv Vel DS (ft/s)          7.59
  E.G. US. (ft)            2810.88    Culv Inv El Up (ft)      2808.00
  W.S. US. (ft)            2810.84    Culv Inv El Dn (ft)      2808.00
  E.G. DS (ft)             2809.36    Culv Frctn Ls (ft)          0.07
  W.S. DS (ft)             2808.97    Culv Exit Loss (ft)         1.32
  Delta EG (ft)               1.52    Culv Entr Loss (ft)         0.13
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  Delta WS (ft)               1.88    Q Weir (cfs)
  E.G. IC (ft)             2810.80    Weir Sta Lft (ft)
  E.G. OC (ft)             2810.88    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2810.11    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2809.79    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.79    Min El Weir Flow (ft)    2819.01


CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 7231.3

INPUT
Description: Section 72+31.3 (d/s face Kasota Rd.)
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2821  113.66    2820  128.71    2819  142.71    2818     150    2817
     170    2817     188    2808     311    2808     329    2817     349    2817
     720    2817

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     150    .016     170    .013     329    .016     349    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           170     329            221.1   221.1   221.1             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     170    2819       T
     329     720    2819       T
Left Levee      Station=     170      Elevation=    2819
Right Levee     Station=     329      Elevation=    2819

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2815.11    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.17    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2814.94    Reach Len. (ft)           221.10     221.10     221.10
  Crit W.S. (ft)           2810.70    Flow Area (sq ft)                    950.01
  E.G. Slope (ft/ft)      0.000074    Area (sq ft)                         950.01
  Q Total (cfs)            3150.00    Flow (cfs)                          3150.00
  Top Width (ft)            150.76    Top Width (ft)                       150.76
  Vel Total (ft/s)            3.32    Avg. Vel. (ft/s)                       3.32
  Max Chl Dpth (ft)           6.94    Hydr. Depth (ft)                       6.30
  Conv. Total (cfs)       365185.9    Conv. (cfs)                        365185.9
  Length Wtd. (ft)          221.10    Wetted Per. (ft)                     154.04
  Min Ch El (ft)           2808.00    Shear (lb/sq ft)                       0.03
  Alpha                       1.00    Stream Power (lb/ft s)    720.00     170.00     329.00
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)        0.60      51.68       0.38
  C & E Loss (ft)             0.06    Cum SA (acres)              0.54      10.96       0.23


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2814.21    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.17    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2814.04    Reach Len. (ft)           221.10     221.10     221.10
  Crit W.S. (ft)           2810.43    Flow Area (sq ft)                    815.21
```

E.G. Slope (ft/ft)	0.000088	Area (sq ft)		815.21	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	147.14	Top Width (ft)		147.14	
Vel Total (ft/s)	3.31	Avg. Vel. (ft/s)		3.31	
Max Chl Dpth (ft)	6.04	Hydr. Depth (ft)		5.54	
Conv. Total (cfs)	288040.8	Conv. (cfs)		288040.8	
Length Wtd. (ft)	221.10	Wetted Per. (ft)		149.99	
Min Ch El (ft)	2808.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	720.00	170.00	329.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.38	46.62	0.28
C & E Loss (ft)	0.06	Cum SA (acres)	0.37	10.83	0.18

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2811.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.40	Reach Len. (ft)	221.10	221.10	221.10
Crit W.S. (ft)	2809.67	Flow Area (sq ft)		440.64	
E.G. Slope (ft/ft)	0.000189	Area (sq ft)		440.64	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	136.58	Top Width (ft)		136.58	
Vel Total (ft/s)	3.40	Avg. Vel. (ft/s)		3.40	
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)		3.23	
Conv. Total (cfs)	109115.9	Conv. (cfs)		109115.9	
Length Wtd. (ft)	221.10	Wetted Per. (ft)		138.18	
Min Ch El (ft)	2808.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	720.00	170.00	329.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.13	30.82	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	10.26	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2808.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.43	Reach Len. (ft)	221.10	221.10	221.10
Crit W.S. (ft)	2808.43	Flow Area (sq ft)		53.31	
E.G. Slope (ft/ft)	0.003353	Area (sq ft)		53.31	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	124.72	Top Width (ft)		124.72	
Vel Total (ft/s)	3.75	Avg. Vel. (ft/s)		3.75	
Max Chl Dpth (ft)	0.43	Hydr. Depth (ft)		0.43	
Conv. Total (cfs)	3454.1	Conv. (cfs)		3454.1	
Length Wtd. (ft)	221.10	Wetted Per. (ft)		124.92	
Min Ch El (ft)	2808.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	720.00	170.00	329.00
Frctn Loss (ft)	0.96	Cum Volume (acre-ft)	0.01	8.20	0.01
C & E Loss (ft)	0.07	Cum SA (acres)	0.03	9.29	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2811.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.35	Reach Len. (ft)	221.10	221.10	221.10
Crit W.S. (ft)	2809.63	Flow Area (sq ft)		434.11	
E.G. Slope (ft/ft)	0.000193	Area (sq ft)		434.11	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	136.39	Top Width (ft)		136.39	
Vel Total (ft/s)	3.41	Avg. Vel. (ft/s)		3.41	
Max Chl Dpth (ft)	3.35	Hydr. Depth (ft)		3.18	
Conv. Total (cfs)	106543.8	Conv. (cfs)		106543.8	
Length Wtd. (ft)	221.10	Wetted Per. (ft)		137.97	
Min Ch El (ft)	2808.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	720.00	170.00	329.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.13	31.31	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	10.29	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2810.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.09	Reach Len. (ft)	221.10	221.10	221.10
Crit W.S. (ft)	2809.26	Flow Area (sq ft)		266.40	
E.G. Slope (ft/ft)	0.000416	Area (sq ft)		266.40	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	131.38	Top Width (ft)		131.38	
Vel Total (ft/s)	3.72	Avg. Vel. (ft/s)		3.72	
Max Chl Dpth (ft)	2.09	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	48537.4	Conv. (cfs)		48537.4	
Length Wtd. (ft)	221.10	Wetted Per. (ft)		132.37	
Min Ch El (ft)	2808.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	720.00	170.00	329.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.08	23.64	0.08
C & E Loss (ft)	0.09	Cum SA (acres)	0.08	10.03	0.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2809.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.97	Reach Len. (ft)	221.10	221.10	221.10
Crit W.S. (ft)	2808.91	Flow Area (sq ft)		120.72	
E.G. Slope (ft/ft)	0.002098	Area (sq ft)		120.72	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	126.87	Top Width (ft)		126.87	
Vel Total (ft/s)	5.05	Avg. Vel. (ft/s)		5.05	
Max Chl Dpth (ft)	0.97	Hydr. Depth (ft)		0.95	
Conv. Total (cfs)	13317.9	Conv. (cfs)		13317.9	

Length Wtd. (ft)	221.10	Wetted Per. (ft)		127.32	
Min Ch El (ft)	2808.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	720.00	170.00	329.00
Frctn Loss (ft)	0.15	Cum Volume (acre-ft)	0.04	17.15	0.04
C & E Loss (ft)	0.18	Cum SA (acres)	0.06	9.76	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7010.2

INPUT
Description: Section 70+10.2
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2818	123	2815	143.65	2815	156	2815	172	2807
385	2807	401	2815	421	2815	428	2818		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	123	.016	156	.03	401	.016	421	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
156	401	208.7	208.7	208.7	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	156	2818	T
401	428	2818	T

Left Levee Station= 156 Elevation= 2818
Right Levee Station= 401 Elevation= 2818

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2815.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2814.99	Reach Len. (ft)	208.70	208.70	208.70
Crit W.S. (ft)	2808.88	Flow Area (sq ft)		1828.35	
E.G. Slope (ft/ft)	0.000085	Area (sq ft)		1828.35	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	244.94	Top Width (ft)		244.94	
Vel Total (ft/s)	1.72	Avg. Vel. (ft/s)		1.72	
Max Chl Dpth (ft)	7.99	Hydr. Depth (ft)		7.46	
Conv. Total (cfs)	342381.9	Conv. (cfs)		342381.9	
Length Wtd. (ft)	208.70	Wetted Per. (ft)		248.71	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	428.00	156.00	401.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.60	44.63	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.54	9.96	0.23

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2814.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2814.08	Reach Len. (ft)	208.70	208.70	208.70
Crit W.S. (ft)	2808.71	Flow Area (sq ft)		1607.96	
E.G. Slope (ft/ft)	0.000093	Area (sq ft)		1607.96	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	241.31	Top Width (ft)		241.31	
Vel Total (ft/s)	1.68	Avg. Vel. (ft/s)		1.68	
Max Chl Dpth (ft)	7.08	Hydr. Depth (ft)		6.66	
Conv. Total (cfs)	279443.5	Conv. (cfs)		279443.5	
Length Wtd. (ft)	208.70	Wetted Per. (ft)		244.66	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	428.00	156.00	401.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.38	40.47	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.37	9.84	0.18

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2811.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2811.43	Reach Len. (ft)	208.70	208.70	208.70
Crit W.S. (ft)	2808.16	Flow Area (sq ft)		983.11	
E.G. Slope (ft/ft)	0.000139	Area (sq ft)		983.11	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	230.72	Top Width (ft)		230.72	
Vel Total (ft/s)	1.53	Avg. Vel. (ft/s)		1.53	
Max Chl Dpth (ft)	4.43	Hydr. Depth (ft)		4.26	
Conv. Total (cfs)	127213.0	Conv. (cfs)		127213.0	
Length Wtd. (ft)	208.70	Wetted Per. (ft)		232.82	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	428.00	156.00	401.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	27.21	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	9.33	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2807.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	2807.43	Reach Len. (ft)	208.70	208.70	208.70
Crit W.S. (ft)	2807.30	Flow Area (sq ft)		92.73	
E.G. Slope (ft/ft)	0.005816	Area (sq ft)		92.73	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	214.73	Top Width (ft)		214.73	
Vel Total (ft/s)	2.16	Avg. Vel. (ft/s)		2.16	
Max Chl Dpth (ft)	0.43	Hydr. Depth (ft)		0.43	
Conv. Total (cfs)	2622.5	Conv. (cfs)		2622.5	
Length Wtd. (ft)	208.70	Wetted Per. (ft)		214.94	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	428.00	156.00	401.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01	7.83	0.01

C & E Loss (ft)	0.02	Cum SA (acres)	0.03	8.43	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2811.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2811.38	Reach Len. (ft)	208.70	208.70	208.70
Crit W.S. (ft)	2808.14	Flow Area (sq ft)		972.07	
E.G. Slope (ft/ft)	0.000140	Area (sq ft)		972.07	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	230.53	Top Width (ft)		230.53	
Vel Total (ft/s)	1.52	Avg. Vel. (ft/s)		1.52	
Max Chl Dpth (ft)	4.38	Hydr. Depth (ft)		4.22	
Conv. Total (cfs)	124918.4	Conv. (cfs)		124918.4	
Length Wtd. (ft)	208.70	Wetted Per. (ft)		232.60	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	428.00	156.00	401.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	27.74	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	9.36	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2810.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	2810.13	Reach Len. (ft)	208.70	208.70	208.70
Crit W.S. (ft)	2807.87	Flow Area (sq ft)		685.10	
E.G. Slope (ft/ft)	0.000195	Area (sq ft)		685.10	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	225.50	Top Width (ft)		225.50	
Vel Total (ft/s)	1.45	Avg. Vel. (ft/s)		1.45	
Max Chl Dpth (ft)	3.12	Hydr. Depth (ft)		3.04	
Conv. Total (cfs)	70873.0	Conv. (cfs)		70873.0	
Length Wtd. (ft)	208.70	Wetted Per. (ft)		226.97	
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	428.00	156.00	401.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.08	21.23	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	9.12	0.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2809.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	2809.00	Reach Len. (ft)	208.70	208.70	208.70
Crit W.S. (ft)	2807.63	Flow Area (sq ft)		433.35	

E.G. Slope (ft/ft)	0.000331	Area (sq ft)		433.35		
Q Total (cfs)	610.00	Flow (cfs)		610.00		
Top Width (ft)	220.99	Top Width (ft)		220.99		
Vel Total (ft/s)	1.41	Avg. Vel. (ft/s)		1.41		
Max Chl Dpth (ft)	2.00	Hydr. Depth (ft)		1.96		
Conv. Total (cfs)	33532.3	Conv. (cfs)		33532.3		
Length Wtd. (ft)	208.70	Wetted Per. (ft)		221.93		
Min Ch El (ft)	2807.00	Shear (lb/sq ft)		0.04		
Alpha	1.00	Stream Power (lb/ft s)	428.00	156.00	401.00	
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.04	15.74	0.04	
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	8.87	0.06	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6801.5

INPUT
Description: Section 68+01.5 (U/S face of Tuscola Rd.)
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2815	112.62	2814	127.02	2813	168	2812	180	2806
310	2806	322	2812	550.8	2813	633.9	2815		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	168	.013	322	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
168	322	31.8	31.8	31.8	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	168	2818	T
322	633.9	2818	T

Left Levee Station= 168 Elevation= 2818
Right Levee Station= 322 Elevation= 2818

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2815.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2814.93	Reach Len. (ft)	31.80	31.80	31.80
Crit W.S. (ft)	2808.60	Flow Area (sq ft)		1302.68	
E.G. Slope (ft/ft)	0.000028	Area (sq ft)		1302.68	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	154.00	Top Width (ft)		154.00	
Vel Total (ft/s)	2.42	Avg. Vel. (ft/s)		2.42	
Max Chl Dpth (ft)	8.93	Hydr. Depth (ft)		8.46	
Conv. Total (cfs)	595959.3	Conv. (cfs)		595959.3	
Length Wtd. (ft)	31.80	Wetted Per. (ft)		162.69	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	633.90	168.00	322.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.60	37.13	0.38
C & E Loss (ft)		Cum SA (acres)	0.54	9.00	0.23

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2814.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2814.03	Reach Len. (ft)	31.80	31.80	31.80
Crit W.S. (ft)	2808.34	Flow Area (sq ft)		1163.80	
E.G. Slope (ft/ft)	0.000029	Area (sq ft)		1163.80	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	154.00	Top Width (ft)		154.00	
Vel Total (ft/s)	2.32	Avg. Vel. (ft/s)		2.32	
Max Chl Dpth (ft)	8.02	Hydr. Depth (ft)		7.56	
Conv. Total (cfs)	497556.3	Conv. (cfs)		497556.3	
Length Wtd. (ft)	31.80	Wetted Per. (ft)		160.88	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	633.90	168.00	322.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.38	33.83	0.28
C & E Loss (ft)		Cum SA (acres)	0.37	8.89	0.18

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2811.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.39	Reach Len. (ft)	31.80	31.80	31.80
Crit W.S. (ft)	2807.60	Flow Area (sq ft)		758.97	
E.G. Slope (ft/ft)	0.000036	Area (sq ft)		758.97	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	151.56	Top Width (ft)		151.56	
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)		1.98	
Max Chl Dpth (ft)	5.39	Hydr. Depth (ft)		5.01	
Conv. Total (cfs)	251116.6	Conv. (cfs)		251116.6	
Length Wtd. (ft)	31.80	Wetted Per. (ft)		154.11	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	633.90	168.00	322.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	23.03	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	8.41	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2807.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.43	Reach Len. (ft)	31.80	31.80	31.80
Crit W.S. (ft)	2806.42	Flow Area (sq ft)		190.58	
E.G. Slope (ft/ft)	0.000054	Area (sq ft)		190.58	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	135.74	Top Width (ft)		135.74	
Vel Total (ft/s)	1.05	Avg. Vel. (ft/s)		1.05	
Max Chl Dpth (ft)	1.43	Hydr. Depth (ft)		1.40	
Conv. Total (cfs)	27222.6	Conv. (cfs)		27222.6	
Length Wtd. (ft)	31.80	Wetted Per. (ft)		136.41	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	633.90	168.00	322.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	7.15	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	7.59	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2811.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.34	Reach Len. (ft)	31.80	31.80	31.80
Crit W.S. (ft)	2807.58	Flow Area (sq ft)		751.72	
E.G. Slope (ft/ft)	0.000036	Area (sq ft)		751.72	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	151.37	Top Width (ft)		151.37	
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)		1.97	
Max Chl Dpth (ft)	5.34	Hydr. Depth (ft)		4.97	
Conv. Total (cfs)	247361.5	Conv. (cfs)		247361.5	
Length Wtd. (ft)	31.80	Wetted Per. (ft)		153.90	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	633.90	168.00	322.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	23.61	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	8.45	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2810.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.09	Reach Len. (ft)	31.80	31.80	31.80
Crit W.S. (ft)	2807.21	Flow Area (sq ft)		565.53	
E.G. Slope (ft/ft)	0.000039	Area (sq ft)		565.53	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	146.37	Top Width (ft)		146.37	
Vel Total (ft/s)	1.75	Avg. Vel. (ft/s)		1.75	
Max Chl Dpth (ft)	4.09	Hydr. Depth (ft)		3.86	
Conv. Total (cfs)	157776.1	Conv. (cfs)		157776.1	
Length Wtd. (ft)	31.80	Wetted Per. (ft)		148.30	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	633.90	168.00	322.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	18.23	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	8.23	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2809.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.97	Reach Len. (ft)	31.80	31.80	31.80
Crit W.S. (ft)	2806.88	Flow Area (sq ft)		404.05	
E.G. Slope (ft/ft)	0.000044	Area (sq ft)		404.05	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	141.89	Top Width (ft)		141.89	
Vel Total (ft/s)	1.51	Avg. Vel. (ft/s)		1.51	
Max Chl Dpth (ft)	2.97	Hydr. Depth (ft)		2.85	
Conv. Total (cfs)	92178.2	Conv. (cfs)		92178.2	
Length Wtd. (ft)	31.80	Wetted Per. (ft)		143.29	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	633.90	168.00	322.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	13.74	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	8.00	0.06

```
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CULVERT


RIVER: Desert Knolls Wa
REACH: Main               RS: 6785.6

INPUT
Description: Tuscola Road
Distance from Upstream XS =      .2
Deck/Roadway Width        =    31.5
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100  2817.5             200  2817.5             280  2817.5
     333  2817.5             400  2817.5             634  2817.5

Upstream Bridge Cross Section Data
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2815  112.62    2814  127.02    2813     168    2812     180    2806
     310    2806     322    2812   550.8    2813   633.9    2815

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     168    .013     322    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           168     322             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     168    2818       T
     322   633.9    2818       T
Left Levee      Station=     168      Elevation=    2818
Right Levee     Station=     322      Elevation=    2818

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100  2817.5             200  2817.5             280  2817.5
     333  2817.5             400  2817.5             634  2817.5

Downstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2815  112.62    2814  127.02    2813  144.82    2812  158.44    2811
     196    2810     200    2806     290    2806     294    2810  396.13  2810.5
  435.17    2811   550.8    2813   633.9    2815

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     196    .013     294    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           196     294             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     196  2817.5       T
     294   633.9  2817.5       T
Left Levee      Station=     196      Elevation=  2817.5
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Right Levee     Station=     294      Elevation=  2817.5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box     9.5      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  0    31.8     .013     .013        0                   .2                1
Number of Barrels =  3
Upstream   Elevation =  2806
Centerline Stations
    Sta.    Sta.    Sta.
   231.5   246.5   261.5
Downstream Elevation =  2806
Centerline Stations
    Sta.    Sta.    Sta.
   231.5   246.5   261.5

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       3150.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         12.15
  Q Barrel (cfs)           1050.00    Culv Vel DS (ft/s)         13.42
  E.G. US. (ft)            2815.02    Culv Inv El Up (ft)      2806.00
  W.S. US. (ft)            2814.93    Culv Inv El Dn (ft)      2806.00
  E.G. DS (ft)             2810.93    Culv Frctn Ls (ft)          0.08
  W.S. DS (ft)             2809.33    Culv Exit Loss (ft)         3.46
  Delta EG (ft)               4.09    Culv Entr Loss (ft)         0.55
  Delta WS (ft)               5.60    Q Weir (cfs)
  E.G. IC (ft)             2815.02    Weir Sta Lft (ft)
  E.G. OC (ft)             2814.92    Weir Sta Rgt (ft)
  Culvert Control            Inlet    Weir Submerg
  Culv WS Inlet (ft)       2812.18    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2811.59    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.59    Min El Weir Flow (ft)    2817.51


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2700.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         11.50
  Q Barrel (cfs)            900.00    Culv Vel DS (ft/s)         12.74
  E.G. US. (ft)            2814.11    Culv Inv El Up (ft)      2806.00
  W.S. US. (ft)            2814.03    Culv Inv El Dn (ft)      2806.00
  E.G. DS (ft)             2810.45    Culv Frctn Ls (ft)          0.08
  W.S. DS (ft)             2809.02    Culv Exit Loss (ft)         3.11
  Delta EG (ft)               3.65    Culv Entr Loss (ft)         0.46
  Delta WS (ft)               5.01    Q Weir (cfs)
  E.G. IC (ft)             2814.11    Weir Sta Lft (ft)
  E.G. OC (ft)             2814.05    Weir Sta Rgt (ft)
  Culvert Control            Inlet    Weir Submerg
  Culv WS Inlet (ft)       2811.59    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2811.04    Weir Avg Depth (ft)
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  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)
  Culv Crt Depth (ft)          5.04    Min El Weir Flow (ft)    2817.51


CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)        1500.00    Culv Full Len (ft)
  # Barrels                       3    Culv Vel US (ft/s)          9.30
  Q Barrel (cfs)             500.00    Culv Vel DS (ft/s)         10.48
  E.G. US. (ft)             2811.45    Culv Inv El Up (ft)      2806.00
  W.S. US. (ft)             2811.39    Culv Inv El Dn (ft)      2806.00
  E.G. DS (ft)              2809.03    Culv Frctn Ls (ft)          0.07
  W.S. DS (ft)              2808.05    Culv Exit Loss (ft)         2.08
  Delta EG (ft)                2.42    Culv Entr Loss (ft)         0.27
  Delta WS (ft)                3.34    Q Weir (cfs)
  E.G. IC (ft)              2811.42    Weir Sta Lft (ft)
  E.G. OC (ft)              2811.45    Weir Sta Rgt (ft)
  Culvert Control            Outlet    Weir Submerg
  Culv WS Inlet (ft)        2809.84    Weir Max Depth (ft)
  Culv WS Outlet (ft)       2809.41    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)
  Culv Crt Depth (ft)          3.41    Min El Weir Flow (ft)    2817.51


CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)         200.00    Culv Full Len (ft)
  # Barrels                       3    Culv Vel US (ft/s)          4.30
  Q Barrel (cfs)              66.67    Culv Vel DS (ft/s)          5.35
  E.G. US. (ft)             2807.45    Culv Inv El Up (ft)      2806.00
  W.S. US. (ft)             2807.43    Culv Inv El Dn (ft)      2806.00
  E.G. DS (ft)              2806.80    Culv Frctn Ls (ft)          0.06
  W.S. DS (ft)              2806.53    Culv Exit Loss (ft)         0.53
  Delta EG (ft)                0.65    Culv Entr Loss (ft)         0.06
  Delta WS (ft)                0.90    Q Weir (cfs)
  E.G. IC (ft)              2807.38    Weir Sta Lft (ft)
  E.G. OC (ft)              2807.45    Weir Sta Rgt (ft)
  Culvert Control            Outlet    Weir Submerg
  Culv WS Inlet (ft)        2807.11    Weir Max Depth (ft)
  Culv WS Outlet (ft)       2806.89    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)
  Culv Crt Depth (ft)          0.89    Min El Weir Flow (ft)    2817.51


CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        1480.00    Culv Full Len (ft)
  # Barrels                       3    Culv Vel US (ft/s)          9.25
  Q Barrel (cfs)             493.33    Culv Vel DS (ft/s)         10.43
  E.G. US. (ft)             2811.40    Culv Inv El Up (ft)      2806.00
  W.S. US. (ft)             2811.34    Culv Inv El Dn (ft)      2806.00
  E.G. DS (ft)              2809.00    Culv Frctn Ls (ft)          0.07
  W.S. DS (ft)              2808.03    Culv Exit Loss (ft)         2.06
  Delta EG (ft)                2.40    Culv Entr Loss (ft)         0.27
  Delta WS (ft)                3.32    Q Weir (cfs)
  E.G. IC (ft)              2811.37    Weir Sta Lft (ft)
  E.G. OC (ft)              2811.40    Weir Sta Rgt (ft)
  Culvert Control            Outlet    Weir Submerg
  Culv WS Inlet (ft)        2809.81    Weir Max Depth (ft)
  Culv WS Outlet (ft)       2809.38    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)
  Culv Crt Depth (ft)          3.38    Min El Weir Flow (ft)    2817.51


CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1
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  Q Culv Group (cfs)        990.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          7.98
  Q Barrel (cfs)            330.00    Culv Vel DS (ft/s)          9.12
  E.G. US. (ft)            2810.14    Culv Inv El Up (ft)      2806.00
  W.S. US. (ft)            2810.09    Culv Inv El Dn (ft)      2806.00
  E.G. DS (ft)             2808.31    Culv Frctn Ls (ft)          0.07
  W.S. DS (ft)             2807.56    Culv Exit Loss (ft)         1.57
  Delta EG (ft)               1.83    Culv Entr Loss (ft)         0.20
  Delta WS (ft)               2.53    Q Weir (cfs)
  E.G. IC (ft)             2810.08    Weir Sta Lft (ft)
  E.G. OC (ft)             2810.14    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2808.95    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2808.58    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         2.58    Min El Weir Flow (ft)    2817.51


CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        610.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          6.65
  Q Barrel (cfs)            203.33    Culv Vel DS (ft/s)          7.76
  E.G. US. (ft)            2809.01    Culv Inv El Up (ft)      2806.00
  W.S. US. (ft)            2808.97    Culv Inv El Dn (ft)      2806.00
  E.G. DS (ft)             2807.68    Culv Frctn Ls (ft)          0.06
  W.S. DS (ft)             2807.13    Culv Exit Loss (ft)         1.13
  Delta EG (ft)               1.33    Culv Entr Loss (ft)         0.14
  Delta WS (ft)               1.85    Q Weir (cfs)
  E.G. IC (ft)             2808.93    Weir Sta Lft (ft)
  E.G. OC (ft)             2809.01    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2808.18    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2807.87    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.87    Min El Weir Flow (ft)    2817.51


CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 6769.7

INPUT
Description: Section 67+69.7 (D/S face of Tuscola Rd.)
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2815  112.62    2814  127.02    2813  144.82    2812  158.44    2811
     196    2810     200    2806     290    2806     294    2810  396.13  2810.5
  435.17    2811   550.8    2813   633.9    2815

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     196    .013     294    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           196     294               .6      .6      .6             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     196  2817.5       T
     294   633.9  2817.5       T
Left Levee      Station=     196      Elevation=  2817.5
Right Levee     Station=     294      Elevation=  2817.5
```

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2810.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.60	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.33	Reach Len. (ft)	0.60	0.60	0.60
Crit W.S. (ft)	2809.33	Flow Area (sq ft)		310.35	
E.G. Slope (ft/ft)	0.001728	Area (sq ft)		310.35	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	96.65	Top Width (ft)		96.65	
Vel Total (ft/s)	10.15	Avg. Vel. (ft/s)		10.15	
Max Chl Dpth (ft)	3.33	Hydr. Depth (ft)		3.21	
Conv. Total (cfs)	75775.0	Conv. (cfs)		75775.0	
Length Wtd. (ft)	0.60	Wetted Per. (ft)		99.41	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)	633.90	196.00	294.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.60	37.07	0.38
C & E Loss (ft)	0.36	Cum SA (acres)	0.54	8.91	0.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2810.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.44	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.02	Reach Len. (ft)	0.60	0.60	0.60
Crit W.S. (ft)	2809.02	Flow Area (sq ft)		280.78	
E.G. Slope (ft/ft)	0.001752	Area (sq ft)		280.78	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	96.04	Top Width (ft)		96.04	
Vel Total (ft/s)	9.62	Avg. Vel. (ft/s)		9.62	
Max Chl Dpth (ft)	3.02	Hydr. Depth (ft)		2.92	
Conv. Total (cfs)	64505.7	Conv. (cfs)		64505.7	
Length Wtd. (ft)	0.60	Wetted Per. (ft)		98.54	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	633.90	196.00	294.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.38	33.78	0.28
C & E Loss (ft)	0.32	Cum SA (acres)	0.37	8.80	0.18

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2809.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.98	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.05	Reach Len. (ft)	0.60	0.60	0.60
Crit W.S. (ft)	2808.05	Flow Area (sq ft)		188.50	
E.G. Slope (ft/ft)	0.001966	Area (sq ft)		188.50	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	94.10	Top Width (ft)		94.10	
Vel Total (ft/s)	7.96	Avg. Vel. (ft/s)		7.96	
Max Chl Dpth (ft)	2.05	Hydr. Depth (ft)		2.00	
Conv. Total (cfs)	33833.9	Conv. (cfs)		33833.9	
Length Wtd. (ft)	0.60	Wetted Per. (ft)		95.79	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)	633.90	196.00	294.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	23.00	0.13
C & E Loss (ft)	0.04	Cum SA (acres)	0.11	8.32	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2806.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.013	
W.S. Elev (ft)	2806.53	Reach Len. (ft)	0.60	0.60	0.60
Crit W.S. (ft)	2806.53	Flow Area (sq ft)		48.23	
E.G. Slope (ft/ft)	0.003092	Area (sq ft)		48.23	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	91.07	Top Width (ft)		91.07	
Vel Total (ft/s)	4.15	Avg. Vel. (ft/s)		4.15	
Max Chl Dpth (ft)	0.53	Hydr. Depth (ft)		0.53	
Conv. Total (cfs)	3596.8	Conv. (cfs)		3596.8	
Length Wtd. (ft)	0.60	Wetted Per. (ft)		91.51	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	633.90	196.00	294.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	7.14	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	7.50	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2809.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.98	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.03	Reach Len. (ft)	0.60	0.60	0.60
Crit W.S. (ft)	2808.03	Flow Area (sq ft)		186.62	
E.G. Slope (ft/ft)	0.001977	Area (sq ft)		186.62	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	94.06	Top Width (ft)		94.06	
Vel Total (ft/s)	7.93	Avg. Vel. (ft/s)		7.93	
Max Chl Dpth (ft)	2.03	Hydr. Depth (ft)		1.98	
Conv. Total (cfs)	33285.5	Conv. (cfs)		33285.5	
Length Wtd. (ft)	0.60	Wetted Per. (ft)		95.74	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)	633.90	196.00	294.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	23.58	0.13
C & E Loss (ft)	0.04	Cum SA (acres)	0.11	8.36	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2808.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.56	Reach Len. (ft)	0.60	0.60	0.60
Crit W.S. (ft)	2807.56	Flow Area (sq ft)		142.79	
E.G. Slope (ft/ft)	0.002119	Area (sq ft)		142.79	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	93.12	Top Width (ft)		93.12	
Vel Total (ft/s)	6.93	Avg. Vel. (ft/s)		6.93	
Max Chl Dpth (ft)	1.56	Hydr. Depth (ft)		1.53	
Conv. Total (cfs)	21505.6	Conv. (cfs)		21505.6	
Length Wtd. (ft)	0.60	Wetted Per. (ft)		94.41	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.20	

Alpha	1.00	Stream Power (lb/ft s)	633.90	196.00	294.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	18.20	0.08
C & E Loss (ft)	0.03	Cum SA (acres)	0.08	8.14	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2807.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.13	Reach Len. (ft)	0.60	0.60	0.60
Crit W.S. (ft)	2807.13	Flow Area (sq ft)		102.70	
E.G. Slope (ft/ft)	0.002372	Area (sq ft)		102.70	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	92.25	Top Width (ft)		92.25	
Vel Total (ft/s)	5.94	Avg. Vel. (ft/s)		5.94	
Max Chl Dpth (ft)	1.13	Hydr. Depth (ft)		1.11	
Conv. Total (cfs)	12523.8	Conv. (cfs)		12523.8	
Length Wtd. (ft)	0.60	Wetted Per. (ft)		93.19	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	633.90	196.00	294.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	13.72	0.04
C & E Loss (ft)	0.02	Cum SA (acres)	0.06	7.92	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6769.1

INPUT

```
Description: Section 67+69.1
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2815  112.62    2814  127.02    2813  144.82    2812  158.44    2811
     200    2810     220    2810     232  2804.3     301  2804.3     313    2810
     333    2810  396.13  2810.5

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     200    .016     220     .03     313    .016     333    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           220     313            213.3   213.3   213.3             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     220  2810.5       T
     313  396.13  2810.5       T
Left Levee      Station=     220      Elevation=  2810.5
Right Levee     Station=     313      Elevation=  2810.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2810.43    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               3.22    Wt. n-Val.                             0.030
  W.S. Elev (ft)           2807.21    Reach Len. (ft)            213.30     213.30     213.30
  Crit W.S. (ft)           2808.17    Flow Area (sq ft)                     218.61
  E.G. Slope (ft/ft)      0.023104    Area (sq ft)                          218.61
  Q Total (cfs)            3150.00    Flow (cfs)                           3150.00
  Top Width (ft)             81.25    Top Width (ft)                         81.25
  Vel Total (ft/s)           14.41    Avg. Vel. (ft/s)                       14.41
  Max Chl Dpth (ft)           2.91    Hydr. Depth (ft)                        2.69
  Conv. Total (cfs)        20723.6    Conv. (cfs)                          20723.6
  Length Wtd. (ft)          213.30    Wetted Per. (ft)                       82.56
  Min Ch El (ft)           2804.30    Shear (lb/sq ft)                        3.82
  Alpha                       1.00    Stream Power (lb/ft s)     396.13     220.00     313.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)         0.60      37.06       0.38
  C & E Loss (ft)             0.49    Cum SA (acres)               0.54       8.91       0.23


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2809.96    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               3.08    Wt. n-Val.                             0.030
  W.S. Elev (ft)           2806.88    Reach Len. (ft)            213.30     213.30     213.30
  Crit W.S. (ft)           2807.81    Flow Area (sq ft)                     191.61
  E.G. Slope (ft/ft)      0.025679    Area (sq ft)                          191.61
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             79.84    Top Width (ft)                         79.84
  Vel Total (ft/s)           14.09    Avg. Vel. (ft/s)                       14.09
  Max Chl Dpth (ft)           2.57    Hydr. Depth (ft)                        2.40
  Conv. Total (cfs)        16849.2    Conv. (cfs)                          16849.2
  Length Wtd. (ft)          213.30    Wetted Per. (ft)                       81.00
  Min Ch El (ft)           2804.30    Shear (lb/sq ft)                        3.79
  Alpha                       1.00    Stream Power (lb/ft s)     396.13     220.00     313.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)         0.38      33.78       0.28
```

C & E Loss (ft)	0.49	Cum SA (acres)	0.37	8.80	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2808.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.64	Wt. n-Val.		0.030	
W.S. Elev (ft)	2805.89	Reach Len. (ft)	213.30	213.30	213.30
Crit W.S. (ft)	2806.69	Flow Area (sq ft)		115.04	
E.G. Slope (ft/ft)	0.040164	Area (sq ft)		115.04	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	75.70	Top Width (ft)		75.70	
Vel Total (ft/s)	13.04	Avg. Vel. (ft/s)		13.04	
Max Chl Dpth (ft)	1.59	Hydr. Depth (ft)		1.52	
Conv. Total (cfs)	7484.7	Conv. (cfs)		7484.7	
Length Wtd. (ft)	213.30	Wetted Per. (ft)		76.41	
Min Ch El (ft)	2804.30	Shear (lb/sq ft)		3.77	
Alpha	1.00	Stream Power (lb/ft s)	396.13	220.00	313.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	22.99	0.13
C & E Loss (ft)	0.50	Cum SA (acres)	0.11	8.32	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2806.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.77	Wt. n-Val.		0.030	
W.S. Elev (ft)	2804.57	Reach Len. (ft)	213.30	213.30	213.30
Crit W.S. (ft)	2804.93	Flow Area (sq ft)		18.73	
E.G. Slope (ft/ft)	0.270701	Area (sq ft)		18.73	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	70.13	Top Width (ft)		70.13	
Vel Total (ft/s)	10.68	Avg. Vel. (ft/s)		10.68	
Max Chl Dpth (ft)	0.27	Hydr. Depth (ft)		0.27	
Conv. Total (cfs)	384.4	Conv. (cfs)		384.4	
Length Wtd. (ft)	213.30	Wetted Per. (ft)		70.26	
Min Ch El (ft)	2804.30	Shear (lb/sq ft)		4.51	
Alpha	1.00	Stream Power (lb/ft s)	396.13	220.00	313.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	7.14	0.01
C & E Loss (ft)	0.45	Cum SA (acres)	0.03	7.50	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2808.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.63	Wt. n-Val.		0.030	
W.S. Elev (ft)	2805.87	Reach Len. (ft)	213.30	213.30	213.30
Crit W.S. (ft)	2806.68	Flow Area (sq ft)		113.69	
E.G. Slope (ft/ft)	0.040608	Area (sq ft)		113.69	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	75.62	Top Width (ft)		75.62	
Vel Total (ft/s)	13.02	Avg. Vel. (ft/s)		13.02	
Max Chl Dpth (ft)	1.57	Hydr. Depth (ft)		1.50	
Conv. Total (cfs)	7344.4	Conv. (cfs)		7344.4	
Length Wtd. (ft)	213.30	Wetted Per. (ft)		76.33	
Min Ch El (ft)	2804.30	Shear (lb/sq ft)		3.78	
Alpha	1.00	Stream Power (lb/ft s)	396.13	220.00	313.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	23.57	0.13
C & E Loss (ft)	0.50	Cum SA (acres)	0.11	8.36	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2807.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.39	Wt. n-Val.		0.030	
W.S. Elev (ft)	2805.42	Reach Len. (ft)	213.30	213.30	213.30
Crit W.S. (ft)	2806.14	Flow Area (sq ft)		79.79	
E.G. Slope (ft/ft)	0.056983	Area (sq ft)		79.79	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	73.71	Top Width (ft)		73.71	
Vel Total (ft/s)	12.41	Avg. Vel. (ft/s)		12.41	
Max Chl Dpth (ft)	1.12	Hydr. Depth (ft)		1.08	
Conv. Total (cfs)	4147.3	Conv. (cfs)		4147.3	
Length Wtd. (ft)	213.30	Wetted Per. (ft)		74.21	
Min Ch El (ft)	2804.30	Shear (lb/sq ft)		3.82	
Alpha	1.00	Stream Power (lb/ft s)	396.13	220.00	313.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	18.20	0.08
C & E Loss (ft)	0.49	Cum SA (acres)	0.08	8.14	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2807.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.15	Wt. n-Val.		0.030	
W.S. Elev (ft)	2805.03	Reach Len. (ft)	213.30	213.30	213.30
Crit W.S. (ft)	2805.63	Flow Area (sq ft)		51.79	
E.G. Slope (ft/ft)	0.088429	Area (sq ft)		51.79	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	72.09	Top Width (ft)		72.09	
Vel Total (ft/s)	11.78	Avg. Vel. (ft/s)		11.78	
Max Chl Dpth (ft)	0.73	Hydr. Depth (ft)		0.72	
Conv. Total (cfs)	2051.3	Conv. (cfs)		2051.3	
Length Wtd. (ft)	213.30	Wetted Per. (ft)		72.42	
Min Ch El (ft)	2804.30	Shear (lb/sq ft)		3.95	
Alpha	1.00	Stream Power (lb/ft s)	396.13	220.00	313.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	13.72	0.04
C & E Loss (ft)	0.48	Cum SA (acres)	0.06	7.92	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6555.8

INPUT
Description: Section 65+55.8
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2812	112.03	2811	131.49	2810	179	2809.8	199	2809.8
213	2802.8	346	2802.8	360	2809.8	380	2809.8	423.52	2809

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	179	.016	199	.03	360	.016	380	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
199	360	15.8	15.8	15.8	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	199	2811	T
360	423.52	2811	T

Left Levee Station= 199 Elevation= 2811
Right Levee Station= 360 Elevation= 2811

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2808.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.030	
W.S. Elev (ft)	2807.83	Reach Len. (ft)	15.80	15.80	15.80
Crit W.S. (ft)	2805.38	Flow Area (sq ft)		719.86	
E.G. Slope (ft/ft)	0.001012	Area (sq ft)		719.86	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	153.13	Top Width (ft)		153.13	
Vel Total (ft/s)	4.38	Avg. Vel. (ft/s)		4.38	
Max Chl Dpth (ft)	5.03	Hydr. Depth (ft)		4.70	

Conv. Total (cfs)	99036.1	Conv. (cfs)		99036.1	
Length Wtd. (ft)	15.80	Wetted Per. (ft)		155.50	
Min Ch El (ft)	2802.80	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)	423.52	199.00	360.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.60	34.76	0.38
C & E Loss (ft)	0.01	Cum SA (acres)	0.54	8.33	0.23

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2807.28	Element			
Vel Head (ft)	0.33	Wt. n-Val.		0.030	
W.S. Elev (ft)	2806.95	Reach Len. (ft)	15.80	15.80	15.80
Crit W.S. (ft)	2805.13	Flow Area (sq ft)		586.09	
E.G. Slope (ft/ft)	0.001425	Area (sq ft)		586.09	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	149.59	Top Width (ft)		149.59	
Vel Total (ft/s)	4.61	Avg. Vel. (ft/s)		4.61	
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)		3.92	
Conv. Total (cfs)	71522.3	Conv. (cfs)		71522.3	
Length Wtd. (ft)	15.80	Wetted Per. (ft)		151.55	
Min Ch El (ft)	2802.80	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)	423.52	199.00	360.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.38	31.87	0.28
C & E Loss (ft)	0.01	Cum SA (acres)	0.37	8.24	0.18

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2805.44	Element			
Vel Head (ft)	0.35	Wt. n-Val.		0.030	
W.S. Elev (ft)	2805.09	Reach Len. (ft)	15.80	15.80	15.80
Crit W.S. (ft)	2804.38	Flow Area (sq ft)		315.10	
E.G. Slope (ft/ft)	0.003229	Area (sq ft)		315.10	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	142.16	Top Width (ft)		142.16	
Vel Total (ft/s)	4.76	Avg. Vel. (ft/s)		4.76	
Max Chl Dpth (ft)	2.29	Hydr. Depth (ft)		2.22	
Conv. Total (cfs)	26397.9	Conv. (cfs)		26397.9	
Length Wtd. (ft)	15.80	Wetted Per. (ft)		143.24	
Min Ch El (ft)	2802.80	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)	423.52	199.00	360.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.13	21.94	0.13
C & E Loss (ft)	0.05	Cum SA (acres)	0.11	7.79	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2803.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.030	
W.S. Elev (ft)	2803.44	Reach Len. (ft)	15.80	15.80	15.80
Crit W.S. (ft)	2803.22	Flow Area (sq ft)		85.83	
E.G. Slope (ft/ft)	0.004084	Area (sq ft)		85.83	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	135.56	Top Width (ft)		135.56	
Vel Total (ft/s)	2.33	Avg. Vel. (ft/s)		2.33	
Max Chl Dpth (ft)	0.64	Hydr. Depth (ft)		0.63	
Conv. Total (cfs)	3129.7	Conv. (cfs)		3129.7	
Length Wtd. (ft)	15.80	Wetted Per. (ft)		135.86	
Min Ch El (ft)	2802.80	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	423.52	199.00	360.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.01	6.89	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	7.00	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2805.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.030	
W.S. Elev (ft)	2805.07	Reach Len. (ft)	15.80	15.80	15.80
Crit W.S. (ft)	2804.36	Flow Area (sq ft)		312.22	
E.G. Slope (ft/ft)	0.003238	Area (sq ft)		312.22	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	142.08	Top Width (ft)		142.08	
Vel Total (ft/s)	4.74	Avg. Vel. (ft/s)		4.74	
Max Chl Dpth (ft)	2.27	Hydr. Depth (ft)		2.20	
Conv. Total (cfs)	26008.0	Conv. (cfs)		26008.0	
Length Wtd. (ft)	15.80	Wetted Per. (ft)		143.15	
Min Ch El (ft)	2802.80	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)	423.52	199.00	360.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.13	22.53	0.13
C & E Loss (ft)	0.05	Cum SA (acres)	0.11	7.82	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2804.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.030	
W.S. Elev (ft)	2804.55	Reach Len. (ft)	15.80	15.80	15.80
Crit W.S. (ft)	2803.99	Flow Area (sq ft)		239.49	
E.G. Slope (ft/ft)	0.003432	Area (sq ft)		239.49	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	140.02	Top Width (ft)		140.02	
Vel Total (ft/s)	4.13	Avg. Vel. (ft/s)		4.13	
Max Chl Dpth (ft)	1.75	Hydr. Depth (ft)		1.71	
Conv. Total (cfs)	16898.9	Conv. (cfs)		16898.9	
Length Wtd. (ft)	15.80	Wetted Per. (ft)		140.85	
Min Ch El (ft)	2802.80	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)	423.52	199.00	360.00

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  Frctn Loss (ft)            0.09    Cum Volume (acre-ft)        0.08      17.42       0.08
  C & E Loss (ft)            0.04    Cum SA (acres)              0.08       7.62       0.08


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)          2804.27    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              0.19    Wt. n-Val.                            0.030
  W.S. Elev (ft)          2804.08    Reach Len. (ft)            15.80      15.80      15.80
  Crit W.S. (ft)          2803.66    Flow Area (sq ft)                    174.03
  E.G. Slope (ft/ft)     0.003702    Area (sq ft)                         174.03
  Q Total (cfs)            610.00    Flow (cfs)                           610.00
  Top Width (ft)           138.13    Top Width (ft)                       138.13
  Vel Total (ft/s)           3.51    Avg. Vel. (ft/s)                       3.51
  Max Chl Dpth (ft)          1.28    Hydr. Depth (ft)                       1.26
  Conv. Total (cfs)       10025.3    Conv. (cfs)                         10025.3
  Length Wtd. (ft)          15.80    Wetted Per. (ft)                     138.74
  Min Ch El (ft)          2802.80    Shear (lb/sq ft)                       0.29
  Alpha                      1.00    Stream Power (lb/ft s)    423.52     199.00     360.00
  Frctn Loss (ft)            0.10    Cum Volume (acre-ft)        0.04      13.16       0.04
  C & E Loss (ft)            0.03    Cum SA (acres)              0.06       7.40       0.06


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 6540

INPUT
Description: Section 65+40
Station Elevation Data    num=       7
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2809     194    2808     214    2808     227  2802.7     338  2802.7
     351    2808     371    2808

Manning's n Values        num=       4
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     194    .016     214     .03     351    .016

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           214     351               15      15      15             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     214    2811       T
     351     371    2811       T
Left Levee      Station=     214      Elevation=    2811
Right Levee     Station=     351      Elevation=    2811

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD
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E.G. Elev (ft)	2808.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.030	
W.S. Elev (ft)	2807.69	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2805.57	Flow Area (sq ft)		615.26	
E.G. Slope (ft/ft)	0.001448	Area (sq ft)		615.26	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	135.49	Top Width (ft)		135.49	
Vel Total (ft/s)	5.12	Avg. Vel. (ft/s)		5.12	
Max Chl Dpth (ft)	4.99	Hydr. Depth (ft)		4.54	
Conv. Total (cfs)	82772.0	Conv. (cfs)		82772.0	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		137.45	
Min Ch El (ft)	2802.70	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	371.00	214.00	351.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.60	34.52	0.38
C & E Loss (ft)	0.08	Cum SA (acres)	0.54	8.28	0.23

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2807.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.030	
W.S. Elev (ft)	2806.77	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2805.30	Flow Area (sq ft)		492.35	
E.G. Slope (ft/ft)	0.002131	Area (sq ft)		492.35	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	130.96	Top Width (ft)		130.96	
Vel Total (ft/s)	5.48	Avg. Vel. (ft/s)		5.48	
Max Chl Dpth (ft)	4.07	Hydr. Depth (ft)		3.76	
Conv. Total (cfs)	58485.8	Conv. (cfs)		58485.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		132.56	
Min Ch El (ft)	2802.70	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	371.00	214.00	351.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.38	31.68	0.28
C & E Loss (ft)	0.10	Cum SA (acres)	0.37	8.19	0.18

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2805.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.85	Wt. n-Val.		0.030	
W.S. Elev (ft)	2804.46	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2804.46	Flow Area (sq ft)		202.32	
E.G. Slope (ft/ft)	0.011203	Area (sq ft)		202.32	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	119.61	Top Width (ft)		119.61	
Vel Total (ft/s)	7.41	Avg. Vel. (ft/s)		7.41	
Max Chl Dpth (ft)	1.75	Hydr. Depth (ft)		1.69	
Conv. Total (cfs)	14171.9	Conv. (cfs)		14171.9	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		120.30	
Min Ch El (ft)	2802.70	Shear (lb/sq ft)		1.18	
Alpha	1.00	Stream Power (lb/ft s)	371.00	214.00	351.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	21.85	0.13
C & E Loss (ft)	0.22	Cum SA (acres)	0.11	7.74	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2803.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.030	
W.S. Elev (ft)	2803.17	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2803.17	Flow Area (sq ft)		52.24	
E.G. Slope (ft/ft)	0.016808	Area (sq ft)		52.24	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	113.29	Top Width (ft)		113.29	
Vel Total (ft/s)	3.83	Avg. Vel. (ft/s)		3.83	
Max Chl Dpth (ft)	0.47	Hydr. Depth (ft)		0.46	
Conv. Total (cfs)	1542.7	Conv. (cfs)		1542.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		113.47	
Min Ch El (ft)	2802.70	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)	371.00	214.00	351.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.01	6.86	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	6.95	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2805.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.030	
W.S. Elev (ft)	2804.44	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2804.44	Flow Area (sq ft)		200.86	
E.G. Slope (ft/ft)	0.011165	Area (sq ft)		200.86	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	119.55	Top Width (ft)		119.55	
Vel Total (ft/s)	7.37	Avg. Vel. (ft/s)		7.37	
Max Chl Dpth (ft)	1.74	Hydr. Depth (ft)		1.68	

Conv. Total (cfs)	14006.9	Conv. (cfs)		14006.9	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		120.23	
Min Ch El (ft)	2802.70	Shear (lb/sq ft)		1.16	
Alpha	1.00	Stream Power (lb/ft s)	371.00	214.00	351.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	22.44	0.13
C & E Loss (ft)	0.22	Cum SA (acres)	0.11	7.78	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2804.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.030	
W.S. Elev (ft)	2804.03	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2804.03	Flow Area (sq ft)		152.41	
E.G. Slope (ft/ft)	0.012237	Area (sq ft)		152.41	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	117.54	Top Width (ft)		117.54	
Vel Total (ft/s)	6.50	Avg. Vel. (ft/s)		6.50	
Max Chl Dpth (ft)	1.33	Hydr. Depth (ft)		1.30	
Conv. Total (cfs)	8949.7	Conv. (cfs)		8949.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		118.07	
Min Ch El (ft)	2802.70	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)	371.00	214.00	351.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.08	17.35	0.08
C & E Loss (ft)	0.17	Cum SA (acres)	0.08	7.57	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2804.15	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.47	Wt. n-Val.		0.030	
W.S. Elev (ft)	2803.68	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2803.68	Flow Area (sq ft)		111.22	
E.G. Slope (ft/ft)	0.012999	Area (sq ft)		111.22	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	115.81	Top Width (ft)		115.81	
Vel Total (ft/s)	5.48	Avg. Vel. (ft/s)		5.48	
Max Chl Dpth (ft)	0.98	Hydr. Depth (ft)		0.96	
Conv. Total (cfs)	5350.3	Conv. (cfs)		5350.3	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		116.20	
Min Ch El (ft)	2802.70	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)	371.00	214.00	351.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.04	13.11	0.04
C & E Loss (ft)	0.11	Cum SA (acres)	0.06	7.36	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6535

INPUT
Description: Section 65+35
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2809	188	2808	208	2808	214	2805	220	2802
227	2800	338	2800	345	2802	357	2808	377	2808

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	188	.016	208	.03	357	.016

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
208	357	150	150	150	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	208	2811	T
357	377	2811	T

Left Levee Station= 208 Elevation= 2811
Right Levee Station= 357 Elevation= 2811

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2808.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.030	
W.S. Elev (ft)	2807.87	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)	2802.84	Flow Area (sq ft)		1038.43	

E.G. Slope (ft/ft)	0.000289	Area (sq ft)		1038.43	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	148.47	Top Width (ft)		148.47	
Vel Total (ft/s)	3.03	Avg. Vel. (ft/s)		3.03	
Max Chl Dpth (ft)	7.87	Hydr. Depth (ft)		6.99	
Conv. Total (cfs)	185343.7	Conv. (cfs)		185343.7	
Length Wtd. (ft)	150.00	Wetted Per. (ft)		151.80	
Min Ch El (ft)	2800.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	377.00	208.00	357.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.60	34.24	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.54	8.23	0.23

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2807.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.030	
W.S. Elev (ft)	2806.99	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)	2802.57	Flow Area (sq ft)		909.44	
E.G. Slope (ft/ft)	0.000319	Area (sq ft)		909.44	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	144.96	Top Width (ft)		144.96	
Vel Total (ft/s)	2.97	Avg. Vel. (ft/s)		2.97	
Max Chl Dpth (ft)	6.99	Hydr. Depth (ft)		6.27	
Conv. Total (cfs)	151207.6	Conv. (cfs)		151207.6	
Length Wtd. (ft)	150.00	Wetted Per. (ft)		147.87	
Min Ch El (ft)	2800.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	377.00	208.00	357.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.38	31.43	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.37	8.14	0.18

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2804.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.030	
W.S. Elev (ft)	2804.46	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)	2801.75	Flow Area (sq ft)		555.83	
E.G. Slope (ft/ft)	0.000457	Area (sq ft)		555.83	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	134.85	Top Width (ft)		134.85	
Vel Total (ft/s)	2.70	Avg. Vel. (ft/s)		2.70	
Max Chl Dpth (ft)	4.46	Hydr. Depth (ft)		4.12	
Conv. Total (cfs)	70178.9	Conv. (cfs)		70178.9	
Length Wtd. (ft)	150.00	Wetted Per. (ft)		136.57	
Min Ch El (ft)	2800.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	377.00	208.00	357.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	21.72	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	7.70	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2802.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.27	Wt. n-Val.		0.030	
W.S. Elev (ft)	2800.15	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)	2800.47	Flow Area (sq ft)		16.55	
E.G. Slope (ft/ft)	0.762145	Area (sq ft)		16.55	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	112.04	Top Width (ft)		112.04	
Vel Total (ft/s)	12.08	Avg. Vel. (ft/s)		12.08	
Max Chl Dpth (ft)	0.15	Hydr. Depth (ft)		0.15	
Conv. Total (cfs)	229.1	Conv. (cfs)		229.1	
Length Wtd. (ft)	150.00	Wetted Per. (ft)		112.08	
Min Ch El (ft)	2800.00	Shear (lb/sq ft)		7.03	
Alpha	1.00	Stream Power (lb/ft s)	377.00	208.00	357.00
Frctn Loss (ft)	0.76	Cum Volume (acre-ft)	0.01	6.85	0.01
C & E Loss (ft)	0.20	Cum SA (acres)	0.03	6.92	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2804.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.030	
W.S. Elev (ft)	2804.42	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)	2801.73	Flow Area (sq ft)		549.51	
E.G. Slope (ft/ft)	0.000461	Area (sq ft)		549.51	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	134.66	Top Width (ft)		134.66	
Vel Total (ft/s)	2.69	Avg. Vel. (ft/s)		2.69	
Max Chl Dpth (ft)	4.41	Hydr. Depth (ft)		4.08	
Conv. Total (cfs)	68925.3	Conv. (cfs)		68925.3	
Length Wtd. (ft)	150.00	Wetted Per. (ft)		136.36	
Min Ch El (ft)	2800.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	377.00	208.00	357.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	22.31	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	7.73	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2803.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2803.19	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)	2801.33	Flow Area (sq ft)		387.51	
E.G. Slope (ft/ft)	0.000626	Area (sq ft)		387.51	

Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	129.76	Top Width (ft)		129.76	
Vel Total (ft/s)	2.55	Avg. Vel. (ft/s)		2.55	
Max Chl Dpth (ft)	3.19	Hydr. Depth (ft)		2.99	
Conv. Total (cfs)	39576.1	Conv. (cfs)		39576.1	
Length Wtd. (ft)	150.00	Wetted Per. (ft)		130.88	
Min Ch El (ft)	2800.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	377.00	208.00	357.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.08	17.25	0.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.08	7.53	0.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2802.19	Element			
Vel Head (ft)	0.09	Wt. n-Val.		0.030	
W.S. Elev (ft)	2802.09	Reach Len. (ft)	150.00	150.00	150.00
Crit W.S. (ft)	2800.97	Flow Area (sq ft)		247.46	
E.G. Slope (ft/ft)	0.001007	Area (sq ft)		247.46	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	125.37	Top Width (ft)		125.37	
Vel Total (ft/s)	2.47	Avg. Vel. (ft/s)		2.47	
Max Chl Dpth (ft)	2.09	Hydr. Depth (ft)		1.97	
Conv. Total (cfs)	19225.3	Conv. (cfs)		19225.3	
Length Wtd. (ft)	150.00	Wetted Per. (ft)		125.97	
Min Ch El (ft)	2800.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	377.00	208.00	357.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.04	13.05	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.06	7.31	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6385

INPUT
Description: Section 63+85
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2809	190	2808	210	2808	216	2805	227	2799.5
338	2799.5	349	2805	355	2808	375	2808		

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	190	.016	210	.013	355	.016

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
210	355	40.3	40.3	40.3	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	210	2811	T
355	375	2811	T

Left Levee Station= 210 Elevation= 2811
Right Levee Station= 355 Elevation= 2811

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2808.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.86	Reach Len. (ft)	40.30	40.30	40.30
Crit W.S. (ft)	2802.39	Flow Area (sq ft)		1067.65	
E.G. Slope (ft/ft)	0.000048	Area (sq ft)		1067.65	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	144.44	Top Width (ft)		144.44	
Vel Total (ft/s)	2.95	Avg. Vel. (ft/s)		2.95	
Max Chl Dpth (ft)	8.36	Hydr. Depth (ft)		7.39	
Conv. Total (cfs)	454821.2	Conv. (cfs)		454821.2	
Length Wtd. (ft)	40.30	Wetted Per. (ft)		148.38	
Min Ch El (ft)	2799.50	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	375.00	210.00	355.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.60	30.61	0.38
C & E Loss (ft)	0.02	Cum SA (acres)	0.54	7.73	0.23

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2807.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.013	
W.S. Elev (ft)	2806.98	Reach Len. (ft)	40.30	40.30	40.30
Crit W.S. (ft)	2802.08	Flow Area (sq ft)		942.21	
E.G. Slope (ft/ft)	0.000052	Area (sq ft)		942.21	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	140.92	Top Width (ft)		140.92	
Vel Total (ft/s)	2.87	Avg. Vel. (ft/s)		2.87	
Max Chl Dpth (ft)	7.48	Hydr. Depth (ft)		6.69	
Conv. Total (cfs)	375966.9	Conv. (cfs)		375966.9	
Length Wtd. (ft)	40.30	Wetted Per. (ft)		144.45	
Min Ch El (ft)	2799.50	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	375.00	210.00	355.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.38	28.25	0.28
C & E Loss (ft)	0.02	Cum SA (acres)	0.37	7.65	0.18

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2804.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.45	Reach Len. (ft)	40.30	40.30	40.30
Crit W.S. (ft)	2801.27	Flow Area (sq ft)		598.74	
E.G. Slope (ft/ft)	0.000065	Area (sq ft)		598.74	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	130.81	Top Width (ft)		130.81	
Vel Total (ft/s)	2.51	Avg. Vel. (ft/s)		2.51	
Max Chl Dpth (ft)	4.95	Hydr. Depth (ft)		4.58	
Conv. Total (cfs)	186447.8	Conv. (cfs)		186447.8	
Length Wtd. (ft)	40.30	Wetted Per. (ft)		133.15	
Min Ch El (ft)	2799.50	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	375.00	210.00	355.00

Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	19.73	0.13
C & E Loss (ft)	0.02	Cum SA (acres)	0.11	7.24	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2800.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2800.57	Reach Len. (ft)	40.30	40.30	40.30
Crit W.S. (ft)	2799.96	Flow Area (sq ft)		120.50	
E.G. Slope (ft/ft)	0.000200	Area (sq ft)		120.50	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	115.26	Top Width (ft)		115.26	
Vel Total (ft/s)	1.66	Avg. Vel. (ft/s)		1.66	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		1.05	
Conv. Total (cfs)	14147.4	Conv. (cfs)		14147.4	
Length Wtd. (ft)	40.30	Wetted Per. (ft)		115.76	
Min Ch El (ft)	2799.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	375.00	210.00	355.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	6.61	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	6.52	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2804.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.41	Reach Len. (ft)	40.30	40.30	40.30
Crit W.S. (ft)	2801.24	Flow Area (sq ft)		592.58	
E.G. Slope (ft/ft)	0.000065	Area (sq ft)		592.58	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	130.62	Top Width (ft)		130.62	
Vel Total (ft/s)	2.50	Avg. Vel. (ft/s)		2.50	
Max Chl Dpth (ft)	4.91	Hydr. Depth (ft)		4.54	
Conv. Total (cfs)	183455.8	Conv. (cfs)		183455.8	
Length Wtd. (ft)	40.30	Wetted Per. (ft)		132.94	
Min Ch El (ft)	2799.50	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	375.00	210.00	355.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	20.34	0.13
C & E Loss (ft)	0.02	Cum SA (acres)	0.11	7.28	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2803.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.18	Reach Len. (ft)	40.30	40.30	40.30
Crit W.S. (ft)	2800.85	Flow Area (sq ft)		435.43	
E.G. Slope (ft/ft)	0.000077	Area (sq ft)		435.43	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	125.72	Top Width (ft)		125.72	
Vel Total (ft/s)	2.27	Avg. Vel. (ft/s)		2.27	

Max Chl Dpth (ft)	3.68	Hydr. Depth (ft)		3.46	
Conv. Total (cfs)	112898.6	Conv. (cfs)		112898.6	
Length Wtd. (ft)	40.30	Wetted Per. (ft)		127.45	
Min Ch El (ft)	2799.50	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	375.00	210.00	355.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	15.84	0.08
C & E Loss (ft)	0.02	Cum SA (acres)	0.08	7.09	0.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2802.14	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2802.08	Reach Len. (ft)	40.30	40.30	40.30
Crit W.S. (ft)	2800.48	Flow Area (sq ft)		299.52	
E.G. Slope (ft/ft)	0.000096	Area (sq ft)		299.52	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	121.31	Top Width (ft)		121.31	
Vel Total (ft/s)	2.04	Avg. Vel. (ft/s)		2.04	
Max Chl Dpth (ft)	2.58	Hydr. Depth (ft)		2.47	
Conv. Total (cfs)	62126.0	Conv. (cfs)		62126.0	
Length Wtd. (ft)	40.30	Wetted Per. (ft)		122.53	
Min Ch El (ft)	2799.50	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	375.00	210.00	355.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	12.11	0.04
C & E Loss (ft)	0.02	Cum SA (acres)	0.06	6.89	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6344.7

INPUT
Description: Section 63+44.7 (U/S face of Quantico Rd.)
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2809	113.35	2808	209	2808	209	2799.2	357	2799.2
357	2808	564.5	2808						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	209	.013	357	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
209	357	32	32	32	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	209	2811	T
357	564.5	2811	T

Left Levee Station= 209 Elevation= 2811
Right Levee Station= 357 Elevation= 2811

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2807.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.88	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2801.63	Flow Area (sq ft)		1284.45	
E.G. Slope (ft/ft)	0.000030	Area (sq ft)		1284.45	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	148.00	Top Width (ft)		148.00	
Vel Total (ft/s)	2.45	Avg. Vel. (ft/s)		2.45	
Max Chl Dpth (ft)	8.68	Hydr. Depth (ft)		8.68	
Conv. Total (cfs)	575834.4	Conv. (cfs)		575834.4	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		165.36	
Min Ch El (ft)	2799.20	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	564.50	209.00	357.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.60	29.52	0.38
C & E Loss (ft)		Cum SA (acres)	0.54	7.59	0.23

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2807.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.00	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2801.38	Flow Area (sq ft)		1154.37	
E.G. Slope (ft/ft)	0.000031	Area (sq ft)		1154.37	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	148.00	Top Width (ft)		148.00	
Vel Total (ft/s)	2.34	Avg. Vel. (ft/s)		2.34	
Max Chl Dpth (ft)	7.80	Hydr. Depth (ft)		7.80	
Conv. Total (cfs)	485407.0	Conv. (cfs)		485407.0	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		163.60	
Min Ch El (ft)	2799.20	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	564.50	209.00	357.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.38	27.28	0.28
C & E Loss (ft)		Cum SA (acres)	0.37	7.52	0.18

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2804.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.47	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2800.66	Flow Area (sq ft)		780.04	
E.G. Slope (ft/ft)	0.000034	Area (sq ft)		780.04	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	148.00	Top Width (ft)		148.00	
Vel Total (ft/s)	1.92	Avg. Vel. (ft/s)		1.92	
Max Chl Dpth (ft)	5.27	Hydr. Depth (ft)		5.27	
Conv. Total (cfs)	257917.6	Conv. (cfs)		257917.6	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		158.54	
Min Ch El (ft)	2799.20	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	564.50	209.00	357.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	19.09	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	7.11	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2800.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2800.58	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2799.59	Flow Area (sq ft)		203.61	
E.G. Slope (ft/ft)	0.000049	Area (sq ft)		203.61	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	148.00	Top Width (ft)		148.00	
Vel Total (ft/s)	0.98	Avg. Vel. (ft/s)		0.98	
Max Chl Dpth (ft)	1.38	Hydr. Depth (ft)		1.38	
Conv. Total (cfs)	28436.1	Conv. (cfs)		28436.1	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		150.75	
Min Ch El (ft)	2799.20	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	564.50	209.00	357.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	6.46	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	6.40	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2804.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.42	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2800.67	Flow Area (sq ft)		773.06	
E.G. Slope (ft/ft)	0.000034	Area (sq ft)		773.06	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	148.00	Top Width (ft)		148.00	
Vel Total (ft/s)	1.91	Avg. Vel. (ft/s)		1.91	
Max Chl Dpth (ft)	5.22	Hydr. Depth (ft)		5.22	
Conv. Total (cfs)	254186.8	Conv. (cfs)		254186.8	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		158.45	
Min Ch El (ft)	2799.20	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	564.50	209.00	357.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	19.71	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	7.15	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2803.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.20	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2800.32	Flow Area (sq ft)		591.31	
E.G. Slope (ft/ft)	0.000036	Area (sq ft)		591.31	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	148.00	Top Width (ft)		148.00	
Vel Total (ft/s)	1.67	Avg. Vel. (ft/s)		1.67	
Max Chl Dpth (ft)	4.00	Hydr. Depth (ft)		4.00	
Conv. Total (cfs)	164316.9	Conv. (cfs)		164316.9	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		155.99	
Min Ch El (ft)	2799.20	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	564.50	209.00	357.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	15.36	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	6.96	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2802.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.013	
W.S. Elev (ft)	2802.09	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2800.01	Flow Area (sq ft)		428.14	
E.G. Slope (ft/ft)	0.000040	Area (sq ft)		428.14	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	148.00	Top Width (ft)		148.00	
Vel Total (ft/s)	1.42	Avg. Vel. (ft/s)		1.42	
Max Chl Dpth (ft)	2.89	Hydr. Depth (ft)		2.89	
Conv. Total (cfs)	96845.7	Conv. (cfs)		96845.7	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		153.79	
Min Ch El (ft)	2799.20	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	564.50	209.00	357.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	11.77	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	6.76	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 6328.7

INPUT
Description: Quantico Road
Distance from Upstream XS = .4
Deck/Roadway Width = 31.5
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
100	2810		242	2810		262	2810	
296	2810		580	2810				

Upstream Bridge Cross Section Data
Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2809	113.35	2808	209	2808	209	2799.2	357	2799.2
357	2808	564.5	2808						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	209	.013	357	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
209	357	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	209	2811	T
357	564.5	2811	T

Left Levee Station= 209 Elevation= 2811
Right Levee Station= 357 Elevation= 2811

Downstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord

```
     100    2810             242    2810             262    2810
     296    2810             580    2810

Downstream Bridge Cross Section Data
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2809  113.35    2808  128.27    2807     143    2806     227    2808
     227    2805     227    2799     338    2799     338    2805     338    2808
   564.5    2805

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     227    .013     338    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           227     338             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     227    2808       T
     338   564.5    2808       T
Left Levee      Station=     227      Elevation=    2808
Right Levee     Station=     338      Elevation=    2808

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box     9.5    14.5
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  0      32     .013     .013        0                  .2                1
Number of Barrels =  3
Upstream   Elevation =  2799.2
Centerline Stations
    Sta.    Sta.    Sta.
     267   282.5     298
Downstream Elevation =  2799
Centerline Stations
    Sta.    Sta.    Sta.
     267   282.5     298

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       3150.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         13.26
  Q Barrel (cfs)           1050.00    Culv Vel DS (ft/s)         14.66
  E.G. US. (ft)            2807.97    Culv Inv El Up (ft)      2799.20
  W.S. US. (ft)            2807.88    Culv Inv El Dn (ft)      2799.00
  E.G. DS (ft)             2805.13    Culv Frctn Ls (ft)          0.12
  W.S. DS (ft)             2804.75    Culv Exit Loss (ft)         2.15
  Delta EG (ft)               2.84    Culv Entr Loss (ft)         0.58
  Delta WS (ft)               3.13    Q Weir (cfs)
  E.G. IC (ft)             2807.97    Weir Sta Lft (ft)
  E.G. OC (ft)             2807.94    Weir Sta Rgt (ft)
  Culvert Control            Inlet    Weir Submerg
  Culv WS Inlet (ft)       2804.66    Weir Max Depth (ft)
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  Culv WS Outlet (ft)      2803.94    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         4.18    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.46    Min El Weir Flow (ft)    2810.01


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    During the supercritical calculations a hydraulic jump occurred at the outlet of (leaving)
the culvert.
Warning: During the supercritical analysis, the program could not converge on a supercritical
answer in the downstream cross
         section.  The program used the solution with the least error.
Note:    The flow in the culvert is entirely supercritical.

CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2700.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         12.60
  Q Barrel (cfs)            900.00    Culv Vel DS (ft/s)         14.00
  E.G. US. (ft)            2807.09    Culv Inv El Up (ft)      2799.20
  W.S. US. (ft)            2807.00    Culv Inv El Dn (ft)      2799.00
  E.G. DS (ft)             2804.45    Culv Frctn Ls (ft)          0.11
  W.S. DS (ft)             2804.10    Culv Exit Loss (ft)         2.03
  Delta EG (ft)               2.64    Culv Entr Loss (ft)         0.49
  Delta WS (ft)               2.90    Q Weir (cfs)
  E.G. IC (ft)             2807.09    Weir Sta Lft (ft)
  E.G. OC (ft)             2807.08    Weir Sta Rgt (ft)
  Culvert Control            Inlet    Weir Submerg
  Culv WS Inlet (ft)       2804.13    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2803.43    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         3.76    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         4.93    Min El Weir Flow (ft)    2810.01


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    During the supercritical calculations a hydraulic jump occurred at the outlet of (leaving)
the culvert.
Warning: During the supercritical analysis, the program could not converge on a supercritical
answer in the downstream cross
         section.  The program used the solution with the least error.
Note:    The flow in the culvert is entirely supercritical.

CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1500.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         10.36
  Q Barrel (cfs)            500.00    Culv Vel DS (ft/s)         11.77
  E.G. US. (ft)            2804.53    Culv Inv El Up (ft)      2799.20
  W.S. US. (ft)            2804.47    Culv Inv El Dn (ft)      2799.00
  E.G. DS (ft)             2802.34    Culv Frctn Ls (ft)          0.11
  W.S. DS (ft)             2802.03    Culv Exit Loss (ft)         1.75
  Delta EG (ft)               2.19    Culv Entr Loss (ft)         0.33
  Delta WS (ft)               2.44    Q Weir (cfs)
  E.G. IC (ft)             2804.46    Weir Sta Lft (ft)
  E.G. OC (ft)             2804.53    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2802.53    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2801.93    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         2.52    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.33    Min El Weir Flow (ft)    2810.01


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
```

```
Note:    During the supercritical calculations a hydraulic jump occurred at the outlet of (leaving)
the culvert.
Warning: During the supercritical analysis, the program could not converge on a supercritical
answer in the downstream cross
         section.  The program used the solution with the least error.
Note:    The flow in the culvert is entirely supercritical.

CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)        200.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          5.29
  Q Barrel (cfs)             66.67    Culv Vel DS (ft/s)          6.37
  E.G. US. (ft)            2800.59    Culv Inv El Up (ft)      2799.20
  W.S. US. (ft)            2800.58    Culv Inv El Dn (ft)      2799.00
  E.G. DS (ft)             2799.70    Culv Frctn Ls (ft)          0.15
  W.S. DS (ft)             2799.46    Culv Exit Loss (ft)         0.65
  Delta EG (ft)               0.89    Culv Entr Loss (ft)         0.09
  Delta WS (ft)               1.12    Q Weir (cfs)
  E.G. IC (ft)             2800.51    Weir Sta Lft (ft)
  E.G. OC (ft)             2800.59    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2800.07    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2799.72    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         0.69    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         0.87    Min El Weir Flow (ft)    2810.01


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    During the supercritical calculations a hydraulic jump occurred at the outlet of (leaving)
the culvert.
Warning: During the supercritical analysis, the program could not converge on a supercritical
answer in the downstream cross
         section.  The program used the solution with the least error.
Note:    The flow in the culvert is entirely supercritical.

CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1480.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         10.31
  Q Barrel (cfs)            493.33    Culv Vel DS (ft/s)         11.72
  E.G. US. (ft)            2804.48    Culv Inv El Up (ft)      2799.20
  W.S. US. (ft)            2804.42    Culv Inv El Dn (ft)      2799.00
  E.G. DS (ft)             2802.30    Culv Frctn Ls (ft)          0.11
  W.S. DS (ft)             2801.99    Culv Exit Loss (ft)         1.74
  Delta EG (ft)               2.18    Culv Entr Loss (ft)         0.33
  Delta WS (ft)               2.44    Q Weir (cfs)
  E.G. IC (ft)             2804.41    Weir Sta Lft (ft)
  E.G. OC (ft)             2804.48    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2802.50    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2801.90    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         2.50    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.30    Min El Weir Flow (ft)    2810.01


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    During the supercritical calculations a hydraulic jump occurred at the outlet of (leaving)
the culvert.
Warning: During the supercritical analysis, the program could not converge on a supercritical
answer in the downstream cross
         section.  The program used the solution with the least error.
Note:    The flow in the culvert is entirely supercritical.
```

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	990.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	9.02
Q Barrel (cfs)	330.00	Culv Vel DS (ft/s)	10.41
E.G. US. (ft)	2803.24	Culv Inv El Up (ft)	2799.20
W.S. US. (ft)	2803.20	Culv Inv El Dn (ft)	2799.00
E.G. DS (ft)	2801.25	Culv Frctn Ls (ft)	0.12
W.S. DS (ft)	2800.92	Culv Exit Loss (ft)	1.62
Delta EG (ft)	1.99	Culv Entr Loss (ft)	0.25
Delta WS (ft)	2.28	Q Weir (cfs)	
E.G. IC (ft)	2803.15	Weir Sta Lft (ft)	
E.G. OC (ft)	2803.24	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2801.72	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2801.19	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.91	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.52	Min El Weir Flow (ft)	2810.01

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: During the supercritical calculations a hydraulic jump occurred at the outlet of (leaving) the culvert.
Warning: During the supercritical analysis, the program could not converge on a supercritical answer in the downstream cross
section. The program used the solution with the least error.
Note: The flow in the culvert is entirely supercritical.

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	610.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	7.67
Q Barrel (cfs)	203.33	Culv Vel DS (ft/s)	9.01
E.G. US. (ft)	2802.13	Culv Inv El Up (ft)	2799.20
W.S. US. (ft)	2802.09	Culv Inv El Dn (ft)	2799.00
E.G. DS (ft)	2800.47	Culv Frctn Ls (ft)	0.12
W.S. DS (ft)	2799.99	Culv Exit Loss (ft)	1.35
Delta EG (ft)	1.66	Culv Entr Loss (ft)	0.18
Delta WS (ft)	2.11	Q Weir (cfs)	
E.G. IC (ft)	2802.03	Weir Sta Lft (ft)	
E.G. OC (ft)	2802.13	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2801.03	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2800.56	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	1.39	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.83	Min El Weir Flow (ft)	2810.01

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: During the supercritical calculations a hydraulic jump occurred at the outlet of (leaving) the culvert.
Warning: During the supercritical analysis, the program could not converge on a supercritical answer in the downstream cross
section. The program used the solution with the least error.
Note: The flow in the culvert is entirely supercritical.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6312.5

INPUT

```
Description: Section 63+12.5 (D/S face of Quantico Rd.)
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2809  113.35    2808  128.27    2807     143    2806     227    2808
     227    2805     227    2799     338    2799     338    2805     338    2808
   564.5    2805

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     227    .013     338    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           227     338             37.5    37.5    37.5             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     227    2808       T
     338   564.5    2808       T
Left Levee      Station=     227      Elevation=    2808
Right Levee     Station=     338      Elevation=    2808

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2805.13    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.38    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2804.75    Reach Len. (ft)             37.50      37.50      37.50
  Crit W.S. (ft)           2801.94    Flow Area (sq ft)                     638.55
  E.G. Slope (ft/ft)      0.000206    Area (sq ft)                          638.55
  Q Total (cfs)            3150.00    Flow (cfs)                           3150.00
  Top Width (ft)            111.00    Top Width (ft)                        111.00
  Vel Total (ft/s)            4.93    Avg. Vel. (ft/s)                        4.93
  Max Chl Dpth (ft)           5.75    Hydr. Depth (ft)                        5.75
  Conv. Total (cfs)       219417.4    Conv. (cfs)                         219417.4
  Length Wtd. (ft)           37.50    Wetted Per. (ft)                      122.51
  Min Ch El (ft)           2799.00    Shear (lb/sq ft)                        0.07
  Alpha                       1.00    Stream Power (lb/ft s)    564.50     227.00     338.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.60      29.47       0.38
  C & E Loss (ft)             0.07    Cum SA (acres)              0.54       7.50       0.23


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2804.45    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.35    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2804.10    Reach Len. (ft)             37.50      37.50      37.50
  Crit W.S. (ft)           2801.64    Flow Area (sq ft)                     565.62
  E.G. Slope (ft/ft)      0.000224    Area (sq ft)                          565.62
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)            111.00    Top Width (ft)                        111.00
  Vel Total (ft/s)            4.77    Avg. Vel. (ft/s)                        4.77
  Max Chl Dpth (ft)           5.10    Hydr. Depth (ft)                        5.10
  Conv. Total (cfs)       180557.6    Conv. (cfs)                         180557.6
  Length Wtd. (ft)           37.50    Wetted Per. (ft)                      121.19
  Min Ch El (ft)           2799.00    Shear (lb/sq ft)                        0.07
  Alpha                       1.00    Stream Power (lb/ft s)    564.50     227.00     338.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.38      27.23       0.28
  C & E Loss (ft)             0.07    Cum SA (acres)              0.37       7.42       0.18
```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2802.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.013	
W.S. Elev (ft)	2802.03	Reach Len. (ft)	37.50	37.50	37.50
Crit W.S. (ft)	2800.80	Flow Area (sq ft)		335.90	
E.G. Slope (ft/ft)	0.000374	Area (sq ft)		335.90	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	111.00	Top Width (ft)		111.00	
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)		4.47	
Max Chl Dpth (ft)	3.03	Hydr. Depth (ft)		3.03	
Conv. Total (cfs)	77532.0	Conv. (cfs)		77532.0	
Length Wtd. (ft)	37.50	Wetted Per. (ft)		117.05	
Min Ch El (ft)	2799.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	564.50	227.00	338.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	19.06	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	7.02	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2799.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.013	
W.S. Elev (ft)	2799.46	Reach Len. (ft)	37.50	37.50	37.50
Crit W.S. (ft)	2799.46	Flow Area (sq ft)		50.89	
E.G. Slope (ft/ft)	0.003380	Area (sq ft)		50.89	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	111.00	Top Width (ft)		111.00	
Vel Total (ft/s)	3.93	Avg. Vel. (ft/s)		3.93	
Max Chl Dpth (ft)	0.46	Hydr. Depth (ft)		0.46	
Conv. Total (cfs)	3440.0	Conv. (cfs)		3440.0	
Length Wtd. (ft)	37.50	Wetted Per. (ft)		111.92	
Min Ch El (ft)	2799.00	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	564.50	227.00	338.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.01	6.45	0.01
C & E Loss (ft)	0.08	Cum SA (acres)	0.03	6.31	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2802.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.013	

W.S. Elev (ft)	2801.99	Reach Len. (ft)	37.50	37.50	37.50
Crit W.S. (ft)	2800.78	Flow Area (sq ft)		331.54	
E.G. Slope (ft/ft)	0.000380	Area (sq ft)		331.54	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	111.00	Top Width (ft)		111.00	
Vel Total (ft/s)	4.46	Avg. Vel. (ft/s)		4.46	
Max Chl Dpth (ft)	2.99	Hydr. Depth (ft)		2.99	
Conv. Total (cfs)	75894.8	Conv. (cfs)		75894.8	
Length Wtd. (ft)	37.50	Wetted Per. (ft)		116.97	
Min Ch El (ft)	2799.00	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	564.50	227.00	338.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	19.68	0.13
C & E Loss (ft)	0.07	Cum SA (acres)	0.11	7.05	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2801.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.013	
W.S. Elev (ft)	2800.92	Reach Len. (ft)	37.50	37.50	37.50
Crit W.S. (ft)	2800.36	Flow Area (sq ft)		212.84	
E.G. Slope (ft/ft)	0.000727	Area (sq ft)		212.84	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	111.00	Top Width (ft)		111.00	
Vel Total (ft/s)	4.65	Avg. Vel. (ft/s)		4.65	
Max Chl Dpth (ft)	1.92	Hydr. Depth (ft)		1.92	
Conv. Total (cfs)	36707.8	Conv. (cfs)		36707.8	
Length Wtd. (ft)	37.50	Wetted Per. (ft)		114.84	
Min Ch El (ft)	2799.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	564.50	227.00	338.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.08	15.34	0.08
C & E Loss (ft)	0.10	Cum SA (acres)	0.08	6.87	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2800.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.		0.013	
W.S. Elev (ft)	2799.99	Reach Len. (ft)	37.50	37.50	37.50
Crit W.S. (ft)	2799.99	Flow Area (sq ft)		109.32	
E.G. Slope (ft/ft)	0.002490	Area (sq ft)		109.32	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	111.00	Top Width (ft)		111.00	
Vel Total (ft/s)	5.58	Avg. Vel. (ft/s)		5.58	
Max Chl Dpth (ft)	0.98	Hydr. Depth (ft)		0.98	
Conv. Total (cfs)	12224.8	Conv. (cfs)		12224.8	
Length Wtd. (ft)	37.50	Wetted Per. (ft)		112.97	
Min Ch El (ft)	2799.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	564.50	227.00	338.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.04	11.75	0.04
C & E Loss (ft)	0.18	Cum SA (acres)	0.06	6.67	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6275

INPUT
Description: Section 62+75 (exit of Quantico Rd.)
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2809	113.35	2808	194	2806	214	2806	220	2803
222	2802	230	2798	335	2798	343	2802	351	2806
371	2806	564.5	2805						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	194	.016	214	.03	351	.016	371	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
214	351	105	105	105	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	214	2808	T
351	564.5	2808	T

Left Levee Station= 214 Elevation= 2808
Right Levee Station= 351 Elevation= 2808

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2805.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.030	
W.S. Elev (ft)	2804.81	Reach Len. (ft)	105.00	105.00	105.00
Crit W.S. (ft)	2800.99	Flow Area (sq ft)		807.94	
E.G. Slope (ft/ft)	0.000573	Area (sq ft)		807.94	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	132.24	Top Width (ft)		132.24	
Vel Total (ft/s)	3.90	Avg. Vel. (ft/s)		3.90	
Max Chl Dpth (ft)	6.81	Hydr. Depth (ft)		6.11	
Conv. Total (cfs)	131612.7	Conv. (cfs)		131612.7	
Length Wtd. (ft)	105.00	Wetted Per. (ft)		135.46	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	564.50	214.00	351.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.60	28.85	0.38
C & E Loss (ft)	0.20	Cum SA (acres)	0.54	7.39	0.23

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2804.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.030	
W.S. Elev (ft)	2804.15	Reach Len. (ft)	105.00	105.00	105.00

Crit W.S. (ft)	2800.70	Flow Area (sq ft)		721.45	
E.G. Slope (ft/ft)	0.000596	Area (sq ft)		721.45	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	129.60	Top Width (ft)		129.60	
Vel Total (ft/s)	3.74	Avg. Vel. (ft/s)		3.74	
Max Chl Dpth (ft)	6.15	Hydr. Depth (ft)		5.57	
Conv. Total (cfs)	110592.1	Conv. (cfs)		110592.1	
Length Wtd. (ft)	105.00	Wetted Per. (ft)		132.51	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	564.50	214.00	351.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.38	26.67	0.28
C & E Loss (ft)	0.19	Cum SA (acres)	0.37	7.32	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2802.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2802.08	Reach Len. (ft)	105.00	105.00	105.00
Crit W.S. (ft)	2799.84	Flow Area (sq ft)		461.67	
E.G. Slope (ft/ft)	0.000740	Area (sq ft)		461.67	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	121.32	Top Width (ft)		121.32	
Vel Total (ft/s)	3.25	Avg. Vel. (ft/s)		3.25	
Max Chl Dpth (ft)	4.08	Hydr. Depth (ft)		3.81	
Conv. Total (cfs)	55154.8	Conv. (cfs)		55154.8	
Length Wtd. (ft)	105.00	Wetted Per. (ft)		123.25	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	564.50	214.00	351.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.13	18.72	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	6.92	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2798.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.030	
W.S. Elev (ft)	2798.82	Reach Len. (ft)	105.00	105.00	105.00
Crit W.S. (ft)	2798.47	Flow Area (sq ft)		87.72	
E.G. Slope (ft/ft)	0.002820	Area (sq ft)		87.72	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	108.29	Top Width (ft)		108.29	
Vel Total (ft/s)	2.28	Avg. Vel. (ft/s)		2.28	
Max Chl Dpth (ft)	0.82	Hydr. Depth (ft)		0.81	
Conv. Total (cfs)	3766.3	Conv. (cfs)		3766.3	
Length Wtd. (ft)	105.00	Wetted Per. (ft)		108.68	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	564.50	214.00	351.00
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)	0.01	6.40	0.01

C & E Loss (ft)	0.04	Cum SA (acres)	0.03	6.21	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2802.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2802.04	Reach Len. (ft)	105.00	105.00	105.00
Crit W.S. (ft)	2799.82	Flow Area (sq ft)		456.91	
E.G. Slope (ft/ft)	0.000744	Area (sq ft)		456.91	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	121.16	Top Width (ft)		121.16	
Vel Total (ft/s)	3.24	Avg. Vel. (ft/s)		3.24	
Max Chl Dpth (ft)	4.04	Hydr. Depth (ft)		3.77	
Conv. Total (cfs)	54260.8	Conv. (cfs)		54260.8	
Length Wtd. (ft)	105.00	Wetted Per. (ft)		123.07	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	564.50	214.00	351.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.13	19.34	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	6.95	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2801.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.030	
W.S. Elev (ft)	2800.99	Reach Len. (ft)	105.00	105.00	105.00
Crit W.S. (ft)	2799.38	Flow Area (sq ft)		331.29	
E.G. Slope (ft/ft)	0.000923	Area (sq ft)		331.29	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	116.94	Top Width (ft)		116.94	
Vel Total (ft/s)	2.99	Avg. Vel. (ft/s)		2.99	
Max Chl Dpth (ft)	2.99	Hydr. Depth (ft)		2.83	
Conv. Total (cfs)	32591.1	Conv. (cfs)		32591.1	
Length Wtd. (ft)	105.00	Wetted Per. (ft)		118.35	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	564.50	214.00	351.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.08	15.10	0.08
C & E Loss (ft)	0.11	Cum SA (acres)	0.08	6.77	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2800.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.030	
W.S. Elev (ft)	2800.03	Reach Len. (ft)	105.00	105.00	105.00
Crit W.S. (ft)	2799.02	Flow Area (sq ft)		221.67	
E.G. Slope (ft/ft)	0.001273	Area (sq ft)		221.67	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	113.13	Top Width (ft)		113.13	
Vel Total (ft/s)	2.75	Avg. Vel. (ft/s)		2.75	
Max Chl Dpth (ft)	2.03	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	17095.9	Conv. (cfs)		17095.9	
Length Wtd. (ft)	105.00	Wetted Per. (ft)		114.09	
Min Ch El (ft)	2798.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	564.50	214.00	351.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.04	11.61	0.04
C & E Loss (ft)	0.08	Cum SA (acres)	0.06	6.57	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6170

INPUT
Description: Section 61+70: Stabilizer #1 (inlet)
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2806.13	113.58	2806.13	130.47	2806.13	207.5	2806.13	227.5	2806.13
246.5	2796.8	281.5	2796.8	300.5	2806.13	320.5	2806.13	355.07	2806.13

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	207.5	.016	227.5	.035	300.5	.016	320.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
227.5	300.5	56	56	56	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2804.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.28	Wt. n-Val.		0.035	
W.S. Elev (ft)	2802.40	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	2802.40	Flow Area (sq ft)		260.11	
E.G. Slope (ft/ft)	0.011621	Area (sq ft)		260.11	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	57.83	Top Width (ft)		57.83	
Vel Total (ft/s)	12.11	Avg. Vel. (ft/s)		12.11	
Max Chl Dpth (ft)	5.60	Hydr. Depth (ft)		4.50	
Conv. Total (cfs)	29220.6	Conv. (cfs)		29220.6	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		60.43	
Min Ch El (ft)	2796.80	Shear (lb/sq ft)		3.12	
Alpha	1.00	Stream Power (lb/ft s)	355.07	0.00	0.00
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)	0.60	27.56	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.54	7.16	0.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2804.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.10	Wt. n-Val.		0.035	
W.S. Elev (ft)	2801.91	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	2801.91	Flow Area (sq ft)		232.17	
E.G. Slope (ft/ft)	0.011860	Area (sq ft)		232.17	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	55.82	Top Width (ft)		55.82	
Vel Total (ft/s)	11.63	Avg. Vel. (ft/s)		11.63	
Max Chl Dpth (ft)	5.11	Hydr. Depth (ft)		4.16	
Conv. Total (cfs)	24792.9	Conv. (cfs)		24792.9	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		58.20	
Min Ch El (ft)	2796.80	Shear (lb/sq ft)		2.95	
Alpha	1.00	Stream Power (lb/ft s)	355.07	0.00	0.00
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)	0.38	25.52	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.37	7.09	0.18

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2801.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.54	Wt. n-Val.		0.035	
W.S. Elev (ft)	2800.37	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	2800.37	Flow Area (sq ft)		150.86	
E.G. Slope (ft/ft)	0.012983	Area (sq ft)		150.86	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	49.54	Top Width (ft)		49.54	
Vel Total (ft/s)	9.94	Avg. Vel. (ft/s)		9.94	
Max Chl Dpth (ft)	3.57	Hydr. Depth (ft)		3.05	
Conv. Total (cfs)	13164.3	Conv. (cfs)		13164.3	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		51.19	
Min Ch El (ft)	2796.80	Shear (lb/sq ft)		2.39	
Alpha	1.00	Stream Power (lb/ft s)	355.07	0.00	0.00
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)	0.13	17.98	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	6.71	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2798.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.035	
W.S. Elev (ft)	2797.78	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	2797.78	Flow Area (sq ft)		36.32	
E.G. Slope (ft/ft)	0.018784	Area (sq ft)		36.32	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	39.00	Top Width (ft)		39.00	
Vel Total (ft/s)	5.51	Avg. Vel. (ft/s)		5.51	
Max Chl Dpth (ft)	0.98	Hydr. Depth (ft)		0.93	
Conv. Total (cfs)	1459.3	Conv. (cfs)		1459.3	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		39.45	
Min Ch El (ft)	2796.80	Shear (lb/sq ft)		1.08	
Alpha	1.00	Stream Power (lb/ft s)	355.07	0.00	0.00
Frctn Loss (ft)	1.05	Cum Volume (acre-ft)	0.01	6.25	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	6.04	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2801.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.53	Wt. n-Val.		0.035	
W.S. Elev (ft)	2800.34	Reach Len. (ft)	56.00	56.00	56.00
Crit W.S. (ft)	2800.34	Flow Area (sq ft)		149.30	
E.G. Slope (ft/ft)	0.013036	Area (sq ft)		149.30	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	49.41	Top Width (ft)		49.41	
Vel Total (ft/s)	9.91	Avg. Vel. (ft/s)		9.91	
Max Chl Dpth (ft)	3.54	Hydr. Depth (ft)		3.02	
Conv. Total (cfs)	12962.6	Conv. (cfs)		12962.6	
Length Wtd. (ft)	56.00	Wetted Per. (ft)		51.05	
Min Ch El (ft)	2796.80	Shear (lb/sq ft)		2.38	
Alpha	1.00	Stream Power (lb/ft s)	355.07	0.00	0.00
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)	0.13	18.61	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	6.75	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

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         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION OUTPUT  Profile #5-yr SBCFCD

  E.G. Elev (ft)          2800.77    Element                  Left OB    Channel   Right OB
  Vel Head (ft)              1.22    Wt. n-Val.                           0.035
  W.S. Elev (ft)          2799.55    Reach Len. (ft)           56.00      56.00      56.00
  Crit W.S. (ft)          2799.55    Flow Area (sq ft)                   111.52
  E.G. Slope (ft/ft)     0.014000    Area (sq ft)                        111.52
  Q Total (cfs)            990.00    Flow (cfs)                          990.00
  Top Width (ft)            46.19    Top Width (ft)                       46.19
  Vel Total (ft/s)           8.88    Avg. Vel. (ft/s)                      8.88
  Max Chl Dpth (ft)          2.75    Hydr. Depth (ft)                      2.41
  Conv. Total (cfs)        8367.0    Conv. (cfs)                         8367.0
  Length Wtd. (ft)          56.00    Wetted Per. (ft)                     47.46
  Min Ch El (ft)          2796.80    Shear (lb/sq ft)                      2.05
  Alpha                      1.00    Stream Power (lb/ft s)    355.07      0.00       0.00
  Frctn Loss (ft)            0.78    Cum Volume (acre-ft)        0.08     14.57       0.08
  C & E Loss (ft)            0.00    Cum SA (acres)              0.08      6.57       0.08


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)          2799.75    Element                  Left OB    Channel   Right OB
  Vel Head (ft)              0.92    Wt. n-Val.                           0.035
  W.S. Elev (ft)          2798.82    Reach Len. (ft)           56.00      56.00      56.00
  Crit W.S. (ft)          2798.82    Flow Area (sq ft)                    79.05
  E.G. Slope (ft/ft)     0.015203    Area (sq ft)                         79.05
  Q Total (cfs)            610.00    Flow (cfs)                          610.00
  Top Width (ft)            43.23    Top Width (ft)                       43.23
  Vel Total (ft/s)           7.72    Avg. Vel. (ft/s)                      7.72
  Max Chl Dpth (ft)          2.02    Hydr. Depth (ft)                      1.83
  Conv. Total (cfs)        4947.3    Conv. (cfs)                         4947.3
  Length Wtd. (ft)          56.00    Wetted Per. (ft)                     44.17
  Min Ch El (ft)          2796.80    Shear (lb/sq ft)                      1.70
  Alpha                      1.00    Stream Power (lb/ft s)    355.07      0.00       0.00
  Frctn Loss (ft)            0.85    Cum Volume (acre-ft)        0.04     11.25       0.04
  C & E Loss (ft)            0.00    Cum SA (acres)              0.06      6.38       0.06


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
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water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6114

INPUT
Description: Section 61+14: Stabilizer #1
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2804.33	113.58	2804.33	130.47	2804.33	207.5	2804.33	227.5	2804.33
246.5	2795	281.5	2795	300.5	2804.33	320.5	2804.33	355.07	2804.33

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	207.5	.016	227.5	.035	300.5	.016	320.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
227.5	300.5	30	30	30	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2803.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.15	Wt. n-Val.		0.035	
W.S. Elev (ft)	2799.39	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	2800.61	Flow Area (sq ft)		192.62	
E.G. Slope (ft/ft)	0.027828	Area (sq ft)		192.62	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	52.86	Top Width (ft)		52.86	
Vel Total (ft/s)	16.35	Avg. Vel. (ft/s)		16.35	
Max Chl Dpth (ft)	4.38	Hydr. Depth (ft)		3.64	
Conv. Total (cfs)	18882.9	Conv. (cfs)		18882.9	
Length Wtd. (ft)	30.00	Wetted Per. (ft)		54.90	
Min Ch El (ft)	2795.00	Shear (lb/sq ft)		6.10	
Alpha	1.00	Stream Power (lb/ft s)	355.07	0.00	0.00
Frctn Loss (ft)	0.95	Cum Volume (acre-ft)	0.60	27.27	0.38
C & E Loss (ft)	0.19	Cum SA (acres)	0.54	7.09	0.23

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2802.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.88	Wt. n-Val.		0.035	
W.S. Elev (ft)	2798.97	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	2800.11	Flow Area (sq ft)		170.84	
E.G. Slope (ft/ft)	0.029098	Area (sq ft)		170.84	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	51.15	Top Width (ft)		51.15	
Vel Total (ft/s)	15.80	Avg. Vel. (ft/s)		15.80	
Max Chl Dpth (ft)	3.97	Hydr. Depth (ft)		3.34	
Conv. Total (cfs)	15828.3	Conv. (cfs)		15828.3	
Length Wtd. (ft)	30.00	Wetted Per. (ft)		53.00	

Min Ch El (ft)	2795.00	Shear (lb/sq ft)		5.86	
Alpha	1.00	Stream Power (lb/ft s)	355.07	0.00	0.00
Frctn Loss (ft)	0.99	Cum Volume (acre-ft)	0.38	25.27	0.28
C & E Loss (ft)	0.18	Cum SA (acres)	0.37	7.03	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2800.64	Element			
Vel Head (ft)	2.95	Wt. n-Val.		0.035	
W.S. Elev (ft)	2797.69	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	2798.57	Flow Area (sq ft)		108.76	
E.G. Slope (ft/ft)	0.034669	Area (sq ft)		108.76	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	45.94	Top Width (ft)		45.94	
Vel Total (ft/s)	13.79	Avg. Vel. (ft/s)		13.79	
Max Chl Dpth (ft)	2.69	Hydr. Depth (ft)		2.37	
Conv. Total (cfs)	8056.0	Conv. (cfs)		8056.0	
Length Wtd. (ft)	30.00	Wetted Per. (ft)		47.19	
Min Ch El (ft)	2795.00	Shear (lb/sq ft)		4.99	
Alpha	1.00	Stream Power (lb/ft s)	355.07	0.00	0.00
Frctn Loss (ft)	1.12	Cum Volume (acre-ft)	0.13	17.81	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	6.65	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2796.60	Element			
Vel Head (ft)	0.87	Wt. n-Val.		0.035	
W.S. Elev (ft)	2795.73	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	2795.98	Flow Area (sq ft)		26.79	
E.G. Slope (ft/ft)	0.049841	Area (sq ft)		26.79	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	37.99	Top Width (ft)		37.99	
Vel Total (ft/s)	7.46	Avg. Vel. (ft/s)		7.46	
Max Chl Dpth (ft)	0.73	Hydr. Depth (ft)		0.71	
Conv. Total (cfs)	895.9	Conv. (cfs)		895.9	
Length Wtd. (ft)	30.00	Wetted Per. (ft)		38.33	
Min Ch El (ft)	2795.00	Shear (lb/sq ft)		2.17	
Alpha	1.00	Stream Power (lb/ft s)	355.07	0.00	0.00
Frctn Loss (ft)	1.62	Cum Volume (acre-ft)	0.01	6.21	0.01
C & E Loss (ft)	0.04	Cum SA (acres)	0.03	5.99	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2800.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.93	Wt. n-Val.		0.035	
W.S. Elev (ft)	2797.66	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	2798.54	Flow Area (sq ft)		107.67	
E.G. Slope (ft/ft)	0.034794	Area (sq ft)		107.67	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	45.85	Top Width (ft)		45.85	
Vel Total (ft/s)	13.75	Avg. Vel. (ft/s)		13.75	
Max Chl Dpth (ft)	2.66	Hydr. Depth (ft)		2.35	
Conv. Total (cfs)	7934.3	Conv. (cfs)		7934.3	
Length Wtd. (ft)	30.00	Wetted Per. (ft)		47.09	
Min Ch El (ft)	2795.00	Shear (lb/sq ft)		4.97	
Alpha	1.00	Stream Power (lb/ft s)	355.07	0.00	0.00
Frctn Loss (ft)	1.12	Cum Volume (acre-ft)	0.13	18.44	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	6.69	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2799.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.39	Wt. n-Val.		0.035	
W.S. Elev (ft)	2797.04	Reach Len. (ft)	30.00	30.00	30.00
Crit W.S. (ft)	2797.75	Flow Area (sq ft)		79.75	
E.G. Slope (ft/ft)	0.038975	Area (sq ft)		79.75	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	43.30	Top Width (ft)		43.30	
Vel Total (ft/s)	12.41	Avg. Vel. (ft/s)		12.41	
Max Chl Dpth (ft)	2.04	Hydr. Depth (ft)		1.84	
Conv. Total (cfs)	5014.7	Conv. (cfs)		5014.7	
Length Wtd. (ft)	30.00	Wetted Per. (ft)		44.24	
Min Ch El (ft)	2795.00	Shear (lb/sq ft)		4.39	
Alpha	1.00	Stream Power (lb/ft s)	355.07	0.00	0.00
Frctn Loss (ft)	1.22	Cum Volume (acre-ft)	0.08	14.45	0.08
C & E Loss (ft)	0.12	Cum SA (acres)	0.08	6.52	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2798.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.83	Wt. n-Val.		0.035	
W.S. Elev (ft)	2796.48	Reach Len. (ft)	30.00	30.00	30.00

Crit W.S. (ft)	2797.02	Flow Area (sq ft)		56.25	
E.G. Slope (ft/ft)	0.043797	Area (sq ft)		56.25	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	41.03	Top Width (ft)		41.03	
Vel Total (ft/s)	10.84	Avg. Vel. (ft/s)		10.84	
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)		1.37	
Conv. Total (cfs)	2914.8	Conv. (cfs)		2914.8	
Length Wtd. (ft)	30.00	Wetted Per. (ft)		41.71	
Min Ch El (ft)	2795.00	Shear (lb/sq ft)		3.69	
Alpha	1.00	Stream Power (lb/ft s)	355.07	0.00	0.00
Frctn Loss (ft)	1.35	Cum Volume (acre-ft)	0.04	11.16	0.04
C & E Loss (ft)	0.09	Cum SA (acres)	0.06	6.33	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6084

INPUT
Description: Section 60+84: Stabilizer #1
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2801	113.58	2800	200	2800	220	2800	222	2799
227.5	2796.23	246.5	2786.9	281.5	2786.9	300.5	2796.23	306	2799
308	2800	328	2800	355.07	2800.8				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	200	.016	220	.035	308	.016	328	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
220	308	53	53	53	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	220	2802	T
308	355.07	2802	T

Left Levee Station= 220 Elevation= 2802
Right Levee Station= 308 Elevation= 2802

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2798.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.		0.035	
W.S. Elev (ft)	2798.59	Reach Len. (ft)	53.00	53.00	53.00
Crit W.S. (ft)	2792.52	Flow Area (sq ft)		687.35	
E.G. Slope (ft/ft)	0.000750	Area (sq ft)		687.35	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	82.38	Top Width (ft)		82.38	
Vel Total (ft/s)	4.58	Avg. Vel. (ft/s)		4.58	
Max Chl Dpth (ft)	11.69	Hydr. Depth (ft)		8.34	
Conv. Total (cfs)	115019.6	Conv. (cfs)		115019.6	
Length Wtd. (ft)	53.00	Wetted Per. (ft)		87.84	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)	355.07	220.00	308.00

Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.60	26.96	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.54	7.05	0.23

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2798.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.035	
W.S. Elev (ft)	2797.86	Reach Len. (ft)	53.00	53.00	53.00
Crit W.S. (ft)	2792.05	Flow Area (sq ft)		627.94	
E.G. Slope (ft/ft)	0.000708	Area (sq ft)		627.94	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	79.47	Top Width (ft)		79.47	
Vel Total (ft/s)	4.30	Avg. Vel. (ft/s)		4.30	
Max Chl Dpth (ft)	10.96	Hydr. Depth (ft)		7.90	
Conv. Total (cfs)	101462.5	Conv. (cfs)		101462.5	
Length Wtd. (ft)	53.00	Wetted Per. (ft)		84.57	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	355.07	220.00	308.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.38	24.99	0.28
C & E Loss (ft)	0.00	Cum SA (acres)	0.37	6.98	0.18

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2795.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2795.48	Reach Len. (ft)	53.00	53.00	53.00
Crit W.S. (ft)	2790.50	Flow Area (sq ft)		450.08	
E.G. Slope (ft/ft)	0.000554	Area (sq ft)		450.08	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	69.94	Top Width (ft)		69.94	
Vel Total (ft/s)	3.33	Avg. Vel. (ft/s)		3.33	
Max Chl Dpth (ft)	8.58	Hydr. Depth (ft)		6.44	
Conv. Total (cfs)	63713.4	Conv. (cfs)		63713.4	
Length Wtd. (ft)	53.00	Wetted Per. (ft)		73.92	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	355.07	220.00	308.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.13	17.62	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	6.61	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2790.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2790.97	Reach Len. (ft)	53.00	53.00	53.00
Crit W.S. (ft)	2787.88	Flow Area (sq ft)		176.31	
E.G. Slope (ft/ft)	0.000145	Area (sq ft)		176.31	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	51.59	Top Width (ft)		51.59	
Vel Total (ft/s)	1.13	Avg. Vel. (ft/s)		1.13	
Max Chl Dpth (ft)	4.07	Hydr. Depth (ft)		3.42	

Conv. Total (cfs)	16581.1	Conv. (cfs)		16581.1	
Length Wtd. (ft)	53.00	Wetted Per. (ft)		53.48	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	355.07	220.00	308.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	6.14	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	5.96	0.03

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2795.60	Element			
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2795.43	Reach Len. (ft)	53.00	53.00	53.00
Crit W.S. (ft)	2790.47	Flow Area (sq ft)		446.83	
E.G. Slope (ft/ft)	0.000551	Area (sq ft)		446.83	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	69.75	Top Width (ft)		69.75	
Vel Total (ft/s)	3.31	Avg. Vel. (ft/s)		3.31	
Max Chl Dpth (ft)	8.53	Hydr. Depth (ft)		6.41	
Conv. Total (cfs)	63067.2	Conv. (cfs)		63067.2	
Length Wtd. (ft)	53.00	Wetted Per. (ft)		73.71	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	355.07	220.00	308.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.13	18.25	0.13
C & E Loss (ft)	0.00	Cum SA (acres)	0.11	6.65	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2794.27	Element			
Vel Head (ft)	0.12	Wt. n-Val.		0.035	
W.S. Elev (ft)	2794.15	Reach Len. (ft)	53.00	53.00	53.00
Crit W.S. (ft)	2789.66	Flow Area (sq ft)		360.73	
E.G. Slope (ft/ft)	0.000451	Area (sq ft)		360.73	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	64.52	Top Width (ft)		64.52	
Vel Total (ft/s)	2.74	Avg. Vel. (ft/s)		2.74	
Max Chl Dpth (ft)	7.25	Hydr. Depth (ft)		5.59	
Conv. Total (cfs)	46631.5	Conv. (cfs)		46631.5	
Length Wtd. (ft)	53.00	Wetted Per. (ft)		67.89	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	355.07	220.00	308.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.08	14.29	0.08
C & E Loss (ft)	0.00	Cum SA (acres)	0.08	6.48	0.08

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2792.97	Element			
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2792.90	Reach Len. (ft)	53.00	53.00	53.00
Crit W.S. (ft)	2788.94	Flow Area (sq ft)		283.25	
E.G. Slope (ft/ft)	0.000341	Area (sq ft)		283.25	

Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	59.43	Top Width (ft)		59.43	
Vel Total (ft/s)	2.15	Avg. Vel. (ft/s)		2.15	
Max Chl Dpth (ft)	6.00	Hydr. Depth (ft)		4.77	
Conv. Total (cfs)	33031.8	Conv. (cfs)		33031.8	
Length Wtd. (ft)	53.00	Wetted Per. (ft)		62.22	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	355.07	220.00	308.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.04	11.04	0.04
C & E Loss (ft)	0.00	Cum SA (acres)	0.06	6.30	0.06

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6031

INPUT
Description: Section 60+31: Stabilizer #1
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2801	198	2801	218	2801	220	2800	222	2799
227.5	2796.23	246.5	2786.9	281.5	2786.9	300.5	2796.23	308	2800
310	2801	330	2801	355.07	2800.8				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	198	.016	218	.035	310	.016	330	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
218	310	4	4	4	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	218	2802	T
310	355.07	2802	T

Left Levee Station= 218 Elevation= 2802
Right Levee Station= 310 Elevation= 2802

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2798.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.		0.035	
W.S. Elev (ft)	2798.55	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2792.52	Flow Area (sq ft)		683.73	
E.G. Slope (ft/ft)	0.000761	Area (sq ft)		683.73	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	82.21	Top Width (ft)		82.21	
Vel Total (ft/s)	4.61	Avg. Vel. (ft/s)		4.61	
Max Chl Dpth (ft)	11.65	Hydr. Depth (ft)		8.32	
Conv. Total (cfs)	114173.5	Conv. (cfs)		114173.5	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		87.65	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)	355.07	218.00	310.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.60	26.13	0.38
C & E Loss (ft)	0.03	Cum SA (acres)	0.54	6.95	0.23

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2798.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.035	
W.S. Elev (ft)	2797.82	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2792.05	Flow Area (sq ft)		624.65	
E.G. Slope (ft/ft)	0.000719	Area (sq ft)		624.65	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	79.31	Top Width (ft)		79.31	
Vel Total (ft/s)	4.32	Avg. Vel. (ft/s)		4.32	
Max Chl Dpth (ft)	10.92	Hydr. Depth (ft)		7.88	
Conv. Total (cfs)	100720.3	Conv. (cfs)		100720.3	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		84.39	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	355.07	218.00	310.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.38	24.23	0.28
C & E Loss (ft)	0.03	Cum SA (acres)	0.37	6.88	0.18

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2795.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2795.45	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2790.50	Flow Area (sq ft)		447.87	
E.G. Slope (ft/ft)	0.000562	Area (sq ft)		447.87	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	69.81	Top Width (ft)		69.81	
Vel Total (ft/s)	3.35	Avg. Vel. (ft/s)		3.35	
Max Chl Dpth (ft)	8.55	Hydr. Depth (ft)		6.42	
Conv. Total (cfs)	63273.2	Conv. (cfs)		63273.2	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		73.78	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	355.07	218.00	310.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	17.07	0.13
C & E Loss (ft)	0.02	Cum SA (acres)	0.11	6.52	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2790.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2790.97	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2787.88	Flow Area (sq ft)		175.91	
E.G. Slope (ft/ft)	0.000146	Area (sq ft)		175.91	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	51.55	Top Width (ft)		51.55	
Vel Total (ft/s)	1.14	Avg. Vel. (ft/s)		1.14	
Max Chl Dpth (ft)	4.06	Hydr. Depth (ft)		3.41	
Conv. Total (cfs)	16525.3	Conv. (cfs)		16525.3	

Length Wtd. (ft)	4.00	Wetted Per. (ft)		53.44	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	355.07	218.00	310.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	5.92	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	5.89	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2795.57	Element			
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2795.40	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2790.47	Flow Area (sq ft)		444.63	
E.G. Slope (ft/ft)	0.000558	Area (sq ft)		444.63	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	69.62	Top Width (ft)		69.62	
Vel Total (ft/s)	3.33	Avg. Vel. (ft/s)		3.33	
Max Chl Dpth (ft)	8.50	Hydr. Depth (ft)		6.39	
Conv. Total (cfs)	62632.8	Conv. (cfs)		62632.8	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		73.57	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	355.07	218.00	310.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	17.71	0.13
C & E Loss (ft)	0.02	Cum SA (acres)	0.11	6.56	0.11

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2794.24	Element			
Vel Head (ft)	0.12	Wt. n-Val.		0.035	
W.S. Elev (ft)	2794.12	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2789.66	Flow Area (sq ft)		359.09	
E.G. Slope (ft/ft)	0.000457	Area (sq ft)		359.09	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	64.42	Top Width (ft)		64.42	
Vel Total (ft/s)	2.76	Avg. Vel. (ft/s)		2.76	
Max Chl Dpth (ft)	7.22	Hydr. Depth (ft)		5.57	
Conv. Total (cfs)	46331.8	Conv. (cfs)		46331.8	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		67.78	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	355.07	218.00	310.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	13.86	0.08
C & E Loss (ft)	0.02	Cum SA (acres)	0.08	6.40	0.08

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2792.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2792.88	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)	2788.94	Flow Area (sq ft)		282.12	
E.G. Slope (ft/ft)	0.000345	Area (sq ft)		282.12	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	59.36	Top Width (ft)		59.36	
Vel Total (ft/s)	2.16	Avg. Vel. (ft/s)		2.16	
Max Chl Dpth (ft)	5.98	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	32842.6	Conv. (cfs)		32842.6	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		62.13	
Min Ch El (ft)	2786.90	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	355.07	218.00	310.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	10.70	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.06	6.22	0.06

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6027

INPUT
Description: Section 60+27: Stabilizer #1
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2801	113.58	2800	204	2800	224	2800	226.3	2799
227.5	2798.23	246.5	2788.9	281.5	2788.9	300.5	2798.23	304	2800
324	2800	355.07	2800.8						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	204	.016	224	.035	304	.016	324	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
224	304	3	3	3	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	224	2801.5	T
304	355.07	2801.5	T

Left Levee Station= 224 Elevation= 2801.5
Right Levee Station= 304 Elevation= 2801.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2798.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.		0.035	
W.S. Elev (ft)	2798.24	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2794.53	Flow Area (sq ft)		504.59	
E.G. Slope (ft/ft)	0.001775	Area (sq ft)		504.59	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	73.04	Top Width (ft)		73.04	
Vel Total (ft/s)	6.24	Avg. Vel. (ft/s)		6.24	
Max Chl Dpth (ft)	9.34	Hydr. Depth (ft)		6.91	
Conv. Total (cfs)	74774.1	Conv. (cfs)		74774.1	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		77.38	
Min Ch El (ft)	2788.90	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)	355.07	224.00	304.00

Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.60	26.08	0.38
C & E Loss (ft)	0.19	Cum SA (acres)	0.54	6.94	0.23

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2798.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.		0.035	
W.S. Elev (ft)	2797.53	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2794.05	Flow Area (sq ft)		453.43	
E.G. Slope (ft/ft)	0.001759	Area (sq ft)		453.43	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	70.13	Top Width (ft)		70.13	
Vel Total (ft/s)	5.95	Avg. Vel. (ft/s)		5.95	
Max Chl Dpth (ft)	8.63	Hydr. Depth (ft)		6.47	
Conv. Total (cfs)	64380.0	Conv. (cfs)		64380.0	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		74.14	
Min Ch El (ft)	2788.90	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)	355.07	224.00	304.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.38	24.18	0.28
C & E Loss (ft)	0.18	Cum SA (acres)	0.37	6.88	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2795.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.035	
W.S. Elev (ft)	2795.21	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2792.50	Flow Area (sq ft)		302.13	
E.G. Slope (ft/ft)	0.001714	Area (sq ft)		302.13	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	60.71	Top Width (ft)		60.71	
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)		4.96	
Max Chl Dpth (ft)	6.31	Hydr. Depth (ft)		4.98	
Conv. Total (cfs)	36229.9	Conv. (cfs)		36229.9	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		63.65	
Min Ch El (ft)	2788.90	Shear (lb/sq ft)		0.51	
Alpha	1.00	Stream Power (lb/ft s)	355.07	224.00	304.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	17.04	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	6.52	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2790.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	2790.87	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2789.88	Flow Area (sq ft)		76.83	
E.G. Slope (ft/ft)	0.001785	Area (sq ft)		76.83	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	43.02	Top Width (ft)		43.02	
Vel Total (ft/s)	2.60	Avg. Vel. (ft/s)		2.60	
Max Chl Dpth (ft)	1.97	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	4734.5	Conv. (cfs)		4734.5	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		43.94	
Min Ch El (ft)	2788.90	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	355.07	224.00	304.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	5.91	0.01
C & E Loss (ft)	0.05	Cum SA (acres)	0.03	5.89	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2795.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.035	
W.S. Elev (ft)	2795.17	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2792.47	Flow Area (sq ft)		299.41	
E.G. Slope (ft/ft)	0.001713	Area (sq ft)		299.41	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	60.53	Top Width (ft)		60.53	
Vel Total (ft/s)	4.94	Avg. Vel. (ft/s)		4.94	
Max Chl Dpth (ft)	6.27	Hydr. Depth (ft)		4.95	
Conv. Total (cfs)	35763.7	Conv. (cfs)		35763.7	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		63.44	
Min Ch El (ft)	2788.90	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	355.07	224.00	304.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.13	17.68	0.13
C & E Loss (ft)	0.14	Cum SA (acres)	0.11	6.56	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2794.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.035	
W.S. Elev (ft)	2793.93	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2791.66	Flow Area (sq ft)		227.37	
E.G. Slope (ft/ft)	0.001694	Area (sq ft)		227.37	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	55.47	Top Width (ft)		55.47	
Vel Total (ft/s)	4.35	Avg. Vel. (ft/s)		4.35	

Max Chl Dpth (ft)	5.03	Hydr. Depth (ft)		4.10	
Conv. Total (cfs)	24053.0	Conv. (cfs)		24053.0	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		57.81	
Min Ch El (ft)	2788.90	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)	355.07	224.00	304.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.08	13.83	0.08
C & E Loss (ft)	0.12	Cum SA (acres)	0.08	6.39	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2792.94	Element			
Vel Head (ft)	0.22	Wt. n-Val.		0.035	
W.S. Elev (ft)	2792.72	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2790.94	Flow Area (sq ft)		163.36	
E.G. Slope (ft/ft)	0.001696	Area (sq ft)		163.36	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	50.55	Top Width (ft)		50.55	
Vel Total (ft/s)	3.73	Avg. Vel. (ft/s)		3.73	
Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)		3.23	
Conv. Total (cfs)	14814.1	Conv. (cfs)		14814.1	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		52.33	
Min Ch El (ft)	2788.90	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	355.07	224.00	304.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.04	10.68	0.04
C & E Loss (ft)	0.09	Cum SA (acres)	0.06	6.22	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6024

INPUT
Description: Section 60+24: Stabilizer #1 (exit)
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2801	113.58	2800	130.47	2799	216	2798	236	2798
254	2788.9	274	2788.9	294	2799.1	314	2799.1	318.31	2800
355.07	2800.8								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	216	.016	236	.03	294	.016	314	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
236	294	281.9	281.9	281.9	.1	.3

Ineffective Flow num= 2

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   Sta L   Sta R    Elev  Permanent
     100     236  2799.5       T
     294  355.07  2799.1       T
Left Levee      Station=     236      Elevation=  2799.5
Right Levee     Station=     294      Elevation=  2799.1

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2798.64    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               2.52    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2796.12    Reach Len. (ft)           281.90     281.90     281.90
  Crit W.S. (ft)           2796.12    Flow Area (sq ft)                    247.18
  E.G. Slope (ft/ft)      0.008263    Area (sq ft)                         247.18
  Q Total (cfs)            3150.00    Flow (cfs)                          3150.00
  Top Width (ft)             48.45    Top Width (ft)                        48.45
  Vel Total (ft/s)           12.74    Avg. Vel. (ft/s)                      12.74
  Max Chl Dpth (ft)           7.22    Hydr. Depth (ft)                       5.10
  Conv. Total (cfs)        34653.8    Conv. (cfs)                        34653.8
  Length Wtd. (ft)          281.90    Wetted Per. (ft)                      51.90
  Min Ch El (ft)           2788.90    Shear (lb/sq ft)                       2.46
  Alpha                       1.00    Stream Power (lb/ft s)    355.07     236.00     294.00
  Frctn Loss (ft)             0.19    Cum Volume (acre-ft)        0.60      26.05       0.38
  C & E Loss (ft)             0.57    Cum SA (acres)              0.54       6.93       0.23


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2797.89    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               2.35    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2795.54    Reach Len. (ft)           281.90     281.90     281.90
  Crit W.S. (ft)           2795.54    Flow Area (sq ft)                    219.42
  E.G. Slope (ft/ft)      0.008433    Area (sq ft)                         219.42
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             46.14    Top Width (ft)                        46.14
  Vel Total (ft/s)           12.31    Avg. Vel. (ft/s)                      12.31
  Max Chl Dpth (ft)           6.64    Hydr. Depth (ft)                       4.76
  Conv. Total (cfs)        29401.5    Conv. (cfs)                        29401.5
  Length Wtd. (ft)          281.90    Wetted Per. (ft)                      49.31
  Min Ch El (ft)           2788.90    Shear (lb/sq ft)                       2.34
  Alpha                       1.00    Stream Power (lb/ft s)    355.07     236.00     294.00
  Frctn Loss (ft)             0.21    Cum Volume (acre-ft)        0.38      24.16       0.28
  C & E Loss (ft)             0.52    Cum SA (acres)              0.37       6.87       0.18


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
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for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2795.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.78	Wt. n-Val.		0.030	
W.S. Elev (ft)	2793.66	Reach Len. (ft)	281.90	281.90	281.90
Crit W.S. (ft)	2793.66	Flow Area (sq ft)		139.93	
E.G. Slope (ft/ft)	0.009128	Area (sq ft)		139.93	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	38.76	Top Width (ft)		38.76	
Vel Total (ft/s)	10.72	Avg. Vel. (ft/s)		10.72	
Max Chl Dpth (ft)	4.76	Hydr. Depth (ft)		3.61	
Conv. Total (cfs)	15700.2	Conv. (cfs)		15700.2	
Length Wtd. (ft)	281.90	Wetted Per. (ft)		41.04	
Min Ch El (ft)	2788.90	Shear (lb/sq ft)		1.94	
Alpha	1.00	Stream Power (lb/ft s)	355.07	236.00	294.00
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.13	17.02	0.13
C & E Loss (ft)	0.39	Cum SA (acres)	0.11	6.51	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2790.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.030	
W.S. Elev (ft)	2790.29	Reach Len. (ft)	281.90	281.90	281.90
Crit W.S. (ft)	2790.29	Flow Area (sq ft)		31.52	
E.G. Slope (ft/ft)	0.012776	Area (sq ft)		31.52	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.46	Top Width (ft)		25.46	
Vel Total (ft/s)	6.34	Avg. Vel. (ft/s)		6.34	

Max Chl Dpth (ft)	1.39	Hydr. Depth (ft)		1.24	
Conv. Total (cfs)	1769.5	Conv. (cfs)		1769.5	
Length Wtd. (ft)	281.90	Wetted Per. (ft)		26.13	
Min Ch El (ft)	2788.90	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)	355.07	236.00	294.00
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	0.01	5.91	0.01
C & E Loss (ft)	0.13	Cum SA (acres)	0.03	5.89	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2795.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.78	Wt. n-Val.		0.030	
W.S. Elev (ft)	2793.62	Reach Len. (ft)	281.90	281.90	281.90
Crit W.S. (ft)	2793.62	Flow Area (sq ft)		138.09	
E.G. Slope (ft/ft)	0.009222	Area (sq ft)		138.09	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	38.57	Top Width (ft)		38.57	
Vel Total (ft/s)	10.72	Avg. Vel. (ft/s)		10.72	
Max Chl Dpth (ft)	4.72	Hydr. Depth (ft)		3.58	
Conv. Total (cfs)	15411.7	Conv. (cfs)		15411.7	
Length Wtd. (ft)	281.90	Wetted Per. (ft)		40.83	
Min Ch El (ft)	2788.90	Shear (lb/sq ft)		1.95	
Alpha	1.00	Stream Power (lb/ft s)	355.07	236.00	294.00
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.13	17.66	0.13
C & E Loss (ft)	0.39	Cum SA (acres)	0.11	6.55	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2794.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.49	Wt. n-Val.		0.030	
W.S. Elev (ft)	2792.61	Reach Len. (ft)	281.90	281.90	281.90
Crit W.S. (ft)	2792.61	Flow Area (sq ft)		101.23	
E.G. Slope (ft/ft)	0.009961	Area (sq ft)		101.23	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	34.60	Top Width (ft)		34.60	
Vel Total (ft/s)	9.78	Avg. Vel. (ft/s)		9.78	
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)		2.93	
Conv. Total (cfs)	9919.4	Conv. (cfs)		9919.4	
Length Wtd. (ft)	281.90	Wetted Per. (ft)		36.38	
Min Ch El (ft)	2788.90	Shear (lb/sq ft)		1.73	
Alpha	1.00	Stream Power (lb/ft s)	355.07	236.00	294.00
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.08	13.82	0.08
C & E Loss (ft)	0.31	Cum SA (acres)	0.08	6.39	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2792.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.15	Wt. n-Val.		0.030	
W.S. Elev (ft)	2791.68	Reach Len. (ft)	281.90	281.90	281.90
Crit W.S. (ft)	2791.68	Flow Area (sq ft)		70.75	
E.G. Slope (ft/ft)	0.010638	Area (sq ft)		70.75	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	30.94	Top Width (ft)		30.94	
Vel Total (ft/s)	8.62	Avg. Vel. (ft/s)		8.62	
Max Chl Dpth (ft)	2.78	Hydr. Depth (ft)		2.29	
Conv. Total (cfs)	5914.4	Conv. (cfs)		5914.4	
Length Wtd. (ft)	281.90	Wetted Per. (ft)		32.27	
Min Ch El (ft)	2788.90	Shear (lb/sq ft)		1.46	
Alpha	1.00	Stream Power (lb/ft s)	355.07	236.00	294.00
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	0.04	10.67	0.04
C & E Loss (ft)	0.24	Cum SA (acres)	0.06	6.22	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

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Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 5742.1

INPUT
Description: Section 57+42.1
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2797  138.63    2797  197.15    2796  207.41    2796  228.76    2795
     238    2785     285    2785     285    2795  326.77    2795  403.98    2796

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  228.76    .013     285    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        228.76     285               .1      .1      .1             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100  228.76    2798       T
     285  403.98    2798       T
Left Levee      Station=  228.76      Elevation=    2798
Right Levee     Station=     285      Elevation=    2798

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2795.25    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.63    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2794.62    Reach Len. (ft)             0.10       0.10       0.10
  Crit W.S. (ft)           2790.12    Flow Area (sq ft)                    495.13
  E.G. Slope (ft/ft)      0.000227    Area (sq ft)                         495.13
  Q Total (cfs)            3150.00    Flow (cfs)                          3150.00
  Top Width (ft)             55.89    Top Width (ft)                        55.89
  Vel Total (ft/s)            6.36    Avg. Vel. (ft/s)                       6.36
  Max Chl Dpth (ft)           9.62    Hydr. Depth (ft)                       8.86
  Conv. Total (cfs)       209082.7    Conv. (cfs)                        209082.7
  Length Wtd. (ft)            0.10    Wetted Per. (ft)                      69.73
  Min Ch El (ft)           2785.00    Shear (lb/sq ft)                       0.10
  Alpha                       1.00    Stream Power (lb/ft s)    403.98     228.76     285.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.60      23.65       0.38
  C & E Loss (ft)             0.01    Cum SA (acres)              0.54       6.60       0.23


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2794.00    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.62    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2793.38    Reach Len. (ft)             0.10       0.10       0.10
```

Crit W.S. (ft)	2789.60	Flow Area (sq ft)		426.24	
E.G. Slope (ft/ft)	0.000259	Area (sq ft)		426.24	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	54.74	Top Width (ft)		54.74	
Vel Total (ft/s)	6.33	Avg. Vel. (ft/s)		6.33	
Max Chl Dpth (ft)	8.38	Hydr. Depth (ft)		7.79	
Conv. Total (cfs)	167630.7	Conv. (cfs)		167630.7	
Length Wtd. (ft)	0.10	Wetted Per. (ft)		66.79	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	285.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.38	22.07	0.28
C & E Loss (ft)	0.02	Cum SA (acres)	0.37	6.55	0.18

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2790.88	Element			
Vel Head (ft)	0.49	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.39	Reach Len. (ft)	0.10	0.10	0.10
Crit W.S. (ft)	2788.12	Flow Area (sq ft)		266.76	
E.G. Slope (ft/ft)	0.000329	Area (sq ft)		266.76	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	51.98	Top Width (ft)		51.98	
Vel Total (ft/s)	5.62	Avg. Vel. (ft/s)		5.62	
Max Chl Dpth (ft)	5.39	Hydr. Depth (ft)		5.13	
Conv. Total (cfs)	82691.4	Conv. (cfs)		82691.4	
Length Wtd. (ft)	0.10	Wetted Per. (ft)		59.73	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	285.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	15.71	0.13
C & E Loss (ft)	0.02	Cum SA (acres)	0.11	6.22	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2786.71	Element			
Vel Head (ft)	1.24	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.47	Reach Len. (ft)	0.10	0.10	0.10
Crit W.S. (ft)	2785.82	Flow Area (sq ft)		22.38	
E.G. Slope (ft/ft)	0.016974	Area (sq ft)		22.38	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	47.44	Top Width (ft)		47.44	
Vel Total (ft/s)	8.94	Avg. Vel. (ft/s)		8.94	
Max Chl Dpth (ft)	0.47	Hydr. Depth (ft)		0.47	
Conv. Total (cfs)	1535.1	Conv. (cfs)		1535.1	
Length Wtd. (ft)	0.10	Wetted Per. (ft)		48.12	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	285.00
Frctn Loss (ft)	4.13	Cum Volume (acre-ft)	0.01	5.73	0.01
C & E Loss (ft)	0.06	Cum SA (acres)	0.03	5.65	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2790.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.34	Reach Len. (ft)	0.10	0.10	0.10
Crit W.S. (ft)	2788.12	Flow Area (sq ft)		263.91	
E.G. Slope (ft/ft)	0.000331	Area (sq ft)		263.91	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	51.93	Top Width (ft)		51.93	
Vel Total (ft/s)	5.61	Avg. Vel. (ft/s)		5.61	
Max Chl Dpth (ft)	5.34	Hydr. Depth (ft)		5.08	
Conv. Total (cfs)	81340.1	Conv. (cfs)		81340.1	
Length Wtd. (ft)	0.10	Wetted Per. (ft)		59.60	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	285.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.13	16.36	0.13
C & E Loss (ft)	0.02	Cum SA (acres)	0.11	6.26	0.11

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2790.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.28	Reach Len. (ft)	0.10	0.10	0.10
Crit W.S. (ft)	2787.37	Flow Area (sq ft)		60.98	
E.G. Slope (ft/ft)	0.015495	Area (sq ft)		60.98	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	48.18	Top Width (ft)		48.18	
Vel Total (ft/s)	16.24	Avg. Vel. (ft/s)		16.24	
Max Chl Dpth (ft)	1.28	Hydr. Depth (ft)		1.27	
Conv. Total (cfs)	7953.1	Conv. (cfs)		7953.1	
Length Wtd. (ft)	0.10	Wetted Per. (ft)		50.03	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		1.18	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	285.00
Frctn Loss (ft)	3.46	Cum Volume (acre-ft)	0.08	13.29	0.08
C & E Loss (ft)	0.26	Cum SA (acres)	0.08	6.12	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2788.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.98	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.93	Reach Len. (ft)	0.10	0.10	0.10
Crit W.S. (ft)	2786.71	Flow Area (sq ft)		44.04	
E.G. Slope (ft/ft)	0.017024	Area (sq ft)		44.04	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	47.86	Top Width (ft)		47.86	
Vel Total (ft/s)	13.85	Avg. Vel. (ft/s)		13.85	
Max Chl Dpth (ft)	0.93	Hydr. Depth (ft)		0.92	

Conv. Total (cfs)	4675.2	Conv. (cfs)		4675.2		
Length Wtd. (ft)	0.10	Wetted Per. (ft)		49.19		
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.95		
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	285.00	
Frctn Loss (ft)	3.74	Cum Volume (acre-ft)	0.04	10.30	0.04	
C & E Loss (ft)	0.18	Cum SA (acres)	0.06	5.96	0.06	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 5742

INPUT
Description: Section 57+42 (U/S of Apple Valley Road)
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2797	138.63	2797	197.15	2796	207.41	2796	228.76	2795
238	2790	238	2785	285	2785	285	2790	288.85	2794
326.77	2795	403.98	2796						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	228.76	.013	288.85	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
228.76	288.85	132.4	132.4	132.4	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	228.76	2798	T
288.85	403.98	2798	T

Left Levee Station= 228.76 Elevation= 2798
Right Levee Station= 288.85 Elevation= 2798

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2795.24	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.67	Wt. n-Val.		0.013		
W.S. Elev (ft)	2794.57	Reach Len. (ft)	132.40	132.40	132.40	
Crit W.S. (ft)	2790.23	Flow Area (sq ft)		478.86		
E.G. Slope (ft/ft)	0.000268	Area (sq ft)		478.86		
Q Total (cfs)	3150.00	Flow (cfs)		3150.00		
Top Width (ft)	59.29	Top Width (ft)		59.29		
Vel Total (ft/s)	6.58	Avg. Vel. (ft/s)		6.58		
Max Chl Dpth (ft)	9.57	Hydr. Depth (ft)		8.08		
Conv. Total (cfs)	192294.3	Conv. (cfs)		192294.3		
Length Wtd. (ft)	132.40	Wetted Per. (ft)		72.72		
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.11		
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	288.85	
Frctn Loss (ft)		Cum Volume (acre-ft)	0.60	23.65	0.38	
C & E Loss (ft)		Cum SA (acres)	0.54	6.60	0.23	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2793.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.69	Wt. n-Val.		0.013	
W.S. Elev (ft)	2793.29	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2789.71	Flow Area (sq ft)		404.91	
E.G. Slope (ft/ft)	0.000318	Area (sq ft)		404.91	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	56.25	Top Width (ft)		56.25	
Vel Total (ft/s)	6.67	Avg. Vel. (ft/s)		6.67	
Max Chl Dpth (ft)	8.29	Hydr. Depth (ft)		7.20	
Conv. Total (cfs)	151330.6	Conv. (cfs)		151330.6	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		68.48	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	288.85
Frctn Loss (ft)		Cum Volume (acre-ft)	0.38	22.07	0.28
C & E Loss (ft)		Cum SA (acres)	0.37	6.55	0.18

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2790.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.30	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2788.18	Flow Area (sq ft)		249.03	
E.G. Slope (ft/ft)	0.000398	Area (sq ft)		249.03	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	47.83	Top Width (ft)		47.83	
Vel Total (ft/s)	6.02	Avg. Vel. (ft/s)		6.02	
Max Chl Dpth (ft)	5.30	Hydr. Depth (ft)		5.21	
Conv. Total (cfs)	75166.6	Conv. (cfs)		75166.6	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		58.03	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	288.85
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	15.71	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	6.22	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2786.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.24	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.48	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2785.82	Flow Area (sq ft)		22.42	
E.G. Slope (ft/ft)	0.016782	Area (sq ft)		22.42	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	47.00	Top Width (ft)		47.00	
Vel Total (ft/s)	8.92	Avg. Vel. (ft/s)		8.92	
Max Chl Dpth (ft)	0.48	Hydr. Depth (ft)		0.48	
Conv. Total (cfs)	1543.9	Conv. (cfs)		1543.9	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		47.95	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	5.73	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	5.65	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2790.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.24	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2788.15	Flow Area (sq ft)		246.48	
E.G. Slope (ft/ft)	0.000400	Area (sq ft)		246.48	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	47.68	Top Width (ft)		47.68	
Vel Total (ft/s)	6.00	Avg. Vel. (ft/s)		6.00	
Max Chl Dpth (ft)	5.24	Hydr. Depth (ft)		5.17	
Conv. Total (cfs)	74045.3	Conv. (cfs)		74045.3	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		57.85	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	288.85
Frctn Loss (ft)		Cum Volume (acre-ft)	0.13	16.36	0.13
C & E Loss (ft)		Cum SA (acres)	0.11	6.26	0.11

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2790.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.30	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2787.42	Flow Area (sq ft)		61.18	
E.G. Slope (ft/ft)	0.015150	Area (sq ft)		61.18	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	47.00	Top Width (ft)		47.00	
Vel Total (ft/s)	16.18	Avg. Vel. (ft/s)		16.18	
Max Chl Dpth (ft)	1.30	Hydr. Depth (ft)		1.30	
Conv. Total (cfs)	8043.1	Conv. (cfs)		8043.1	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		49.60	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		1.17	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.08	13.29	0.08
C & E Loss (ft)	0.01	Cum SA (acres)	0.08	6.12	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2788.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.96	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.94	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2786.75	Flow Area (sq ft)		44.17	
E.G. Slope (ft/ft)	0.016715	Area (sq ft)		44.17	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	47.00	Top Width (ft)		47.00	
Vel Total (ft/s)	13.81	Avg. Vel. (ft/s)		13.81	
Max Chl Dpth (ft)	0.94	Hydr. Depth (ft)		0.94	
Conv. Total (cfs)	4718.2	Conv. (cfs)		4718.2	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		48.88	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	288.85
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.04	10.30	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.06	5.96	0.06

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Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CULVERT


RIVER: Desert Knolls Wa
REACH: Main               RS: 5679.8

INPUT
Description: Apple Valley Road Station 56+79.8
Distance from Upstream XS =      .5
Deck/Roadway Width        =   131.5
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       9
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     119  2798.2          135.81  2797.5          159.24  2797.5
  177.08  2797.5          227.59  2797.5          268.39  2797.5
  334.53  2797.5          413.82  2797.5             455    2799

Upstream Bridge Cross Section Data
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2797  138.63    2797  197.15    2796  207.41    2796  228.76    2795
     238    2790     238    2785     285    2785     285    2790  288.85    2794
  326.77    2795  403.98    2796

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  228.76    .013  288.85    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        228.76  288.85             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100  228.76    2798       T
  288.85  403.98    2798       T
Left Levee      Station=  228.76      Elevation=    2798
Right Levee     Station=  288.85      Elevation=    2798

Downstream  Deck/Roadway Coordinates
    num=       9
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     119    2798          135.81    2797          159.24    2797
  177.08    2797          227.59    2797          268.39    2797
  334.53    2797          413.82    2797             455    2797

Downstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2806  163.43    2803  186.22    2801  189.43    2800   193.6    2799
  220.14    2798  225.96    2797  235.64    2796  243.21    2795  252.32    2794
  265.12    2793     273    2792     273    2784     319    2784     319    2792
  340.05    2793  406.62    2794  422.95    2794  454.77    2795

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  265.12    .013  340.05    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        265.12  340.05             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
```

```
     100  265.12    2797       T
  340.05  454.77    2797       T
Left Levee      Station=  265.12      Elevation=    2797
Right Levee     Station=  340.05      Elevation=    2797

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  2

Culvert Name     Shape      Rise    Span
Culvert #2           Box       9       7
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .3     132     .013     .013        0                  .2                1
Number of Barrels =  2
Upstream   Elevation =  2785
Centerline Stations
    Sta.    Sta.
     242   280.5
Downstream Elevation =  2784
Centerline Stations
    Sta.    Sta.
     277   314.5

Culvert Name     Shape      Rise    Span
Culvert #1           Box       9      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .3     132     .013     .013        0                  .2                1
Number of Barrels =  2
Upstream   Elevation =  2785
Centerline Stations
    Sta.    Sta.
   253.5     269
Downstream Elevation =  2784
Centerline Stations
    Sta.    Sta.
     288     303

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #2

  Q Culv Group (cfs)       1032.47    Culv Full Len (ft)        132.00
  # Barrels                      2    Culv Vel US (ft/s)          8.19
  Q Barrel (cfs)            516.23    Culv Vel DS (ft/s)          8.19
  E.G. US. (ft)            2795.24    Culv Inv El Up (ft)      2785.00
  W.S. US. (ft)            2794.57    Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)             2794.39    Culv Frctn Ls (ft)          0.27
  W.S. DS (ft)             2793.73    Culv Exit Loss (ft)         0.38
  Delta EG (ft)               0.85    Culv Entr Loss (ft)         0.21
  Delta WS (ft)               0.84    Q Weir (cfs)
  E.G. IC (ft)             2793.90    Weir Sta Lft (ft)
  E.G. OC (ft)             2795.26    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2794.00    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2793.00    Weir Avg Depth (ft)
```

Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.53	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	875.42	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	8.07
Q Barrel (cfs)	437.71	Culv Vel DS (ft/s)	7.10
E.G. US. (ft)	2793.98	Culv Inv El Up (ft)	2785.00
W.S. US. (ft)	2793.29	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2793.46	Culv Frctn Ls (ft)	0.17
W.S. DS (ft)	2792.80	Culv Exit Loss (ft)	0.12
Delta EG (ft)	0.52	Culv Entr Loss (ft)	0.20
Delta WS (ft)	0.49	Q Weir (cfs)	
E.G. IC (ft)	2792.94	Weir Sta Lft (ft)	
E.G. OC (ft)	2793.96	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2792.75	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2792.80	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	4.11	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.95	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)	493.72	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	7.18
Q Barrel (cfs)	246.86	Culv Vel DS (ft/s)	5.85
E.G. US. (ft)	2790.86	Culv Inv El Up (ft)	2785.00
W.S. US. (ft)	2790.30	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2790.48	Culv Frctn Ls (ft)	0.15
W.S. DS (ft)	2790.03	Culv Exit Loss (ft)	0.08
Delta EG (ft)	0.38	Culv Entr Loss (ft)	0.16
Delta WS (ft)	0.27	Q Weir (cfs)	
E.G. IC (ft)	2790.34	Weir Sta Lft (ft)	
E.G. OC (ft)	2790.87	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2789.91	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2790.03	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.68	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.38	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #2

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2785.00
W.S. US. (ft)		Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2797.51

Warning: The program cannot perform supercritical flow through multiple culverts. The program sets the water surface to critical
depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)	486.72	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	7.15
Q Barrel (cfs)	243.36	Culv Vel DS (ft/s)	5.82
E.G. US. (ft)	2790.80	Culv Inv El Up (ft)	2785.00
W.S. US. (ft)	2790.24	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2790.43	Culv Frctn Ls (ft)	0.15
W.S. DS (ft)	2789.98	Culv Exit Loss (ft)	0.08
Delta EG (ft)	0.38	Culv Entr Loss (ft)	0.16
Delta WS (ft)	0.27	Q Weir (cfs)	
E.G. IC (ft)	2790.29	Weir Sta Lft (ft)	
E.G. OC (ft)	2790.81	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2789.86	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2789.98	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.66	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.35	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2785.00
W.S. US. (ft)		Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2797.51

Warning: The program cannot perform supercritical flow through multiple culverts. The program sets the water surface to critical
depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #2

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2785.00
W.S. US. (ft)		Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	

```
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2797.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2117.53    Culv Full Len (ft)        118.50
  # Barrels                      2    Culv Vel US (ft/s)          8.52
  Q Barrel (cfs)           1058.77    Culv Vel DS (ft/s)          8.40
  E.G. US. (ft)            2795.24    Culv Inv El Up (ft)      2785.00
  W.S. US. (ft)            2794.57    Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)             2794.39    Culv Frctn Ls (ft)          0.18
  W.S. DS (ft)             2793.73    Culv Exit Loss (ft)         0.44
  Delta EG (ft)               0.85    Culv Entr Loss (ft)         0.23
  Delta WS (ft)               0.84    Q Weir (cfs)
  E.G. IC (ft)             2794.05    Weir Sta Lft (ft)
  E.G. OC (ft)             2795.23    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2793.88    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2793.00    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         4.05    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.62    Min El Weir Flow (ft)    2797.51


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1824.58    Culv Full Len (ft)
  # Barrels                      2    Culv Vel US (ft/s)          8.54
  Q Barrel (cfs)            912.29    Culv Vel DS (ft/s)          7.40
  E.G. US. (ft)            2793.98    Culv Inv El Up (ft)      2785.00
  W.S. US. (ft)            2793.29    Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)             2793.46    Culv Frctn Ls (ft)          0.11
  W.S. DS (ft)             2792.80    Culv Exit Loss (ft)         0.19
  Delta EG (ft)               0.52    Culv Entr Loss (ft)         0.23
  Delta WS (ft)               0.49    Q Weir (cfs)
  E.G. IC (ft)             2793.17    Weir Sta Lft (ft)
  E.G. OC (ft)             2793.99    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2792.63    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2792.80    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         3.66    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.09    Min El Weir Flow (ft)    2797.51


CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1006.28    Culv Full Len (ft)
  # Barrels                      2    Culv Vel US (ft/s)          7.46
  Q Barrel (cfs)            503.14    Culv Vel DS (ft/s)          5.96
  E.G. US. (ft)            2790.86    Culv Inv El Up (ft)      2785.00
  W.S. US. (ft)            2790.30    Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)             2790.48    Culv Frctn Ls (ft)          0.10
  W.S. DS (ft)             2790.03    Culv Exit Loss (ft)         0.10
  Delta EG (ft)               0.38    Culv Entr Loss (ft)         0.17
  Delta WS (ft)               0.27    Q Weir (cfs)
  E.G. IC (ft)             2790.41    Weir Sta Lft (ft)
  E.G. OC (ft)             2790.85    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2789.82    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2790.03    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         2.44    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.42    Min El Weir Flow (ft)    2797.51
```

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2785.00
W.S. US. (ft)		Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2797.51

Warning: The program cannot perform supercritical flow through multiple culverts. The program sets the water surface to critical
depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	993.28	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	7.45
Q Barrel (cfs)	496.64	Culv Vel DS (ft/s)	5.94
E.G. US. (ft)	2790.80	Culv Inv El Up (ft)	2785.00
W.S. US. (ft)	2790.24	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2790.43	Culv Frctn Ls (ft)	0.10
W.S. DS (ft)	2789.98	Culv Exit Loss (ft)	0.10
Delta EG (ft)	0.38	Culv Entr Loss (ft)	0.17
Delta WS (ft)	0.27	Q Weir (cfs)	
E.G. IC (ft)	2790.36	Weir Sta Lft (ft)	
E.G. OC (ft)	2790.80	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2789.76	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2789.98	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.41	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.39	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)		Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	
Q Barrel (cfs)		Culv Vel DS (ft/s)	
E.G. US. (ft)		Culv Inv El Up (ft)	2785.00
W.S. US. (ft)		Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)		Culv Frctn Ls (ft)	
W.S. DS (ft)		Culv Exit Loss (ft)	
Delta EG (ft)		Culv Entr Loss (ft)	
Delta WS (ft)		Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2797.51

```
Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     2     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2785.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2797.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 5609.6

INPUT
Description: Section 56+09.6 (D/S of Apple Valley Road)
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2806  163.43    2803  186.22    2801  189.43    2800   193.6    2799
  220.14    2798  225.96    2797  235.64    2796  243.21    2795  252.32    2794
  265.12    2793     273    2792     273    2784     319    2784     319    2792
  340.05    2793  406.62    2794  422.95    2794  454.77    2795

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  265.12    .013  340.05    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        265.12  340.05             28.3    28.3    28.3             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100  265.12    2797       T
  340.05  454.77    2797       T
Left Levee      Station=  265.12      Elevation=    2797
Right Levee     Station=  340.05      Elevation=    2797

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2794.39    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.66    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2793.73    Reach Len. (ft)            28.30      28.30      28.30
  Crit W.S. (ft)           2789.28    Flow Area (sq ft)                    483.22
  E.G. Slope (ft/ft)      0.000359    Area (sq ft)                         483.22
  Q Total (cfs)            3150.00    Flow (cfs)                          3150.00
```

Top Width (ft)	74.93	Top Width (ft)		74.93	
Vel Total (ft/s)	6.52	Avg. Vel. (ft/s)		6.52	
Max Chl Dpth (ft)	9.73	Hydr. Depth (ft)		6.45	
Conv. Total (cfs)	166314.1	Conv. (cfs)		166314.1	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		92.48	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	454.77	265.12	340.05
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.60	23.07	0.38
C & E Loss (ft)	0.67	Cum SA (acres)	0.54	6.39	0.23

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2793.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.013	
W.S. Elev (ft)	2792.80	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2788.77	Flow Area (sq ft)		414.37	
E.G. Slope (ft/ft)	0.000395	Area (sq ft)		414.37	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	69.27	Top Width (ft)		69.27	
Vel Total (ft/s)	6.52	Avg. Vel. (ft/s)		6.52	
Max Chl Dpth (ft)	8.80	Hydr. Depth (ft)		5.98	
Conv. Total (cfs)	135804.3	Conv. (cfs)		135804.3	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		85.34	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	454.77	265.12	340.05
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.38	21.54	0.28
C & E Loss (ft)	0.62	Cum SA (acres)	0.37	6.36	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2790.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.03	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2787.23	Flow Area (sq ft)		277.20	
E.G. Slope (ft/ft)	0.000279	Area (sq ft)		277.20	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	5.41	Avg. Vel. (ft/s)		5.41	
Max Chl Dpth (ft)	6.03	Hydr. Depth (ft)		6.03	
Conv. Total (cfs)	89846.0	Conv. (cfs)		89846.0	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		58.05	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	454.77	265.12	340.05
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	15.36	0.13
C & E Loss (ft)	0.48	Cum SA (acres)	0.11	6.08	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2785.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.013	
W.S. Elev (ft)	2784.84	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2784.84	Flow Area (sq ft)		38.81	
E.G. Slope (ft/ft)	0.002675	Area (sq ft)		38.81	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	5.15	Avg. Vel. (ft/s)		5.15	
Max Chl Dpth (ft)	0.84	Hydr. Depth (ft)		0.84	
Conv. Total (cfs)	3867.2	Conv. (cfs)		3867.2	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		47.69	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	454.77	265.12	340.05
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	5.73	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	5.51	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2790.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.013	
W.S. Elev (ft)	2789.98	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2787.20	Flow Area (sq ft)		274.88	
E.G. Slope (ft/ft)	0.000278	Area (sq ft)		274.88	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	5.38	Avg. Vel. (ft/s)		5.38	
Max Chl Dpth (ft)	5.98	Hydr. Depth (ft)		5.98	
Conv. Total (cfs)	88696.7	Conv. (cfs)		88696.7	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		57.95	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	454.77	265.12	340.05
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.13	16.01	0.13
C & E Loss (ft)	0.48	Cum SA (acres)	0.11	6.12	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2787.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.44	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2786.44	Flow Area (sq ft)		112.04	
E.G. Slope (ft/ft)	0.002086	Area (sq ft)		112.04	
Q Total (cfs)	990.00	Flow (cfs)		990.00	

Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)		8.84	
Max Chl Dpth (ft)	2.44	Hydr. Depth (ft)		2.44	
Conv. Total (cfs)	21676.8	Conv. (cfs)		21676.8	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		50.87	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)	454.77	265.12	340.05
Frctn Loss (ft)		Cum Volume (acre-ft)	0.08	13.29	0.08
C & E Loss (ft)		Cum SA (acres)	0.08	5.98	0.08

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2786.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.78	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2785.78	Flow Area (sq ft)		81.66	
E.G. Slope (ft/ft)	0.002194	Area (sq ft)		81.66	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	7.47	Avg. Vel. (ft/s)		7.47	
Max Chl Dpth (ft)	1.78	Hydr. Depth (ft)		1.78	
Conv. Total (cfs)	13021.9	Conv. (cfs)		13021.9	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		49.55	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	454.77	265.12	340.05
Frctn Loss (ft)		Cum Volume (acre-ft)	0.04	10.30	0.04
C & E Loss (ft)		Cum SA (acres)	0.06	5.82	0.06

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 5581.3

INPUT
Description: Section 52+51.2
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2795	104.63	2793	113	2792	133	2792	134.99	2791
136.49	2790	137.99	2789	140.22	2787	140.23	2783.6	170.24	2783.6
170.25	2788	171.65	2789	173.14	2790	175.06	2791	177.7	2792
197.7	2792	203.68	2793						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	113	.016	133	.013	177.7	.016	197.7	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
133	177.7	66.1	66.1	66.1	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	133	2794	T
177.7	203.68	2794	T

Left Levee Station= 133 Elevation= 2794
Right Levee Station= 177.7 Elevation= 2794

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2793.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.91	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.79	Reach Len. (ft)	66.10	66.10	66.10
Crit W.S. (ft)	2790.79	Flow Area (sq ft)		230.19	
E.G. Slope (ft/ft)	0.001834	Area (sq ft)		230.19	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	39.35	Top Width (ft)		39.35	
Vel Total (ft/s)	13.68	Avg. Vel. (ft/s)		13.68	
Max Chl Dpth (ft)	7.19	Hydr. Depth (ft)		5.85	
Conv. Total (cfs)	73547.3	Conv. (cfs)		73547.3	
Length Wtd. (ft)	66.10	Wetted Per. (ft)		49.25	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)	203.68	133.00	177.70
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.60	22.84	0.38
C & E Loss (ft)	0.31	Cum SA (acres)	0.54	6.36	0.23

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2792.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.73	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.10	Reach Len. (ft)	66.10	66.10	66.10
Crit W.S. (ft)	2790.10	Flow Area (sq ft)		203.69	
E.G. Slope (ft/ft)	0.001876	Area (sq ft)		203.69	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	36.97	Top Width (ft)		36.97	
Vel Total (ft/s)	13.26	Avg. Vel. (ft/s)		13.26	
Max Chl Dpth (ft)	6.49	Hydr. Depth (ft)		5.51	
Conv. Total (cfs)	62332.4	Conv. (cfs)		62332.4	
Length Wtd. (ft)	66.10	Wetted Per. (ft)		46.50	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.51	
Alpha	1.00	Stream Power (lb/ft s)	203.68	133.00	177.70
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.38	21.34	0.28
C & E Loss (ft)	0.16	Cum SA (acres)	0.37	6.32	0.18

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2789.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2787.92	Reach Len. (ft)	66.10	66.10	66.10
Crit W.S. (ft)	2787.92	Flow Area (sq ft)		130.20	
E.G. Slope (ft/ft)	0.002044	Area (sq ft)		130.20	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	31.06	Top Width (ft)		31.06	
Vel Total (ft/s)	11.52	Avg. Vel. (ft/s)		11.52	
Max Chl Dpth (ft)	4.32	Hydr. Depth (ft)		4.19	
Conv. Total (cfs)	33178.7	Conv. (cfs)		33178.7	
Length Wtd. (ft)	66.10	Wetted Per. (ft)		39.11	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)	203.68	133.00	177.70
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.13	15.22	0.13
C & E Loss (ft)	0.13	Cum SA (acres)	0.11	6.05	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2785.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.		0.013	
W.S. Elev (ft)	2784.72	Reach Len. (ft)	66.10	66.10	66.10
Crit W.S. (ft)	2784.72	Flow Area (sq ft)		33.62	
E.G. Slope (ft/ft)	0.002563	Area (sq ft)		33.62	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	30.02	Top Width (ft)		30.02	
Vel Total (ft/s)	5.95	Avg. Vel. (ft/s)		5.95	
Max Chl Dpth (ft)	1.12	Hydr. Depth (ft)		1.12	
Conv. Total (cfs)	3950.3	Conv. (cfs)		3950.3	
Length Wtd. (ft)	66.10	Wetted Per. (ft)		32.25	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	203.68	133.00	177.70
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.01	5.71	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	5.48	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2789.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2787.87	Reach Len. (ft)	66.10	66.10	66.10
Crit W.S. (ft)	2787.87	Flow Area (sq ft)		128.52	
E.G. Slope (ft/ft)	0.002068	Area (sq ft)		128.52	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	31.00	Top Width (ft)		31.00	
Vel Total (ft/s)	11.52	Avg. Vel. (ft/s)		11.52	
Max Chl Dpth (ft)	4.27	Hydr. Depth (ft)		4.15	
Conv. Total (cfs)	32545.4	Conv. (cfs)		32545.4	
Length Wtd. (ft)	66.10	Wetted Per. (ft)		38.97	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)	203.68	133.00	177.70
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.13	15.88	0.13
C & E Loss (ft)	0.13	Cum SA (acres)	0.11	6.09	0.11

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2788.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.60	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.85	Reach Len. (ft)	66.10	66.10	66.10
Crit W.S. (ft)	2786.85	Flow Area (sq ft)		97.56	
E.G. Slope (ft/ft)	0.002126	Area (sq ft)		97.56	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	30.03	Top Width (ft)		30.03	
Vel Total (ft/s)	10.15	Avg. Vel. (ft/s)		10.15	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		3.25	
Conv. Total (cfs)	21473.0	Conv. (cfs)		21473.0	
Length Wtd. (ft)	66.10	Wetted Per. (ft)		36.51	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)	203.68	133.00	177.70
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.08	13.23	0.08
C & E Loss (ft)	0.09	Cum SA (acres)	0.08	5.96	0.08

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

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         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2787.11    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               1.16    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2785.95    Reach Len. (ft)             66.10     66.10      66.10
  Crit W.S. (ft)           2785.95    Flow Area (sq ft)                     70.57
  E.G. Slope (ft/ft)      0.002221    Area (sq ft)                          70.57
  Q Total (cfs)             610.00    Flow (cfs)                           610.00
  Top Width (ft)             30.02    Top Width (ft)                        30.02
  Vel Total (ft/s)            8.64    Avg. Vel. (ft/s)                       8.64
  Max Chl Dpth (ft)           2.35    Hydr. Depth (ft)                       2.35
  Conv. Total (cfs)        12944.9    Conv. (cfs)                         12944.9
  Length Wtd. (ft)           66.10    Wetted Per. (ft)                      34.71
  Min Ch El (ft)           2783.60    Shear (lb/sq ft)                       0.28
  Alpha                       1.00    Stream Power (lb/ft s)    203.68    133.00     177.70
  Frctn Loss (ft)             0.14    Cum Volume (acre-ft)        0.04     10.25       0.04
  C & E Loss (ft)             0.05    Cum SA (acres)              0.06      5.79       0.06


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 5515.3

INPUT
Description: Section 51+85.2 (D/S of Apple Valley Road)
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2799  104.77    2798  110.07    2797  113.04    2796  115.11    2795
  116.81    2794  119.03    2793     121    2792   122.5  2790.1  142.52  2790.1
  145.66    2788  149.33    2786  151.31    2785  153.42    2784  155.79    2783
   187.1    2783  190.49    2785  194.01    2787  199.36  2790.1   219.4  2790.1
  221.95    2792  227.95    2793  280.62    2793   330.6    2794

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .013   122.5    .016  142.52    .013  199.36    .016   219.4    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        142.52  199.36             50.3    50.3    50.3             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2793.17    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               6.13    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2787.05    Reach Len. (ft)             50.30     50.30      50.30
  Crit W.S. (ft)           2788.94    Flow Area (sq ft)                    158.57
  E.G. Slope (ft/ft)      0.006259    Area (sq ft)                         158.57
  Q Total (cfs)            3150.00    Flow (cfs)                          3150.00
```

Top Width (ft)	46.68	Top Width (ft)		46.68	
Vel Total (ft/s)	19.86	Avg. Vel. (ft/s)		19.86	
Max Chl Dpth (ft)	4.05	Hydr. Depth (ft)		3.40	
Conv. Total (cfs)	39817.0	Conv. (cfs)		39817.0	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		48.70	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		1.27	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.60	22.54	0.38
C & E Loss (ft)	0.32	Cum SA (acres)	0.54	6.29	0.23

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2792.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.64	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.68	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2788.43	Flow Area (sq ft)		141.65	
E.G. Slope (ft/ft)	0.006422	Area (sq ft)		141.65	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	45.36	Top Width (ft)		45.36	
Vel Total (ft/s)	19.06	Avg. Vel. (ft/s)		19.06	
Max Chl Dpth (ft)	3.68	Hydr. Depth (ft)		3.12	
Conv. Total (cfs)	33691.1	Conv. (cfs)		33691.1	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		47.19	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		1.20	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)	0.38	21.07	0.28
C & E Loss (ft)	0.29	Cum SA (acres)	0.37	6.26	0.18

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2789.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.99	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.57	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2786.79	Flow Area (sq ft)		93.55	
E.G. Slope (ft/ft)	0.006887	Area (sq ft)		93.55	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	41.31	Top Width (ft)		41.31	
Vel Total (ft/s)	16.03	Avg. Vel. (ft/s)		16.03	
Max Chl Dpth (ft)	2.57	Hydr. Depth (ft)		2.26	
Conv. Total (cfs)	18074.8	Conv. (cfs)		18074.8	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		42.57	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.13	15.05	0.13
C & E Loss (ft)	0.19	Cum SA (acres)	0.11	6.00	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2784.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2783.69	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2784.06	Flow Area (sq ft)		22.70	
E.G. Slope (ft/ft)	0.010362	Area (sq ft)		22.70	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	34.13	Top Width (ft)		34.13	
Vel Total (ft/s)	8.81	Avg. Vel. (ft/s)		8.81	
Max Chl Dpth (ft)	0.69	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	1964.7	Conv. (cfs)		1964.7	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		34.46	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.30	Cum Volume (acre-ft)	0.01	5.66	0.01
C & E Loss (ft)	0.07	Cum SA (acres)	0.03	5.43	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2789.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.96	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.55	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2786.76	Flow Area (sq ft)		92.70	
E.G. Slope (ft/ft)	0.006894	Area (sq ft)		92.70	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	41.23	Top Width (ft)		41.23	
Vel Total (ft/s)	15.97	Avg. Vel. (ft/s)		15.97	
Max Chl Dpth (ft)	2.55	Hydr. Depth (ft)		2.25	
Conv. Total (cfs)	17824.4	Conv. (cfs)		17824.4	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		42.48	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.13	15.72	0.13
C & E Loss (ft)	0.19	Cum SA (acres)	0.11	6.04	0.11

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2788.07	Element	Left OB	Channel	Right OB

Vel Head (ft)	3.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2784.99	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2785.93	Flow Area (sq ft)		70.39	
E.G. Slope (ft/ft)	0.007157	Area (sq ft)		70.39	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	39.16	Top Width (ft)		39.16	
Vel Total (ft/s)	14.06	Avg. Vel. (ft/s)		14.06	
Max Chl Dpth (ft)	1.99	Hydr. Depth (ft)		1.80	
Conv. Total (cfs)	11702.4	Conv. (cfs)		11702.4	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		40.13	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.08	13.10	0.08
C & E Loss (ft)	0.15	Cum SA (acres)	0.08	5.90	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2786.74	Element			
Vel Head (ft)	2.27	Wt. n-Val.		0.013	
W.S. Elev (ft)	2784.47	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2785.16	Flow Area (sq ft)		50.43	
E.G. Slope (ft/ft)	0.007644	Area (sq ft)		50.43	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	37.17	Top Width (ft)		37.17	
Vel Total (ft/s)	12.10	Avg. Vel. (ft/s)		12.10	
Max Chl Dpth (ft)	1.47	Hydr. Depth (ft)		1.36	
Conv. Total (cfs)	6976.8	Conv. (cfs)		6976.8	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		37.88	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.64	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.04	10.16	0.04
C & E Loss (ft)	0.11	Cum SA (acres)	0.06	5.74	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 5135

INPUT
Description: Section 51+35 Improved Concrete Channel
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2790.21	112	2782.21	142	2782.21	154	2790.21

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

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     100    .013     112    .013     142    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           112     142              260     260     260             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2792.90    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               6.21    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2786.70    Reach Len. (ft)           260.00     260.00     260.00
  Crit W.S. (ft)           2788.63    Flow Area (sq ft)          15.10     134.59      15.10
  E.G. Slope (ft/ft)      0.004477    Area (sq ft)               15.10     134.59      15.10
  Q Total (cfs)            3150.00    Flow (cfs)                175.01    2799.98     175.01
  Top Width (ft)             43.46    Top Width (ft)             6.73      30.00       6.73
  Vel Total (ft/s)           19.12    Avg. Vel. (ft/s)          11.59      20.80      11.59
  Max Chl Dpth (ft)           4.49    Hydr. Depth (ft)           2.24       4.49       2.24
  Conv. Total (cfs)        47077.6    Conv. (cfs)               2615.6    41846.4     2615.6
  Length Wtd. (ft)          260.00    Wetted Per. (ft)           8.09      30.00       8.09
  Min Ch El (ft)           2782.21    Shear (lb/sq ft)           0.52       1.25       0.52
  Alpha                       1.09    Stream Power (lb/ft s)   154.00       0.00       0.00
  Frctn Loss (ft)             0.26    Cum Volume (acre-ft)       0.59      22.37       0.37
  C & E Loss (ft)             0.01    Cum SA (acres)             0.54       6.25       0.23


CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2792.03    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               5.78    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2786.26    Reach Len. (ft)           260.00     260.00     260.00
  Crit W.S. (ft)           2788.03    Flow Area (sq ft)          12.27     121.34      12.27
  E.G. Slope (ft/ft)      0.004750    Area (sq ft)               12.27     121.34      12.27
  Q Total (cfs)            2700.00    Flow (cfs)                136.74    2426.52     136.74
  Top Width (ft)             42.13    Top Width (ft)             6.07      30.00       6.07
  Vel Total (ft/s)           18.51    Avg. Vel. (ft/s)          11.14      20.00      11.14
  Max Chl Dpth (ft)           4.04    Hydr. Depth (ft)           2.02       4.04       2.02
  Conv. Total (cfs)        39176.5    Conv. (cfs)               1984.0    35208.4     1984.0
  Length Wtd. (ft)          260.00    Wetted Per. (ft)           7.29      30.00       7.29
  Min Ch El (ft)           2782.21    Shear (lb/sq ft)           0.50       1.20       0.50
  Alpha                       1.09    Stream Power (lb/ft s)   154.00       0.00       0.00
  Frctn Loss (ft)             0.28    Cum Volume (acre-ft)       0.38      20.92       0.28
  C & E Loss (ft)             0.01    Cum SA (acres)             0.37       6.22       0.18


CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2789.22    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               4.28    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2784.94    Reach Len. (ft)           260.00     260.00     260.00
  Crit W.S. (ft)           2786.24    Flow Area (sq ft)           5.59      81.88       5.59
  E.G. Slope (ft/ft)      0.005815    Area (sq ft)                5.59      81.88       5.59
  Q Total (cfs)            1500.00    Flow (cfs)                 53.01    1393.98      53.01
  Top Width (ft)             38.19    Top Width (ft)             4.09      30.00       4.09
  Vel Total (ft/s)           16.12    Avg. Vel. (ft/s)           9.49      17.02       9.49
  Max Chl Dpth (ft)           2.73    Hydr. Depth (ft)           1.36       2.73       1.36
  Conv. Total (cfs)        19670.3    Conv. (cfs)                695.1    18280.0      695.1
  Length Wtd. (ft)          260.00    Wetted Per. (ft)           4.92      30.00       4.92
  Min Ch El (ft)           2782.21    Shear (lb/sq ft)           0.41       0.99       0.41
  Alpha                       1.06    Stream Power (lb/ft s)   154.00       0.00       0.00
  Frctn Loss (ft)             0.32    Cum Volume (acre-ft)       0.13      14.95       0.13
  C & E Loss (ft)             0.03    Cum SA (acres)             0.10       5.96       0.10


CROSS SECTION OUTPUT  Profile #10-yr FIS

  E.G. Elev (ft)           2784.32    Element                   Left OB    Channel   Right OB
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Vel Head (ft)	1.43	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2782.89	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2783.31	Flow Area (sq ft)	0.34	20.32	0.34
E.G. Slope (ft/ft)	0.011998	Area (sq ft)	0.34	20.32	0.34
Q Total (cfs)	200.00	Flow (cfs)	1.85	196.29	1.85
Top Width (ft)	32.03	Top Width (ft)	1.02	30.00	1.02
Vel Total (ft/s)	9.52	Avg. Vel. (ft/s)	5.38	9.66	5.38
Max Chl Dpth (ft)	0.68	Hydr. Depth (ft)	0.34	0.68	0.34
Conv. Total (cfs)	1825.9	Conv. (cfs)	16.9	1792.0	16.9
Length Wtd. (ft)	260.00	Wetted Per. (ft)	1.22	30.00	1.22
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.21	0.51	0.21
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)	0.01	5.64	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	5.40	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2789.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.25	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2784.91	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2786.21	Flow Area (sq ft)	5.48	81.12	5.48
E.G. Slope (ft/ft)	0.005850	Area (sq ft)	5.48	81.12	5.48
Q Total (cfs)	1480.00	Flow (cfs)	51.85	1376.31	51.85
Top Width (ft)	38.11	Top Width (ft)	4.06	30.00	4.06
Vel Total (ft/s)	16.07	Avg. Vel. (ft/s)	9.46	16.97	9.46
Max Chl Dpth (ft)	2.70	Hydr. Depth (ft)	1.35	2.70	1.35
Conv. Total (cfs)	19350.5	Conv. (cfs)	677.9	17994.8	677.9
Length Wtd. (ft)	260.00	Wetted Per. (ft)	4.87	30.00	4.87
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.41	0.99	0.41
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.13	15.62	0.13
C & E Loss (ft)	0.03	Cum SA (acres)	0.10	6.00	0.10

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2787.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.41	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2784.28	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2785.31	Flow Area (sq ft)	3.20	61.96	3.20
E.G. Slope (ft/ft)	0.006642	Area (sq ft)	3.20	61.96	3.20
Q Total (cfs)	990.00	Flow (cfs)	26.94	936.12	26.94
Top Width (ft)	36.20	Top Width (ft)	3.10	30.00	3.10
Vel Total (ft/s)	14.48	Avg. Vel. (ft/s)	8.42	15.11	8.42
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)	1.03	2.07	1.03
Conv. Total (cfs)	12147.7	Conv. (cfs)	330.5	11486.6	330.5
Length Wtd. (ft)	260.00	Wetted Per. (ft)	3.72	30.00	3.72
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.36	0.86	0.36
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.08	13.02	0.08
C & E Loss (ft)	0.03	Cum SA (acres)	0.08	5.86	0.08

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2786.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.62	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2783.69	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2784.48	Flow Area (sq ft)	1.65	44.46	1.65
E.G. Slope (ft/ft)	0.007866	Area (sq ft)	1.65	44.46	1.65
Q Total (cfs)	610.00	Flow (cfs)	12.09	585.81	12.09
Top Width (ft)	34.45	Top Width (ft)	2.22	30.00	2.22
Vel Total (ft/s)	12.77	Avg. Vel. (ft/s)	7.34	13.18	7.34
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)	0.74	1.48	0.74

Conv. Total (cfs)	6878.0	Conv. (cfs)	136.4	6605.2	136.4
Length Wtd. (ft)	260.00	Wetted Per. (ft)	2.67	30.00	2.67
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.30	0.73	0.30
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	0.04	10.10	0.04
C & E Loss (ft)	0.04	Cum SA (acres)	0.06	5.71	0.06

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 4875

INPUT
Description: Section 48+75 Improved Concrete Channel
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2787.75	112	2779.75	142	2779.75	154	2787.75

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	112	.013	142	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112	142	240	240	240	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2791.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.55	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2783.87	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2786.17	Flow Area (sq ft)	12.71	123.50	12.71
E.G. Slope (ft/ft)	0.006074	Area (sq ft)	12.71	123.50	12.71
Q Total (cfs)	3150.00	Flow (cfs)	162.08	2825.85	162.08
Top Width (ft)	42.35	Top Width (ft)	6.18	30.00	6.18
Vel Total (ft/s)	21.15	Avg. Vel. (ft/s)	12.75	22.88	12.75
Max Chl Dpth (ft)	4.12	Hydr. Depth (ft)	2.06	4.12	2.06
Conv. Total (cfs)	40418.8	Conv. (cfs)	2079.7	36259.5	2079.7
Length Wtd. (ft)	240.00	Wetted Per. (ft)	7.42	30.00	7.42
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.65	1.56	0.65
Alpha	1.09	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.35	Cum Volume (acre-ft)	0.51	21.60	0.28
C & E Loss (ft)	0.13	Cum SA (acres)	0.50	6.07	0.19

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2790.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.03	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2783.46	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2785.57	Flow Area (sq ft)	10.32	111.27	10.32
E.G. Slope (ft/ft)	0.006448	Area (sq ft)	10.32	111.27	10.32
Q Total (cfs)	2700.00	Flow (cfs)	126.45	2447.10	126.45
Top Width (ft)	41.13	Top Width (ft)	5.56	30.00	5.56
Vel Total (ft/s)	20.47	Avg. Vel. (ft/s)	12.26	21.99	12.26
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)	1.85	3.71	1.85
Conv. Total (cfs)	33623.6	Conv. (cfs)	1574.7	30474.1	1574.7
Length Wtd. (ft)	240.00	Wetted Per. (ft)	6.69	30.00	6.69

Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.62	1.49	0.62
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)	0.31	20.23	0.21
C & E Loss (ft)	0.12	Cum SA (acres)	0.33	6.04	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2787.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.14	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2782.26	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2783.78	Flow Area (sq ft)	4.73	75.33	4.73
E.G. Slope (ft/ft)	0.007767	Area (sq ft)	4.73	75.33	4.73
Q Total (cfs)	1500.00	Flow (cfs)	49.04	1401.91	49.04
Top Width (ft)	37.53	Top Width (ft)	3.77	30.00	3.77
Vel Total (ft/s)	17.69	Avg. Vel. (ft/s)	10.37	18.61	10.37
Max Chl Dpth (ft)	2.51	Hydr. Depth (ft)	1.26	2.51	1.26
Conv. Total (cfs)	17019.7	Conv. (cfs)	556.5	15906.7	556.5
Length Wtd. (ft)	240.00	Wetted Per. (ft)	4.53	30.00	4.53
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.51	1.22	0.51
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.74	Cum Volume (acre-ft)	0.10	14.48	0.10
C & E Loss (ft)	0.09	Cum SA (acres)	0.08	5.78	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2781.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.15	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2780.50	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2780.84	Flow Area (sq ft)	0.43	22.61	0.43
E.G. Slope (ft/ft)	0.008377	Area (sq ft)	0.43	22.61	0.43
Q Total (cfs)	200.00	Flow (cfs)	2.06	195.89	2.06
Top Width (ft)	32.26	Top Width (ft)	1.13	30.00	1.13
Vel Total (ft/s)	8.52	Avg. Vel. (ft/s)	4.83	8.66	4.83
Max Chl Dpth (ft)	0.75	Hydr. Depth (ft)	0.38	0.75	0.38
Conv. Total (cfs)	2185.2	Conv. (cfs)	22.5	2140.3	22.5
Length Wtd. (ft)	240.00	Wetted Per. (ft)	1.36	30.00	1.36
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.16	0.39	0.16
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.59	Cum Volume (acre-ft)	0.01	5.51	0.01
C & E Loss (ft)	0.08	Cum SA (acres)	0.02	5.22	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2787.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.10	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2782.24	Reach Len. (ft)	240.00	240.00	240.00

Crit W.S. (ft)	2783.75	Flow Area (sq ft)	4.64	74.66	4.64
E.G. Slope (ft/ft)	0.007801	Area (sq ft)	4.64	74.66	4.64
Q Total (cfs)	1480.00	Flow (cfs)	47.99	1384.03	47.99
Top Width (ft)	37.47	Top Width (ft)	3.73	30.00	3.73
Vel Total (ft/s)	17.63	Avg. Vel. (ft/s)	10.33	18.54	10.33
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)	1.24	2.49	1.24
Conv. Total (cfs)	16756.9	Conv. (cfs)	543.3	15670.3	543.3
Length Wtd. (ft)	240.00	Wetted Per. (ft)	4.49	30.00	4.49
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.50	1.21	0.50
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.75	Cum Volume (acre-ft)	0.10	15.15	0.10
C & E Loss (ft)	0.08	Cum SA (acres)	0.08	5.82	0.08

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2785.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.00	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2781.67	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2782.85	Flow Area (sq ft)	2.75	57.49	2.75
E.G. Slope (ft/ft)	0.008595	Area (sq ft)	2.75	57.49	2.75
Q Total (cfs)	990.00	Flow (cfs)	25.09	939.82	25.09
Top Width (ft)	35.75	Top Width (ft)	2.87	30.00	2.87
Vel Total (ft/s)	15.72	Avg. Vel. (ft/s)	9.11	16.35	9.11
Max Chl Dpth (ft)	1.92	Hydr. Depth (ft)	0.96	1.92	0.96
Conv. Total (cfs)	10678.8	Conv. (cfs)	270.6	10137.5	270.6
Length Wtd. (ft)	240.00	Wetted Per. (ft)	3.45	30.00	3.45
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.43	1.03	0.43
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.96	Cum Volume (acre-ft)	0.06	12.67	0.06
C & E Loss (ft)	0.06	Cum SA (acres)	0.06	5.69	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2784.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.90	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2781.16	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2782.02	Flow Area (sq ft)	1.50	42.38	1.50
E.G. Slope (ft/ft)	0.009262	Area (sq ft)	1.50	42.38	1.50
Q Total (cfs)	610.00	Flow (cfs)	11.55	586.90	11.55
Top Width (ft)	34.24	Top Width (ft)	2.12	30.00	2.12
Vel Total (ft/s)	13.44	Avg. Vel. (ft/s)	7.72	13.85	7.72
Max Chl Dpth (ft)	1.41	Hydr. Depth (ft)	0.71	1.41	0.71
Conv. Total (cfs)	6338.3	Conv. (cfs)	120.0	6098.2	120.0
Length Wtd. (ft)	240.00	Wetted Per. (ft)	2.55	30.00	2.55
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.34	0.82	0.34
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.22	Cum Volume (acre-ft)	0.03	9.85	0.03
C & E Loss (ft)	0.03	Cum SA (acres)	0.05	5.53	0.05

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 4635

INPUT
Description: Section 46+35 Improved Concrete Channel
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2785.45	112	2777.45	142	2777.45	154	2785.45

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	112	.013	142	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112	142	250	250	250	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2789.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.38	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2781.38	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2783.87	Flow Area (sq ft)	11.60	117.99	11.60
E.G. Slope (ft/ft)	0.007137	Area (sq ft)	11.60	117.99	11.60
Q Total (cfs)	3150.00	Flow (cfs)	155.56	2838.88	155.56
Top Width (ft)	41.80	Top Width (ft)	5.90	30.00	5.90
Vel Total (ft/s)	22.31	Avg. Vel. (ft/s)	13.41	24.06	13.41
Max Chl Dpth (ft)	3.93	Hydr. Depth (ft)	1.97	3.93	1.97
Conv. Total (cfs)	37287.5	Conv. (cfs)	1841.4	33604.6	1841.4
Length Wtd. (ft)	250.00	Wetted Per. (ft)	7.09	30.00	7.09
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.73	1.75	0.73
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.58	Cum Volume (acre-ft)	0.44	20.94	0.22
C & E Loss (ft)	0.08	Cum SA (acres)	0.47	5.90	0.16

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2788.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.75	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2781.00	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2783.27	Flow Area (sq ft)	9.45	106.50	9.45
E.G. Slope (ft/ft)	0.007522	Area (sq ft)	9.45	106.50	9.45
Q Total (cfs)	2700.00	Flow (cfs)	121.52	2456.96	121.52
Top Width (ft)	40.65	Top Width (ft)	5.33	30.00	5.33
Vel Total (ft/s)	21.53	Avg. Vel. (ft/s)	12.86	23.07	12.86
Max Chl Dpth (ft)	3.55	Hydr. Depth (ft)	1.78	3.55	1.78
Conv. Total (cfs)	31131.2	Conv. (cfs)	1401.1	28328.9	1401.1
Length Wtd. (ft)	250.00	Wetted Per. (ft)	6.40	30.00	6.40
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.69	1.67	0.69
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.67	Cum Volume (acre-ft)	0.25	19.63	0.16
C & E Loss (ft)	0.07	Cum SA (acres)	0.30	5.87	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2785.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.51	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2779.88	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2781.48	Flow Area (sq ft)	4.43	72.91	4.43
E.G. Slope (ft/ft)	0.008699	Area (sq ft)	4.43	72.91	4.43
Q Total (cfs)	1500.00	Flow (cfs)	47.57	1404.87	47.57
Top Width (ft)	37.29	Top Width (ft)	3.65	30.00	3.65
Vel Total (ft/s)	18.35	Avg. Vel. (ft/s)	10.74	19.27	10.74
Max Chl Dpth (ft)	2.43	Hydr. Depth (ft)	1.22	2.43	1.22
Conv. Total (cfs)	16082.7	Conv. (cfs)	510.0	15062.7	510.0
Length Wtd. (ft)	250.00	Wetted Per. (ft)	4.38	30.00	4.38
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.55	1.32	0.55
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.97	Cum Volume (acre-ft)	0.07	14.08	0.07
C & E Loss (ft)	0.04	Cum SA (acres)	0.06	5.61	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2779.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.28	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2778.17	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2778.54	Flow Area (sq ft)	0.38	21.45	0.38
E.G. Slope (ft/ft)	0.010001	Area (sq ft)	0.38	21.45	0.38
Q Total (cfs)	200.00	Flow (cfs)	1.95	196.09	1.95
Top Width (ft)	32.15	Top Width (ft)	1.07	30.00	1.07
Vel Total (ft/s)	9.00	Avg. Vel. (ft/s)	5.09	9.14	5.09
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)	0.36	0.72	0.36
Conv. Total (cfs)	1999.9	Conv. (cfs)	19.5	1960.8	19.5
Length Wtd. (ft)	250.00	Wetted Per. (ft)	1.29	30.00	1.29
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.19	0.45	0.19
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.19	Cum Volume (acre-ft)	0.01	5.39	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.02	5.05	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2785.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.47	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2779.86	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2781.45	Flow Area (sq ft)	4.35	72.28	4.35
E.G. Slope (ft/ft)	0.008727	Area (sq ft)	4.35	72.28	4.35
Q Total (cfs)	1480.00	Flow (cfs)	46.55	1386.90	46.55
Top Width (ft)	37.23	Top Width (ft)	3.61	30.00	3.61
Vel Total (ft/s)	18.28	Avg. Vel. (ft/s)	10.69	19.19	10.69
Max Chl Dpth (ft)	2.41	Hydr. Depth (ft)	1.20	2.41	1.20

Conv. Total (cfs)	15843.1	Conv. (cfs)	498.3	14846.4	498.3
Length Wtd. (ft)	250.00	Wetted Per. (ft)	4.34	30.00	4.34
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.55	1.31	0.55
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.98	Cum Volume (acre-ft)	0.07	14.75	0.07
C & E Loss (ft)	0.04	Cum SA (acres)	0.06	5.65	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2783.51	Element			
Vel Head (ft)	4.18	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2779.33	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2780.55	Flow Area (sq ft)	2.64	56.32	2.64
E.G. Slope (ft/ft)	0.009220	Area (sq ft)	2.64	56.32	2.64
Q Total (cfs)	990.00	Flow (cfs)	24.61	940.78	24.61
Top Width (ft)	35.63	Top Width (ft)	2.82	30.00	2.82
Vel Total (ft/s)	16.07	Avg. Vel. (ft/s)	9.31	16.70	9.31
Max Chl Dpth (ft)	1.88	Hydr. Depth (ft)	0.94	1.88	0.94
Conv. Total (cfs)	10310.1	Conv. (cfs)	256.3	9797.5	256.3
Length Wtd. (ft)	250.00	Wetted Per. (ft)	3.38	30.00	3.38
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.45	1.08	0.45
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.14	Cum Volume (acre-ft)	0.04	12.35	0.04
C & E Loss (ft)	0.02	Cum SA (acres)	0.05	5.52	0.05

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2781.80	Element			
Vel Head (ft)	2.95	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2778.85	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2779.72	Flow Area (sq ft)	1.47	42.03	1.47
E.G. Slope (ft/ft)	0.009523	Area (sq ft)	1.47	42.03	1.47
Q Total (cfs)	610.00	Flow (cfs)	11.46	587.08	11.46
Top Width (ft)	34.20	Top Width (ft)	2.10	30.00	2.10
Vel Total (ft/s)	13.56	Avg. Vel. (ft/s)	7.78	13.97	7.78
Max Chl Dpth (ft)	1.40	Hydr. Depth (ft)	0.70	1.40	0.70
Conv. Total (cfs)	6250.8	Conv. (cfs)	117.4	6015.9	117.4
Length Wtd. (ft)	250.00	Wetted Per. (ft)	2.53	30.00	2.53
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.35	0.83	0.35
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.25	Cum Volume (acre-ft)	0.02	9.61	0.02
C & E Loss (ft)	0.01	Cum SA (acres)	0.04	5.36	0.04

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 4385

INPUT

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Description: Section 43+85 Improved Concrete Channel
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2783.05     112 2775.05     142 2775.05     154 2783.05

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .013     112    .013     142    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           112     142              250     250     250             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2787.82    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               8.95    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2778.87    Reach Len. (ft)           250.00     250.00     250.00
  Crit W.S. (ft)           2781.47    Flow Area (sq ft)          10.94     114.57      10.94
  E.G. Slope (ft/ft)      0.007917    Area (sq ft)               10.94     114.57      10.94
  Q Total (cfs)            3150.00    Flow (cfs)                151.49    2847.03     151.49
  Top Width (ft)             41.46    Top Width (ft)              5.73      30.00       5.73
  Vel Total (ft/s)           23.09    Avg. Vel. (ft/s)           13.85      24.85      13.85
  Max Chl Dpth (ft)           3.82    Hydr. Depth (ft)            1.91       3.82       1.91
  Conv. Total (cfs)        35401.8    Conv. (cfs)               1702.5    31996.8     1702.5
  Length Wtd. (ft)          250.00    Wetted Per. (ft)            6.88      30.00       6.88
  Min Ch El (ft)           2775.05    Shear (lb/sq ft)            0.79       1.89       0.79
  Alpha                       1.08    Stream Power (lb/ft s)    154.00       0.00       0.00
  Frctn Loss (ft)             1.88    Cum Volume (acre-ft)        0.37      20.27       0.15
  C & E Loss (ft)             0.06    Cum SA (acres)              0.43       5.73       0.12


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2786.74    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               8.23    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2778.51    Reach Len. (ft)           250.00     250.00     250.00
  Crit W.S. (ft)           2780.87    Flow Area (sq ft)           8.96     103.67       8.96
  E.G. Slope (ft/ft)      0.008267    Area (sq ft)                8.96     103.67       8.96
  Q Total (cfs)            2700.00    Flow (cfs)                118.58    2462.84     118.58
  Top Width (ft)             40.37    Top Width (ft)              5.18      30.00       5.18
  Vel Total (ft/s)           22.21    Avg. Vel. (ft/s)           13.24      23.76      13.24
  Max Chl Dpth (ft)           3.46    Hydr. Depth (ft)            1.73       3.46       1.73
  Conv. Total (cfs)        29695.0    Conv. (cfs)               1304.1    27086.7     1304.1
  Length Wtd. (ft)          250.00    Wetted Per. (ft)            6.23      30.00       6.23
  Min Ch El (ft)           2775.05    Shear (lb/sq ft)            0.74       1.78       0.74
  Alpha                       1.08    Stream Power (lb/ft s)    154.00       0.00       0.00
  Frctn Loss (ft)             1.97    Cum Volume (acre-ft)        0.20      19.03       0.10
  C & E Loss (ft)             0.05    Cum SA (acres)              0.27       5.70       0.08


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2783.14    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               5.69    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2777.45    Reach Len. (ft)           250.00     250.00     250.00
```

Crit W.S. (ft)	2779.08	Flow Area (sq ft)	4.30	71.84	4.30
E.G. Slope (ft/ft)	0.009155	Area (sq ft)	4.30	71.84	4.30
Q Total (cfs)	1500.00	Flow (cfs)	46.91	1406.18	46.91
Top Width (ft)	37.18	Top Width (ft)	3.59	30.00	3.59
Vel Total (ft/s)	18.65	Avg. Vel. (ft/s)	10.91	19.57	10.91
Max Chl Dpth (ft)	2.39	Hydr. Depth (ft)	1.20	2.39	1.20
Conv. Total (cfs)	15676.8	Conv. (cfs)	490.3	14696.3	490.3
Length Wtd. (ft)	250.00	Wetted Per. (ft)	4.32	30.00	4.32
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.57	1.37	0.57
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.23	Cum Volume (acre-ft)	0.05	13.66	0.05
C & E Loss (ft)	0.02	Cum SA (acres)	0.04	5.44	0.04

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2777.01	Element			
Vel Head (ft)	1.23	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2775.78	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2776.14	Flow Area (sq ft)	0.40	21.86	0.40
E.G. Slope (ft/ft)	0.009382	Area (sq ft)	0.40	21.86	0.40
Q Total (cfs)	200.00	Flow (cfs)	1.99	196.02	1.99
Top Width (ft)	32.19	Top Width (ft)	1.09	30.00	1.09
Vel Total (ft/s)	8.83	Avg. Vel. (ft/s)	5.00	8.97	5.00
Max Chl Dpth (ft)	0.73	Hydr. Depth (ft)	0.36	0.73	0.36
Conv. Total (cfs)	2064.8	Conv. (cfs)	20.5	2023.7	20.5
Length Wtd. (ft)	250.00	Wetted Per. (ft)	1.31	30.00	1.31
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.18	0.43	0.18
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.42	Cum Volume (acre-ft)	0.00	5.27	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	4.88	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2783.07	Element			
Vel Head (ft)	5.64	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2777.43	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2779.05	Flow Area (sq ft)	4.23	71.24	4.23
E.G. Slope (ft/ft)	0.009175	Area (sq ft)	4.23	71.24	4.23
Q Total (cfs)	1480.00	Flow (cfs)	45.92	1388.15	45.92
Top Width (ft)	37.12	Top Width (ft)	3.56	30.00	3.56
Vel Total (ft/s)	18.57	Avg. Vel. (ft/s)	10.86	19.49	10.86
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)	1.19	2.37	1.19
Conv. Total (cfs)	15450.9	Conv. (cfs)	479.4	14492.1	479.4
Length Wtd. (ft)	250.00	Wetted Per. (ft)	4.28	30.00	4.28
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.57	1.36	0.57
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.24	Cum Volume (acre-ft)	0.05	14.33	0.05
C & E Loss (ft)	0.02	Cum SA (acres)	0.04	5.48	0.04

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2781.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.25	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2776.91	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2778.15	Flow Area (sq ft)	2.60	55.89	2.60
E.G. Slope (ft/ft)	0.009467	Area (sq ft)	2.60	55.89	2.60
Q Total (cfs)	990.00	Flow (cfs)	24.43	941.14	24.43
Top Width (ft)	35.59	Top Width (ft)	2.79	30.00	2.79
Vel Total (ft/s)	16.20	Avg. Vel. (ft/s)	9.38	16.84	9.38
Max Chl Dpth (ft)	1.86	Hydr. Depth (ft)	0.93	1.86	0.93
Conv. Total (cfs)	10174.7	Conv. (cfs)	251.1	9672.6	251.1
Length Wtd. (ft)	250.00	Wetted Per. (ft)	3.36	30.00	3.36
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.46	1.10	0.46
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.34	Cum Volume (acre-ft)	0.03	12.03	0.03
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	5.35	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2779.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.96	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2776.45	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2777.32	Flow Area (sq ft)	1.47	41.94	1.47
E.G. Slope (ft/ft)	0.009597	Area (sq ft)	1.47	41.94	1.47
Q Total (cfs)	610.00	Flow (cfs)	11.44	587.13	11.44
Top Width (ft)	34.19	Top Width (ft)	2.10	30.00	2.10
Vel Total (ft/s)	13.59	Avg. Vel. (ft/s)	7.80	14.00	7.80
Max Chl Dpth (ft)	1.40	Hydr. Depth (ft)	0.70	1.40	0.70
Conv. Total (cfs)	6226.7	Conv. (cfs)	116.7	5993.2	116.7
Length Wtd. (ft)	250.00	Wetted Per. (ft)	2.52	30.00	2.52
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.35	0.84	0.35
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	0.02	9.37	0.02
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	5.19	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 4135

INPUT
Description: Section 41+35 Improved Concrete Channel
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2780.65	112	2772.65	142	2772.65	154	2780.65

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	112	.013	142	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112	142	165.4	165.4	165.4	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2785.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.34	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2776.40	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2779.07	Flow Area (sq ft)	10.54	112.44	10.54
E.G. Slope (ft/ft)	0.008459	Area (sq ft)	10.54	112.44	10.54
Q Total (cfs)	3150.00	Flow (cfs)	148.93	2852.13	148.93
Top Width (ft)	41.24	Top Width (ft)	5.62	30.00	5.62
Vel Total (ft/s)	23.59	Avg. Vel. (ft/s)	14.14	25.37	14.14
Max Chl Dpth (ft)	3.75	Hydr. Depth (ft)	1.87	3.75	1.87
Conv. Total (cfs)	34249.6	Conv. (cfs)	1619.3	31010.9	1619.3
Length Wtd. (ft)	165.40	Wetted Per. (ft)	6.76	30.00	6.76
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.82	1.98	0.82
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.05	Cum Volume (acre-ft)	0.31	19.62	0.09
C & E Loss (ft)	0.04	Cum SA (acres)	0.40	5.56	0.09

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2784.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.53	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2776.05	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2778.47	Flow Area (sq ft)	8.68	102.04	8.68
E.G. Slope (ft/ft)	0.008741	Area (sq ft)	8.68	102.04	8.68
Q Total (cfs)	2700.00	Flow (cfs)	116.87	2466.26	116.87
Top Width (ft)	40.20	Top Width (ft)	5.10	30.00	5.10
Vel Total (ft/s)	22.61	Avg. Vel. (ft/s)	13.47	24.17	13.47
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)	1.70	3.40	1.70
Conv. Total (cfs)	28879.4	Conv. (cfs)	1250.1	26379.2	1250.1
Length Wtd. (ft)	165.40	Wetted Per. (ft)	6.13	30.00	6.13
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.77	1.86	0.77
Alpha	1.07	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.12	Cum Volume (acre-ft)	0.15	18.44	0.05
C & E Loss (ft)	0.03	Cum SA (acres)	0.24	5.53	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2780.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.78	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2775.03	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2776.68	Flow Area (sq ft)	4.24	71.32	4.24
E.G. Slope (ft/ft)	0.009388	Area (sq ft)	4.24	71.32	4.24
Q Total (cfs)	1500.00	Flow (cfs)	46.59	1406.81	46.59
Top Width (ft)	37.13	Top Width (ft)	3.57	30.00	3.57
Vel Total (ft/s)	18.80	Avg. Vel. (ft/s)	10.99	19.73	10.99
Max Chl Dpth (ft)	2.38	Hydr. Depth (ft)	1.19	2.38	1.19
Conv. Total (cfs)	15481.1	Conv. (cfs)	480.9	14519.4	480.9
Length Wtd. (ft)	165.40	Wetted Per. (ft)	4.29	30.00	4.29
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.58	1.39	0.58
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.32	Cum Volume (acre-ft)	0.02	13.25	0.02
C & E Loss (ft)	0.01	Cum SA (acres)	0.02	5.27	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2774.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2773.37	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2773.74	Flow Area (sq ft)	0.39	21.64	0.39
E.G. Slope (ft/ft)	0.009707	Area (sq ft)	0.39	21.64	0.39
Q Total (cfs)	200.00	Flow (cfs)	1.97	196.06	1.97
Top Width (ft)	32.16	Top Width (ft)	1.08	30.00	1.08
Vel Total (ft/s)	8.92	Avg. Vel. (ft/s)	5.05	9.06	5.05
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)	0.36	0.72	0.36
Conv. Total (cfs)	2029.9	Conv. (cfs)	20.0	1989.9	20.0
Length Wtd. (ft)	165.40	Wetted Per. (ft)	1.30	30.00	1.30
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.18	0.44	0.18
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	0.00	5.14	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	4.71	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2780.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.73	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2775.01	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2776.65	Flow Area (sq ft)	4.17	70.74	4.17
E.G. Slope (ft/ft)	0.009400	Area (sq ft)	4.17	70.74	4.17
Q Total (cfs)	1480.00	Flow (cfs)	45.62	1388.76	45.62
Top Width (ft)	37.07	Top Width (ft)	3.54	30.00	3.54
Vel Total (ft/s)	18.72	Avg. Vel. (ft/s)	10.94	19.63	10.94
Max Chl Dpth (ft)	2.36	Hydr. Depth (ft)	1.18	2.36	1.18
Conv. Total (cfs)	15264.7	Conv. (cfs)	470.5	14323.6	470.5
Length Wtd. (ft)	165.40	Wetted Per. (ft)	4.25	30.00	4.25
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.58	1.38	0.58
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.32	Cum Volume (acre-ft)	0.02	13.93	0.02
C & E Loss (ft)	0.01	Cum SA (acres)	0.02	5.31	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2778.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.28	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2774.51	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2775.75	Flow Area (sq ft)	2.59	55.72	2.59
E.G. Slope (ft/ft)	0.009570	Area (sq ft)	2.59	55.72	2.59
Q Total (cfs)	990.00	Flow (cfs)	24.36	941.29	24.36
Top Width (ft)	35.57	Top Width (ft)	2.79	30.00	2.79
Vel Total (ft/s)	16.26	Avg. Vel. (ft/s)	9.42	16.89	9.42
Max Chl Dpth (ft)	1.86	Hydr. Depth (ft)	0.93	1.86	0.93
Conv. Total (cfs)	10119.9	Conv. (cfs)	249.0	9621.9	249.0
Length Wtd. (ft)	165.40	Wetted Per. (ft)	3.35	30.00	3.35
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.46	1.11	0.46
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00

Frctn Loss (ft)	2.38	Cum Volume (acre-ft)	0.01	11.71	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	5.18	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2777.01	Element			
Vel Head (ft)	2.97	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2774.05	Reach Len. (ft)	165.40	165.40	165.40
Crit W.S. (ft)	2774.92	Flow Area (sq ft)	1.47	41.93	1.47
E.G. Slope (ft/ft)	0.009603	Area (sq ft)	1.47	41.93	1.47
Q Total (cfs)	610.00	Flow (cfs)	11.43	587.13	11.43
Top Width (ft)	34.19	Top Width (ft)	2.10	30.00	2.10
Vel Total (ft/s)	13.60	Avg. Vel. (ft/s)	7.80	14.00	7.80
Max Chl Dpth (ft)	1.40	Hydr. Depth (ft)	0.70	1.40	0.70
Conv. Total (cfs)	6224.8	Conv. (cfs)	116.7	5991.5	116.7
Length Wtd. (ft)	165.40	Wetted Per. (ft)	2.52	30.00	2.52
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.35	0.84	0.35
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.40	Cum Volume (acre-ft)	0.01	9.13	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	5.02	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3969.6

INPUT
Description: Section 39+69.6
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2785	141.2	2781	169.77	2780	181.58	2779	202.31	2778
207.79	2778	213.27	2779	229.66	2779	234.4	2778	239.14	2775
245.44	2771	275.44	2771	277	2772	281.5	2775	286	2778
299.19	2779	315.96	2781	324.96	2785				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	234.4	.013	286	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
234.4	286	134.6	134.6	134.6	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2784.20	Element			
Vel Head (ft)	9.37	Wt. n-Val.		0.013	
W.S. Elev (ft)	2774.83	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2777.51	Flow Area (sq ft)		137.57	
E.G. Slope (ft/ft)	0.010134	Area (sq ft)		137.57	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	41.83	Top Width (ft)		41.83	
Vel Total (ft/s)	24.57	Avg. Vel. (ft/s)		24.57	
Max Chl Dpth (ft)	3.83	Hydr. Depth (ft)		3.29	
Conv. Total (cfs)	33576.4	Conv. (cfs)		33576.4	

Length Wtd. (ft)	134.60	Wetted Per. (ft)		44.09	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		1.97	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.53	Cum Volume (acre-ft)	0.29	19.15	0.07
C & E Loss (ft)	0.00	Cum SA (acres)	0.39	5.42	0.08

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2782.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.67	Wt. n-Val.		0.013	
W.S. Elev (ft)	2774.26	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2776.67	Flow Area (sq ft)		114.25	
E.G. Slope (ft/ft)	0.011260	Area (sq ft)		114.25	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	40.08	Top Width (ft)		40.08	
Vel Total (ft/s)	23.63	Avg. Vel. (ft/s)		23.63	
Max Chl Dpth (ft)	3.26	Hydr. Depth (ft)		2.85	
Conv. Total (cfs)	25444.9	Conv. (cfs)		25444.9	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		42.00	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		1.91	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.63	Cum Volume (acre-ft)	0.13	18.02	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.24	5.39	0.05

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2779.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.80	Wt. n-Val.		0.013	
W.S. Elev (ft)	2773.31	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2774.96	Flow Area (sq ft)		77.64	
E.G. Slope (ft/ft)	0.011223	Area (sq ft)		77.64	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	37.17	Top Width (ft)		37.17	
Vel Total (ft/s)	19.32	Avg. Vel. (ft/s)		19.32	
Max Chl Dpth (ft)	2.31	Hydr. Depth (ft)		2.09	
Conv. Total (cfs)	14159.2	Conv. (cfs)		14159.2	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		38.53	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		1.41	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.69	Cum Volume (acre-ft)	0.01	12.97	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	5.14	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2772.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.		0.013	
W.S. Elev (ft)	2771.71	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2772.09	Flow Area (sq ft)		22.22	
E.G. Slope (ft/ft)	0.010357	Area (sq ft)		22.22	
Q Total (cfs)	200.00	Flow (cfs)		200.00	

Top Width (ft)	32.24	Top Width (ft)		32.24	
Vel Total (ft/s)	9.00	Avg. Vel. (ft/s)		9.00	
Max Chl Dpth (ft)	0.71	Hydr. Depth (ft)		0.69	
Conv. Total (cfs)	1965.2	Conv. (cfs)		1965.2	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		32.66	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.66	Cum Volume (acre-ft)	0.00	5.06	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.00	4.59	0.00

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2779.10	Element			
Vel Head (ft)	5.61	Wt. n-Val.		0.013	
W.S. Elev (ft)	2773.49	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2775.12	Flow Area (sq ft)		84.18	
E.G. Slope (ft/ft)	0.009971	Area (sq ft)		84.18	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	37.70	Top Width (ft)		37.70	
Vel Total (ft/s)	19.01	Avg. Vel. (ft/s)		19.01	
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)		2.23	
Conv. Total (cfs)	16023.4	Conv. (cfs)		16023.4	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		39.17	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		1.34	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.60	Cum Volume (acre-ft)	0.02	13.63	0.02
C & E Loss (ft)	0.04	Cum SA (acres)	0.01	5.18	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2777.16	Element			
Vel Head (ft)	4.19	Wt. n-Val.		0.013	
W.S. Elev (ft)	2772.97	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2774.20	Flow Area (sq ft)		65.14	
E.G. Slope (ft/ft)	0.009813	Area (sq ft)		65.14	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	36.12	Top Width (ft)		36.12	
Vel Total (ft/s)	16.43	Avg. Vel. (ft/s)		16.43	
Max Chl Dpth (ft)	1.97	Hydr. Depth (ft)		1.80	
Conv. Total (cfs)	10801.4	Conv. (cfs)		10801.4	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		37.28	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		1.07	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.60	Cum Volume (acre-ft)	0.01	11.48	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.01	5.05	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2775.39	Element			
Vel Head (ft)	2.93	Wt. n-Val.		0.013	

W.S. Elev (ft)	2772.47	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2773.33	Flow Area (sq ft)		47.34	
E.G. Slope (ft/ft)	0.009802	Area (sq ft)		47.34	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	34.57	Top Width (ft)		34.57	
Vel Total (ft/s)	13.73	Avg. Vel. (ft/s)		13.73	
Max Chl Dpth (ft)	1.47	Hydr. Depth (ft)		1.37	
Conv. Total (cfs)	6565.5	Conv. (cfs)		6565.5	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		35.43	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		0.82	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.61	Cum Volume (acre-ft)	0.01	8.96	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	4.89	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3835

INPUT
Description: Section 38+35 Improved Concrete Channel (D/S Limit)
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2777.77	112	2769.77	142	2769.77	154	2777.77

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	112	.013	142	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112	142	139.8	139.8	139.8	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2782.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.16	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2773.79	Reach Len. (ft)	139.80	139.80	139.80
Crit W.S. (ft)	2776.48	Flow Area (sq ft)	12.14	120.70	12.14
E.G. Slope (ft/ft)	0.007585	Area (sq ft)	12.14	120.70	12.14
Q Total (cfs)	3380.00	Flow (cfs)	170.36	3039.28	170.36
Top Width (ft)	42.07	Top Width (ft)	6.03	30.00	6.03
Vel Total (ft/s)	23.31	Avg. Vel. (ft/s)	14.03	25.18	14.03
Max Chl Dpth (ft)	4.02	Hydr. Depth (ft)	2.01	4.02	2.01
Conv. Total (cfs)	38809.4	Conv. (cfs)	1956.1	34897.3	1956.1
Length Wtd. (ft)	139.80	Wetted Per. (ft)	7.25	30.00	7.25
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.79	1.91	0.79
Alpha	1.09	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.17	Cum Volume (acre-ft)	0.27	18.75	0.05
C & E Loss (ft)	0.06	Cum SA (acres)	0.38	5.31	0.07

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2781.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.30	Wt. n-Val.	0.013	0.013	0.013

W.S. Elev (ft)	2773.21	Reach Len. (ft)	139.80	139.80	139.80
Crit W.S. (ft)	2775.59	Flow Area (sq ft)	8.89	103.29	8.89
E.G. Slope (ft/ft)	0.008377	Area (sq ft)	8.89	103.29	8.89
Q Total (cfs)	2700.00	Flow (cfs)	118.17	2463.65	118.17
Top Width (ft)	40.33	Top Width (ft)	5.16	30.00	5.16
Vel Total (ft/s)	22.30	Avg. Vel. (ft/s)	13.29	23.85	13.29
Max Chl Dpth (ft)	3.44	Hydr. Depth (ft)	1.72	3.44	1.72
Conv. Total (cfs)	29500.2	Conv. (cfs)	1291.2	26917.9	1291.2
Length Wtd. (ft)	139.80	Wetted Per. (ft)	6.21	30.00	6.21
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.75	1.80	0.75
Alpha	1.07	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.30	Cum Volume (acre-ft)	0.12	17.69	0.02
C & E Loss (ft)	0.11	Cum SA (acres)	0.23	5.29	0.04

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2777.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.49	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2772.21	Reach Len. (ft)	139.80	139.80	139.80
Crit W.S. (ft)	2773.80	Flow Area (sq ft)	4.45	73.06	4.45
E.G. Slope (ft/ft)	0.008636	Area (sq ft)	4.45	73.06	4.45
Q Total (cfs)	1500.00	Flow (cfs)	47.66	1404.68	47.66
Top Width (ft)	37.31	Top Width (ft)	3.65	30.00	3.65
Vel Total (ft/s)	18.30	Avg. Vel. (ft/s)	10.71	19.23	10.71
Max Chl Dpth (ft)	2.44	Hydr. Depth (ft)	1.22	2.44	1.22
Conv. Total (cfs)	16141.4	Conv. (cfs)	512.9	15115.7	512.9
Length Wtd. (ft)	139.80	Wetted Per. (ft)	4.39	30.00	4.39
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.55	1.31	0.55
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.32	Cum Volume (acre-ft)	0.01	12.73	0.01
C & E Loss (ft)	0.09	Cum SA (acres)	0.01	5.04	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2771.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.16	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2770.52	Reach Len. (ft)	139.80	139.80	139.80
Crit W.S. (ft)	2770.87	Flow Area (sq ft)	0.42	22.49	0.42
E.G. Slope (ft/ft)	0.008525	Area (sq ft)	0.42	22.49	0.42
Q Total (cfs)	200.00	Flow (cfs)	2.05	195.91	2.05
Top Width (ft)	32.25	Top Width (ft)	1.12	30.00	1.12
Vel Total (ft/s)	8.57	Avg. Vel. (ft/s)	4.85	8.71	4.85
Max Chl Dpth (ft)	0.75	Hydr. Depth (ft)	0.37	0.75	0.37
Conv. Total (cfs)	2166.1	Conv. (cfs)	22.2	2121.8	22.2
Length Wtd. (ft)	139.80	Wetted Per. (ft)	1.35	30.00	1.35
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.17	0.40	0.17
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.26	Cum Volume (acre-ft)	0.00	4.99	0.00
C & E Loss (ft)	0.03	Cum SA (acres)	0.00	4.49	0.00

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2777.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.51	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2772.35	Reach Len. (ft)	139.80	139.80	139.80
Crit W.S. (ft)	2773.97	Flow Area (sq ft)	4.99	77.37	4.99
E.G. Slope (ft/ft)	0.008057	Area (sq ft)	4.99	77.37	4.99
Q Total (cfs)	1600.00	Flow (cfs)	53.63	1492.74	53.63
Top Width (ft)	37.74	Top Width (ft)	3.87	30.00	3.87
Vel Total (ft/s)	18.32	Avg. Vel. (ft/s)	10.75	19.29	10.75
Max Chl Dpth (ft)	2.58	Hydr. Depth (ft)	1.29	2.58	1.29
Conv. Total (cfs)	17824.7	Conv. (cfs)	597.5	16629.7	597.5
Length Wtd. (ft)	139.80	Wetted Per. (ft)	4.65	30.00	4.65
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.54	1.30	0.54
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.20	Cum Volume (acre-ft)	0.01	13.38	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.01	5.07	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2775.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.15	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2771.80	Reach Len. (ft)	139.80	139.80	139.80
Crit W.S. (ft)	2773.03	Flow Area (sq ft)	3.08	60.82	3.08
E.G. Slope (ft/ft)	0.008272	Area (sq ft)	3.08	60.82	3.08
Q Total (cfs)	1070.00	Flow (cfs)	28.61	1012.79	28.61
Top Width (ft)	36.08	Top Width (ft)	3.04	30.00	3.04
Vel Total (ft/s)	15.97	Avg. Vel. (ft/s)	9.28	16.65	9.28
Max Chl Dpth (ft)	2.03	Hydr. Depth (ft)	1.01	2.03	1.01
Conv. Total (cfs)	11764.8	Conv. (cfs)	314.5	11135.7	314.5
Length Wtd. (ft)	139.80	Wetted Per. (ft)	3.65	30.00	3.65
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.44	1.05	0.44
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.21	Cum Volume (acre-ft)	0.00	11.29	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.00	4.95	0.00

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2774.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.88	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2771.28	Reach Len. (ft)	139.80	139.80	139.80
Crit W.S. (ft)	2772.13	Flow Area (sq ft)	1.70	45.16	1.70
E.G. Slope (ft/ft)	0.008465	Area (sq ft)	1.70	45.16	1.70
Q Total (cfs)	650.00	Flow (cfs)	13.08	623.83	13.08
Top Width (ft)	34.52	Top Width (ft)	2.26	30.00	2.26
Vel Total (ft/s)	13.39	Avg. Vel. (ft/s)	7.70	13.81	7.70
Max Chl Dpth (ft)	1.51	Hydr. Depth (ft)	0.75	1.51	0.75
Conv. Total (cfs)	7064.7	Conv. (cfs)	142.2	6780.2	142.2
Length Wtd. (ft)	139.80	Wetted Per. (ft)	2.71	30.00	2.71
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.33	0.80	0.33
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.22	Cum Volume (acre-ft)	0.00	8.82	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.00	4.79	0.00

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3695.2

INPUT
Description: Section 36+95.2
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2779.25	120	2779.25	140	2769.3	200	2769.3	220	2779.25

Manning's n Values num= 2

Sta	n Val	Sta	n Val
100	.016	120	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
120	220	14.3	14.3	14.3	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2780.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.54	Wt. n-Val.		0.035	
W.S. Elev (ft)	2771.54	Reach Len. (ft)	14.30	14.30	14.30
Crit W.S. (ft)	2773.67	Flow Area (sq ft)		144.17	
E.G. Slope (ft/ft)	0.116471	Area (sq ft)		144.17	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	68.99	Top Width (ft)		68.99	
Vel Total (ft/s)	23.45	Avg. Vel. (ft/s)		23.45	
Max Chl Dpth (ft)	2.24	Hydr. Depth (ft)		2.09	
Conv. Total (cfs)	9903.9	Conv. (cfs)		9903.9	
Length Wtd. (ft)	14.30	Wetted Per. (ft)		70.04	
Min Ch El (ft)	2769.30	Shear (lb/sq ft)		14.97	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	2.69	Cum Volume (acre-ft)	0.26	18.32	0.03
C & E Loss (ft)	0.19	Cum SA (acres)	0.37	5.15	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2778.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.94	Wt. n-Val.		0.035	
W.S. Elev (ft)	2771.30	Reach Len. (ft)	14.30	14.30	14.30
Crit W.S. (ft)	2773.09	Flow Area (sq ft)		127.76	
E.G. Slope (ft/ft)	0.108908	Area (sq ft)		127.76	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	68.02	Top Width (ft)		68.02	
Vel Total (ft/s)	21.13	Avg. Vel. (ft/s)		21.13	
Max Chl Dpth (ft)	2.00	Hydr. Depth (ft)		1.88	
Conv. Total (cfs)	8181.5	Conv. (cfs)		8181.5	
Length Wtd. (ft)	14.30	Wetted Per. (ft)		68.96	
Min Ch El (ft)	2769.30	Shear (lb/sq ft)		12.60	

Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	2.87	Cum Volume (acre-ft)	0.11	17.32	0.01
C & E Loss (ft)	0.41	Cum SA (acres)	0.22	5.13	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2774.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.55	Wt. n-Val.		0.035	
W.S. Elev (ft)	2770.87	Reach Len. (ft)	14.30	14.30	14.30
Crit W.S. (ft)	2771.90	Flow Area (sq ft)		99.24	
E.G. Slope (ft/ft)	0.075153	Area (sq ft)		99.24	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	66.32	Top Width (ft)		66.32	
Vel Total (ft/s)	15.11	Avg. Vel. (ft/s)		15.11	
Max Chl Dpth (ft)	1.57	Hydr. Depth (ft)		1.50	
Conv. Total (cfs)	5471.6	Conv. (cfs)		5471.6	
Length Wtd. (ft)	14.30	Wetted Per. (ft)		67.06	
Min Ch El (ft)	2769.30	Shear (lb/sq ft)		6.94	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	2.69	Cum Volume (acre-ft)		12.46	
C & E Loss (ft)	0.58	Cum SA (acres)		4.88	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2770.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2770.00	Reach Len. (ft)	14.30	14.30	14.30
Crit W.S. (ft)	2770.00	Flow Area (sq ft)		42.71	
E.G. Slope (ft/ft)	0.020488	Area (sq ft)		42.71	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	62.80	Top Width (ft)		62.80	
Vel Total (ft/s)	4.68	Avg. Vel. (ft/s)		4.68	
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	1397.3	Conv. (cfs)		1397.3	
Length Wtd. (ft)	14.30	Wetted Per. (ft)		63.12	
Min Ch El (ft)	2769.30	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		4.88	
C & E Loss (ft)	0.09	Cum SA (acres)		4.35	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2774.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.87	Wt. n-Val.		0.035	
W.S. Elev (ft)	2770.90	Reach Len. (ft)	14.30	14.30	14.30
Crit W.S. (ft)	2772.01	Flow Area (sq ft)		101.33	
E.G. Slope (ft/ft)	0.079992	Area (sq ft)		101.33	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	66.44	Top Width (ft)		66.44	
Vel Total (ft/s)	15.79	Avg. Vel. (ft/s)		15.79	
Max Chl Dpth (ft)	1.60	Hydr. Depth (ft)		1.53	
Conv. Total (cfs)	5657.1	Conv. (cfs)		5657.1	
Length Wtd. (ft)	14.30	Wetted Per. (ft)		67.20	
Min Ch El (ft)	2769.30	Shear (lb/sq ft)		7.53	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	2.60	Cum Volume (acre-ft)		13.10	
C & E Loss (ft)	0.49	Cum SA (acres)		4.92	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2772.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.27	Wt. n-Val.		0.035	
W.S. Elev (ft)	2770.71	Reach Len. (ft)	14.30	14.30	14.30
Crit W.S. (ft)	2771.39	Flow Area (sq ft)		88.54	
E.G. Slope (ft/ft)	0.055123	Area (sq ft)		88.54	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	65.67	Top Width (ft)		65.67	
Vel Total (ft/s)	12.08	Avg. Vel. (ft/s)		12.08	
Max Chl Dpth (ft)	1.41	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	4557.4	Conv. (cfs)		4557.4	
Length Wtd. (ft)	14.30	Wetted Per. (ft)		66.33	
Min Ch El (ft)	2769.30	Shear (lb/sq ft)		4.59	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	2.40	Cum Volume (acre-ft)		11.05	
C & E Loss (ft)	0.56	Cum SA (acres)		4.79	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

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Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2771.61    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               1.04    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2770.57    Reach Len. (ft)             14.30     14.30      14.30
  Crit W.S. (ft)           2770.81    Flow Area (sq ft)                     79.40
  E.G. Slope (ft/ft)      0.028889    Area (sq ft)                          79.40
  Q Total (cfs)             650.00    Flow (cfs)                           650.00
  Top Width (ft)             65.10    Top Width (ft)                        65.10
  Vel Total (ft/s)            8.19    Avg. Vel. (ft/s)                       8.19
  Max Chl Dpth (ft)           1.27    Hydr. Depth (ft)                       1.22
  Conv. Total (cfs)         3824.3    Conv. (cfs)                          3824.3
  Length Wtd. (ft)           14.30    Wetted Per. (ft)                      65.70
  Min Ch El (ft)           2769.30    Shear (lb/sq ft)                       2.18
  Alpha                       1.00    Stream Power (lb/ft s)    220.00       0.00       0.00
  Frctn Loss (ft)             1.99    Cum Volume (acre-ft)                   8.62
  C & E Loss (ft)             0.55    Cum SA (acres)                         4.64


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 3680.9

INPUT
Description: Section 36+80.9
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2775.25     120 2775.25     142  2764.5     202  2764.5     224 2775.25

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
     100    .016     120    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           120     224            192.7   192.7   192.7             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2777.74    Element                    Left OB    Channel   Right OB
  Vel Head (ft)              11.28    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2766.46    Reach Len. (ft)            192.70    192.70     192.70
  Crit W.S. (ft)           2768.87    Flow Area (sq ft)                    125.39
  E.G. Slope (ft/ft)      0.181510    Area (sq ft)                         125.39
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             68.02    Top Width (ft)                        68.02
  Vel Total (ft/s)           26.96    Avg. Vel. (ft/s)                      26.96
  Max Chl Dpth (ft)           1.96    Hydr. Depth (ft)                       1.84
  Conv. Total (cfs)         7933.5    Conv. (cfs)                          7933.5
  Length Wtd. (ft)                    Wetted Per. (ft)                      68.92
  Min Ch El (ft)           2764.50    Shear (lb/sq ft)                      20.62
```

Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	2.05	Cum Volume (acre-ft)	0.26	18.28	0.03
C & E Loss (ft)	0.27	Cum SA (acres)	0.37	5.13	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2775.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.75	Wt. n-Val.		0.035	
W.S. Elev (ft)	2766.20	Reach Len. (ft)	192.70	192.70	192.70
Crit W.S. (ft)	2768.29	Flow Area (sq ft)		107.76	
E.G. Slope (ft/ft)	0.187516	Area (sq ft)		107.76	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	66.95	Top Width (ft)		66.95	
Vel Total (ft/s)	25.05	Avg. Vel. (ft/s)		25.05	
Max Chl Dpth (ft)	1.70	Hydr. Depth (ft)		1.61	
Conv. Total (cfs)	6235.1	Conv. (cfs)		6235.1	
Length Wtd. (ft)	192.70	Wetted Per. (ft)		67.73	
Min Ch El (ft)	2764.50	Shear (lb/sq ft)		18.63	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	2.01	Cum Volume (acre-ft)	0.11	17.28	0.01
C & E Loss (ft)	0.28	Cum SA (acres)	0.22	5.11	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2772.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.76	Wt. n-Val.		0.035	
W.S. Elev (ft)	2765.65	Reach Len. (ft)	192.70	192.70	192.70
Crit W.S. (ft)	2767.10	Flow Area (sq ft)		71.91	
E.G. Slope (ft/ft)	0.212122	Area (sq ft)		71.91	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	64.72	Top Width (ft)		64.72	
Vel Total (ft/s)	20.86	Avg. Vel. (ft/s)		20.86	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)		1.11	
Conv. Total (cfs)	3256.9	Conv. (cfs)		3256.9	
Length Wtd. (ft)	192.70	Wetted Per. (ft)		65.25	
Min Ch El (ft)	2764.50	Shear (lb/sq ft)		14.59	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	1.69	Cum Volume (acre-ft)		12.43	
C & E Loss (ft)	0.32	Cum SA (acres)		4.86	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2766.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2766.35	Reach Len. (ft)	192.70	192.70	192.70
Crit W.S. (ft)	2765.20	Flow Area (sq ft)		117.70	
E.G. Slope (ft/ft)	0.000777	Area (sq ft)		117.70	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	67.55	Top Width (ft)		67.55	
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)		1.70	
Max Chl Dpth (ft)	1.85	Hydr. Depth (ft)		1.74	
Conv. Total (cfs)	7174.7	Conv. (cfs)		7174.7	
Length Wtd. (ft)	192.70	Wetted Per. (ft)		68.41	
Min Ch El (ft)	2764.50	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)		4.86	
C & E Loss (ft)	0.03	Cum SA (acres)		4.32	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2772.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	2765.71	Reach Len. (ft)	192.70	192.70	192.70
Crit W.S. (ft)	2767.21	Flow Area (sq ft)		75.29	
E.G. Slope (ft/ft)	0.208028	Area (sq ft)		75.29	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	64.93	Top Width (ft)		64.93	
Vel Total (ft/s)	21.25	Avg. Vel. (ft/s)		21.25	
Max Chl Dpth (ft)	1.21	Hydr. Depth (ft)		1.16	
Conv. Total (cfs)	3508.0	Conv. (cfs)		3508.0	
Length Wtd. (ft)	192.70	Wetted Per. (ft)		65.49	
Min Ch El (ft)	2764.50	Shear (lb/sq ft)		14.93	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	1.74	Cum Volume (acre-ft)		13.07	
C & E Loss (ft)	0.31	Cum SA (acres)		4.90	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2771.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.77	Wt. n-Val.		0.035	
W.S. Elev (ft)	2765.40	Reach Len. (ft)	192.70	192.70	192.70
Crit W.S. (ft)	2766.59	Flow Area (sq ft)		55.51	
E.G. Slope (ft/ft)	0.249662	Area (sq ft)		55.51	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	63.67	Top Width (ft)		63.67	
Vel Total (ft/s)	19.28	Avg. Vel. (ft/s)		19.28	
Max Chl Dpth (ft)	0.90	Hydr. Depth (ft)		0.87	
Conv. Total (cfs)	2141.4	Conv. (cfs)		2141.4	
Length Wtd. (ft)	192.70	Wetted Per. (ft)		64.09	
Min Ch El (ft)	2764.50	Shear (lb/sq ft)		13.50	

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  Alpha                        1.00    Stream Power (lb/ft s)    224.00       0.00       0.00
  Frctn Loss (ft)              1.46    Cum Volume (acre-ft)                  11.02
  C & E Loss (ft)              0.35    Cum SA (acres)                         4.77


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2767.81    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.15    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2767.66    Reach Len. (ft)           192.70     192.70     192.70
  Crit W.S. (ft)           2766.01    Flow Area (sq ft)                    210.19
  E.G. Slope (ft/ft)      0.001329    Area (sq ft)                         210.19
  Q Total (cfs)             650.00    Flow (cfs)                           650.00
  Top Width (ft)             72.94    Top Width (ft)                        72.94
  Vel Total (ft/s)            3.09    Avg. Vel. (ft/s)                       3.09
  Max Chl Dpth (ft)           3.16    Hydr. Depth (ft)                       2.88
  Conv. Total (cfs)        17832.4    Conv. (cfs)                         17832.4
  Length Wtd. (ft)          192.70    Wetted Per. (ft)                      74.41
  Min Ch El (ft)           2764.50    Shear (lb/sq ft)                       0.23
  Alpha                       1.00    Stream Power (lb/ft s)    224.00       0.00       0.00
  Frctn Loss (ft)             0.62    Cum Volume (acre-ft)                   8.57
  C & E Loss (ft)             0.06    Cum SA (acres)                         4.62


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 3488.2

INPUT
Description: Section 34+88.2
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2775.25     120 2775.25     141  2764.9     201  2764.9     222 2775.25

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
     100    .016     120    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           120     222             14.3    14.3    14.3             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2771.23    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.96    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2769.27    Reach Len. (ft)            14.30      14.30      14.30
  Crit W.S. (ft)           2769.27    Flow Area (sq ft)                    301.11
```

E.G. Slope (ft/ft)	0.011897	Area (sq ft)		301.11	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	77.74	Top Width (ft)		77.74	
Vel Total (ft/s)	11.23	Avg. Vel. (ft/s)		11.23	
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)		3.87	
Conv. Total (cfs)	30988.7	Conv. (cfs)		30988.7	
Length Wtd. (ft)	14.30	Wetted Per. (ft)		79.78	
Min Ch El (ft)	2764.90	Shear (lb/sq ft)		2.80	
Alpha	1.00	Stream Power (lb/ft s)	222.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.26	17.33	0.03
C & E Loss (ft)		Cum SA (acres)	0.37	4.81	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2770.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.72	Wt. n-Val.		0.035	
W.S. Elev (ft)	2768.69	Reach Len. (ft)	14.30	14.30	14.30
Crit W.S. (ft)	2768.69	Flow Area (sq ft)		256.53	
E.G. Slope (ft/ft)	0.012383	Area (sq ft)		256.53	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	75.38	Top Width (ft)		75.38	
Vel Total (ft/s)	10.53	Avg. Vel. (ft/s)		10.53	
Max Chl Dpth (ft)	3.79	Hydr. Depth (ft)		3.40	
Conv. Total (cfs)	24263.2	Conv. (cfs)		24263.2	
Length Wtd. (ft)	14.30	Wetted Per. (ft)		77.15	
Min Ch El (ft)	2764.90	Shear (lb/sq ft)		2.57	
Alpha	1.00	Stream Power (lb/ft s)	222.00	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.11	16.47	0.01
C & E Loss (ft)	0.36	Cum SA (acres)	0.22	4.79	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2768.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.035	

W.S. Elev (ft)	2767.50	Reach Len. (ft)	14.30	14.30	14.30
Crit W.S. (ft)	2767.50	Flow Area (sq ft)		169.65	
E.G. Slope (ft/ft)	0.013770	Area (sq ft)		169.65	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	70.55	Top Width (ft)		70.55	
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)		8.84	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		2.40	
Conv. Total (cfs)	12782.6	Conv. (cfs)		12782.6	
Length Wtd. (ft)	14.30	Wetted Per. (ft)		71.76	
Min Ch El (ft)	2764.90	Shear (lb/sq ft)		2.03	
Alpha	1.00	Stream Power (lb/ft s)	222.00	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		11.89	
C & E Loss (ft)	0.27	Cum SA (acres)		4.56	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2765.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.035	
W.S. Elev (ft)	2765.59	Reach Len. (ft)	14.30	14.30	14.30
Crit W.S. (ft)	2765.59	Flow Area (sq ft)		42.36	
E.G. Slope (ft/ft)	0.021046	Area (sq ft)		42.36	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	62.80	Top Width (ft)		62.80	
Vel Total (ft/s)	4.72	Avg. Vel. (ft/s)		4.72	
Max Chl Dpth (ft)	0.69	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	1378.6	Conv. (cfs)		1378.6	
Length Wtd. (ft)	14.30	Wetted Per. (ft)		63.12	
Min Ch El (ft)	2764.90	Shear (lb/sq ft)		0.88	
Alpha	1.00	Stream Power (lb/ft s)	222.00	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		4.50	
C & E Loss (ft)	0.09	Cum SA (acres)		4.04	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2768.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.61	Reach Len. (ft)	14.30	14.30	14.30
Crit W.S. (ft)	2767.61	Flow Area (sq ft)		177.46	
E.G. Slope (ft/ft)	0.013610	Area (sq ft)		177.46	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	70.99	Top Width (ft)		70.99	
Vel Total (ft/s)	9.02	Avg. Vel. (ft/s)		9.02	
Max Chl Dpth (ft)	2.71	Hydr. Depth (ft)		2.50	
Conv. Total (cfs)	13714.7	Conv. (cfs)		13714.7	
Length Wtd. (ft)	14.30	Wetted Per. (ft)		72.26	
Min Ch El (ft)	2764.90	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)	222.00	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		12.51	
C & E Loss (ft)	0.28	Cum SA (acres)		4.60	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2767.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.035	
W.S. Elev (ft)	2766.99	Reach Len. (ft)	14.30	14.30	14.30
Crit W.S. (ft)	2766.99	Flow Area (sq ft)		133.92	
E.G. Slope (ft/ft)	0.014753	Area (sq ft)		133.92	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	68.46	Top Width (ft)		68.46	
Vel Total (ft/s)	7.99	Avg. Vel. (ft/s)		7.99	
Max Chl Dpth (ft)	2.08	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	8809.5	Conv. (cfs)		8809.5	
Length Wtd. (ft)	14.30	Wetted Per. (ft)		69.43	
Min Ch El (ft)	2764.90	Shear (lb/sq ft)		1.78	
Alpha	1.00	Stream Power (lb/ft s)	222.00	0.00	0.00
Frctn Loss (ft)	7.36	Cum Volume (acre-ft)		10.60	
C & E Loss (ft)	1.43	Cum SA (acres)		4.48	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

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Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2767.13    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.72    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2766.41    Reach Len. (ft)             14.30     14.30      14.30
  Crit W.S. (ft)           2766.41    Flow Area (sq ft)                     95.29
  E.G. Slope (ft/ft)      0.016087    Area (sq ft)                          95.29
  Q Total (cfs)             650.00    Flow (cfs)                           650.00
  Top Width (ft)             66.13    Top Width (ft)                        66.13
  Vel Total (ft/s)            6.82    Avg. Vel. (ft/s)                       6.82
  Max Chl Dpth (ft)           1.51    Hydr. Depth (ft)                       1.44
  Conv. Total (cfs)         5124.8    Conv. (cfs)                          5124.8
  Length Wtd. (ft)           14.30    Wetted Per. (ft)                      66.84
  Min Ch El (ft)           2764.90    Shear (lb/sq ft)                       1.43
  Alpha                       1.00    Stream Power (lb/ft s)    222.00       0.00       0.00
  Frctn Loss (ft)             0.05    Cum Volume (acre-ft)                   7.90
  C & E Loss (ft)             0.17    Cum SA (acres)                         4.31


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 3473.9

INPUT
Description: Section 34+73.9
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2770.85     120 2770.85     142  2760.1     202  2760.1     224 2770.85

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
     100    .016     120    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           120     224            192.7   192.7   192.7             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2770.26    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               7.84    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2762.42    Reach Len. (ft)            192.70    192.70     192.70
  Crit W.S. (ft)           2764.47    Flow Area (sq ft)                    150.44
```

E.G. Slope (ft/ft)	0.102102	Area (sq ft)		150.44	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	69.51	Top Width (ft)		69.51	
Vel Total (ft/s)	22.47	Avg. Vel. (ft/s)		22.47	
Max Chl Dpth (ft)	2.32	Hydr. Depth (ft)		2.16	
Conv. Total (cfs)	10577.9	Conv. (cfs)		10577.9	
Length Wtd. (ft)	192.70	Wetted Per. (ft)		70.58	
Min Ch El (ft)	2760.10	Shear (lb/sq ft)		13.59	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.26	17.26	0.03
C & E Loss (ft)	0.59	Cum SA (acres)	0.37	4.78	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2769.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.40	Wt. n-Val.		0.035	
W.S. Elev (ft)	2762.03	Reach Len. (ft)	192.70	192.70	192.70
Crit W.S. (ft)	2763.89	Flow Area (sq ft)		123.67	
E.G. Slope (ft/ft)	0.121027	Area (sq ft)		123.67	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	67.91	Top Width (ft)		67.91	
Vel Total (ft/s)	21.83	Avg. Vel. (ft/s)		21.83	
Max Chl Dpth (ft)	1.93	Hydr. Depth (ft)		1.82	
Conv. Total (cfs)	7761.1	Conv. (cfs)		7761.1	
Length Wtd. (ft)		Wetted Per. (ft)		68.81	
Min Ch El (ft)	2760.10	Shear (lb/sq ft)		13.58	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	0.11	16.41	0.01
C & E Loss (ft)	0.57	Cum SA (acres)	0.22	4.77	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2767.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.42	Wt. n-Val.		0.035	
W.S. Elev (ft)	2761.28	Reach Len. (ft)	192.70	192.70	192.70
Crit W.S. (ft)	2762.70	Flow Area (sq ft)		73.76	
E.G. Slope (ft/ft)	0.195415	Area (sq ft)		73.76	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	64.84	Top Width (ft)		64.84	
Vel Total (ft/s)	20.34	Avg. Vel. (ft/s)		20.34	
Max Chl Dpth (ft)	1.18	Hydr. Depth (ft)		1.14	
Conv. Total (cfs)	3393.2	Conv. (cfs)		3393.2	
Length Wtd. (ft)	192.70	Wetted Per. (ft)		65.38	
Min Ch El (ft)	2760.10	Shear (lb/sq ft)		13.76	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	0.49	Cum Volume (acre-ft)		11.85	
C & E Loss (ft)	0.52	Cum SA (acres)		4.54	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2761.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2761.94	Reach Len. (ft)	192.70	192.70	192.70
Crit W.S. (ft)	2760.80	Flow Area (sq ft)		117.52	
E.G. Slope (ft/ft)	0.000781	Area (sq ft)		117.52	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	67.54	Top Width (ft)		67.54	
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)		1.70	
Max Chl Dpth (ft)	1.84	Hydr. Depth (ft)		1.74	
Conv. Total (cfs)	7157.1	Conv. (cfs)		7157.1	
Length Wtd. (ft)	192.70	Wetted Per. (ft)		68.39	
Min Ch El (ft)	2760.10	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)		4.48	
C & E Loss (ft)	0.03	Cum SA (acres)		4.01	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2767.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.52	Wt. n-Val.		0.035	
W.S. Elev (ft)	2761.35	Reach Len. (ft)	192.70	192.70	192.70
Crit W.S. (ft)	2762.81	Flow Area (sq ft)		78.07	
E.G. Slope (ft/ft)	0.185093	Area (sq ft)		78.07	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	65.11	Top Width (ft)		65.11	
Vel Total (ft/s)	20.49	Avg. Vel. (ft/s)		20.49	
Max Chl Dpth (ft)	1.25	Hydr. Depth (ft)		1.20	
Conv. Total (cfs)	3719.0	Conv. (cfs)		3719.0	
Length Wtd. (ft)	192.70	Wetted Per. (ft)		65.69	
Min Ch El (ft)	2760.10	Shear (lb/sq ft)		13.73	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	0.48	Cum Volume (acre-ft)		12.47	
C & E Loss (ft)	0.53	Cum SA (acres)		4.57	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2766.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.94	Wt. n-Val.		0.035	
W.S. Elev (ft)	2760.99	Reach Len. (ft)	192.70	192.70	192.70
Crit W.S. (ft)	2762.19	Flow Area (sq ft)		54.70	
E.G. Slope (ft/ft)	0.261852	Area (sq ft)		54.70	

```
  Q Total (cfs)            1070.00    Flow (cfs)                          1070.00
  Top Width (ft)             63.62    Top Width (ft)                        63.62
  Vel Total (ft/s)           19.56    Avg. Vel. (ft/s)                      19.56
  Max Chl Dpth (ft)           0.89    Hydr. Depth (ft)                       0.86
  Conv. Total (cfs)         2091.0    Conv. (cfs)                          2091.0
  Length Wtd. (ft)          192.70    Wetted Per. (ft)                      64.03
  Min Ch El (ft)           2760.10    Shear (lb/sq ft)                      13.97
  Alpha                       1.00    Stream Power (lb/ft s)    224.00       0.00       0.00
  Frctn Loss (ft)             0.55    Cum Volume (acre-ft)                  10.57
  C & E Loss (ft)             0.49    Cum SA (acres)                         4.46


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2766.04    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               5.36    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2760.67    Reach Len. (ft)           192.70     192.70     192.70
  Crit W.S. (ft)           2761.61    Flow Area (sq ft)                     34.98
  E.G. Slope (ft/ft)      0.416448    Area (sq ft)                          34.98
  Q Total (cfs)             650.00    Flow (cfs)                           650.00
  Top Width (ft)             62.34    Top Width (ft)                        62.34
  Vel Total (ft/s)           18.58    Avg. Vel. (ft/s)                      18.58
  Max Chl Dpth (ft)           0.57    Hydr. Depth (ft)                       0.56
  Conv. Total (cfs)         1007.2    Conv. (cfs)                          1007.2
  Length Wtd. (ft)          192.70    Wetted Per. (ft)                      62.60
  Min Ch El (ft)           2760.10    Shear (lb/sq ft)                      14.52
  Alpha                       1.00    Stream Power (lb/ft s)    224.00       0.00       0.00
  Frctn Loss (ft)             0.64    Cum Volume (acre-ft)                   7.87
  C & E Loss (ft)             0.46    Cum SA (acres)                         4.29


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 3281.2

INPUT
Description: Section 32+81.2
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2770.45     120 2770.45     140  2760.5     200  2760.5     220 2770.45

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
     100    .016     120    .035
```

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
120	220	19.3	19.3	19.3	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2766.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.96	Wt. n-Val.		0.035	
W.S. Elev (ft)	2764.87	Reach Len. (ft)	19.30	19.30	19.30
Crit W.S. (ft)	2764.88	Flow Area (sq ft)		300.82	
E.G. Slope (ft/ft)	0.011906	Area (sq ft)		300.82	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	77.58	Top Width (ft)		77.58	
Vel Total (ft/s)	11.24	Avg. Vel. (ft/s)		11.24	
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)		3.88	
Conv. Total (cfs)	30977.0	Conv. (cfs)		30977.0	
Length Wtd. (ft)	19.30	Wetted Per. (ft)		79.64	
Min Ch El (ft)	2760.50	Shear (lb/sq ft)		2.81	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.26	16.26	0.03
C & E Loss (ft)	0.44	Cum SA (acres)	0.37	4.46	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2766.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.72	Wt. n-Val.		0.035	
W.S. Elev (ft)	2764.29	Reach Len. (ft)	19.30	19.30	19.30
Crit W.S. (ft)	2764.29	Flow Area (sq ft)		256.26	
E.G. Slope (ft/ft)	0.012399	Area (sq ft)		256.26	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	75.24	Top Width (ft)		75.24	
Vel Total (ft/s)	10.54	Avg. Vel. (ft/s)		10.54	
Max Chl Dpth (ft)	3.79	Hydr. Depth (ft)		3.41	
Conv. Total (cfs)	24247.3	Conv. (cfs)		24247.3	
Length Wtd. (ft)	19.30	Wetted Per. (ft)		77.02	
Min Ch El (ft)	2760.50	Shear (lb/sq ft)		2.58	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.11	15.57	0.01
C & E Loss (ft)		Cum SA (acres)	0.22	4.45	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2764.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.22	Wt. n-Val.		0.035	
W.S. Elev (ft)	2763.10	Reach Len. (ft)	19.30	19.30	19.30
Crit W.S. (ft)	2763.10	Flow Area (sq ft)		169.35	
E.G. Slope (ft/ft)	0.013826	Area (sq ft)		169.35	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	70.44	Top Width (ft)		70.44	
Vel Total (ft/s)	8.86	Avg. Vel. (ft/s)		8.86	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		2.40	
Conv. Total (cfs)	12756.7	Conv. (cfs)		12756.7	
Length Wtd. (ft)	19.30	Wetted Per. (ft)		71.66	
Min Ch El (ft)	2760.50	Shear (lb/sq ft)		2.04	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		11.32	
C & E Loss (ft)	0.29	Cum SA (acres)		4.24	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2761.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2761.20	Reach Len. (ft)	19.30	19.30	19.30
Crit W.S. (ft)	2761.20	Flow Area (sq ft)		42.68	
E.G. Slope (ft/ft)	0.020536	Area (sq ft)		42.68	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	62.79	Top Width (ft)		62.79	
Vel Total (ft/s)	4.69	Avg. Vel. (ft/s)		4.69	
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	1395.6	Conv. (cfs)		1395.6	
Length Wtd. (ft)	19.30	Wetted Per. (ft)		63.12	
Min Ch El (ft)	2760.50	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		4.12	
C & E Loss (ft)	0.09	Cum SA (acres)		3.73	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2764.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.		0.035	
W.S. Elev (ft)	2763.21	Reach Len. (ft)	19.30	19.30	19.30
Crit W.S. (ft)	2763.21	Flow Area (sq ft)		177.36	
E.G. Slope (ft/ft)	0.013614	Area (sq ft)		177.36	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	70.89	Top Width (ft)		70.89	
Vel Total (ft/s)	9.02	Avg. Vel. (ft/s)		9.02	
Max Chl Dpth (ft)	2.71	Hydr. Depth (ft)		2.50	
Conv. Total (cfs)	13712.6	Conv. (cfs)		13712.6	
Length Wtd. (ft)	19.30	Wetted Per. (ft)		72.17	
Min Ch El (ft)	2760.50	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		11.90	
C & E Loss (ft)	0.30	Cum SA (acres)		4.27	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2763.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.035	
W.S. Elev (ft)	2762.59	Reach Len. (ft)	19.30	19.30	19.30
Crit W.S. (ft)	2762.59	Flow Area (sq ft)		134.05	
E.G. Slope (ft/ft)	0.014687	Area (sq ft)		134.05	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	68.39	Top Width (ft)		68.39	
Vel Total (ft/s)	7.98	Avg. Vel. (ft/s)		7.98	
Max Chl Dpth (ft)	2.09	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	8829.0	Conv. (cfs)		8829.0	
Length Wtd. (ft)	19.30	Wetted Per. (ft)		69.38	
Min Ch El (ft)	2760.50	Shear (lb/sq ft)		1.77	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	7.40	Cum Volume (acre-ft)		10.15	
C & E Loss (ft)	1.49	Cum SA (acres)		4.17	

```
Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2762.73    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.73    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2762.01    Reach Len. (ft)             19.30      19.30      19.30
  Crit W.S. (ft)           2762.01    Flow Area (sq ft)                      95.09
  E.G. Slope (ft/ft)      0.016182    Area (sq ft)                           95.09
  Q Total (cfs)             650.00    Flow (cfs)                            650.00
  Top Width (ft)             66.06    Top Width (ft)                         66.06
  Vel Total (ft/s)            6.84    Avg. Vel. (ft/s)                        6.84
  Max Chl Dpth (ft)           1.51    Hydr. Depth (ft)                        1.44
  Conv. Total (cfs)         5109.7    Conv. (cfs)                           5109.7
  Length Wtd. (ft)           19.30    Wetted Per. (ft)                       66.77
  Min Ch El (ft)           2760.50    Shear (lb/sq ft)                        1.44
  Alpha                       1.00    Stream Power (lb/ft s)    220.00        0.00       0.00
  Frctn Loss (ft)             8.70    Cum Volume (acre-ft)                    7.59
  C & E Loss (ft)             1.39    Cum SA (acres)                          4.01


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 3261.9

INPUT
Description: Section 32+61.9
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2764.05     120 2764.05     140  2754.1     200  2754.1     220 2764.05

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
     100    .016     120    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           120     220            355.7   355.7   355.7             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
```

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     100     120    2765       T
     220     220    2765       T
Left Levee      Station=     120      Elevation=    2765
Right Levee     Station=     220      Elevation=    2765
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CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2762.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	2761.97	Reach Len. (ft)	355.70	355.70	355.70
Crit W.S. (ft)	2758.49	Flow Area (sq ft)		596.39	
E.G. Slope (ft/ft)	0.001546	Area (sq ft)		596.39	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	91.63	Top Width (ft)		91.63	
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)		5.67	
Max Chl Dpth (ft)	7.87	Hydr. Depth (ft)		6.51	
Conv. Total (cfs)	85971.1	Conv. (cfs)		85971.1	
Length Wtd. (ft)	355.70	Wetted Per. (ft)		95.32	
Min Ch El (ft)	2754.10	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)	220.00	120.00	220.00
Frctn Loss (ft)	1.19	Cum Volume (acre-ft)	0.26	16.06	0.03
C & E Loss (ft)	0.15	Cum SA (acres)	0.37	4.42	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2761.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.035	
W.S. Elev (ft)	2761.17	Reach Len. (ft)	355.70	355.70	355.70
Crit W.S. (ft)	2757.90	Flow Area (sq ft)		524.64	
E.G. Slope (ft/ft)	0.001437	Area (sq ft)		524.64	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	88.42	Top Width (ft)		88.42	
Vel Total (ft/s)	5.15	Avg. Vel. (ft/s)		5.15	
Max Chl Dpth (ft)	7.07	Hydr. Depth (ft)		5.93	
Conv. Total (cfs)	71226.2	Conv. (cfs)		71226.2	
Length Wtd. (ft)	355.70	Wetted Per. (ft)		91.74	
Min Ch El (ft)	2754.10	Shear (lb/sq ft)		0.51	
Alpha	1.00	Stream Power (lb/ft s)	220.00	120.00	220.00
Frctn Loss (ft)	1.14	Cum Volume (acre-ft)	0.11	15.40	0.01
C & E Loss (ft)	0.13	Cum SA (acres)	0.22	4.41	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2759.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.035	
W.S. Elev (ft)	2759.46	Reach Len. (ft)	355.70	355.70	355.70
Crit W.S. (ft)	2756.69	Flow Area (sq ft)		379.48	
E.G. Slope (ft/ft)	0.001162	Area (sq ft)		379.48	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	81.55	Top Width (ft)		81.55	
Vel Total (ft/s)	3.95	Avg. Vel. (ft/s)		3.95	
Max Chl Dpth (ft)	5.36	Hydr. Depth (ft)		4.65	
Conv. Total (cfs)	44000.7	Conv. (cfs)		44000.7	
Length Wtd. (ft)	355.70	Wetted Per. (ft)		84.07	
Min Ch El (ft)	2754.10	Shear (lb/sq ft)		0.33	
Alpha	1.00	Stream Power (lb/ft s)	220.00	120.00	220.00
Frctn Loss (ft)	0.99	Cum Volume (acre-ft)		11.20	
C & E Loss (ft)	0.10	Cum SA (acres)		4.21	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2756.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2756.31	Reach Len. (ft)	355.70	355.70	355.70
Crit W.S. (ft)	2754.78	Flow Area (sq ft)		142.04	
E.G. Slope (ft/ft)	0.000427	Area (sq ft)		142.04	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	68.86	Top Width (ft)		68.86	
Vel Total (ft/s)	1.41	Avg. Vel. (ft/s)		1.41	
Max Chl Dpth (ft)	2.20	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	9675.1	Conv. (cfs)		9675.1	
Length Wtd. (ft)	355.70	Wetted Per. (ft)		69.90	
Min Ch El (ft)	2754.10	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	220.00	120.00	220.00
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)		4.08	
C & E Loss (ft)	0.03	Cum SA (acres)		3.70	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2759.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.035	
W.S. Elev (ft)	2759.63	Reach Len. (ft)	355.70	355.70	355.70
Crit W.S. (ft)	2756.83	Flow Area (sq ft)		392.93	

E.G. Slope (ft/ft)	0.001191	Area (sq ft)		392.93	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	82.21	Top Width (ft)		82.21	
Vel Total (ft/s)	4.07	Avg. Vel. (ft/s)		4.07	
Max Chl Dpth (ft)	5.53	Hydr. Depth (ft)		4.78	
Conv. Total (cfs)	46360.6	Conv. (cfs)		46360.6	
Length Wtd. (ft)	355.70	Wetted Per. (ft)		84.81	
Min Ch El (ft)	2754.10	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)	220.00	120.00	220.00
Frctn Loss (ft)	1.01	Cum Volume (acre-ft)		11.77	
C & E Loss (ft)	0.10	Cum SA (acres)		4.24	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2758.86	Element			
Vel Head (ft)	0.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.69	Reach Len. (ft)	355.70	355.70	355.70
Crit W.S. (ft)	2756.20	Flow Area (sq ft)		317.49	
E.G. Slope (ft/ft)	0.001013	Area (sq ft)		317.49	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	78.44	Top Width (ft)		78.44	
Vel Total (ft/s)	3.37	Avg. Vel. (ft/s)		3.37	
Max Chl Dpth (ft)	4.59	Hydr. Depth (ft)		4.05	
Conv. Total (cfs)	33620.1	Conv. (cfs)		33620.1	
Length Wtd. (ft)	355.70	Wetted Per. (ft)		80.59	
Min Ch El (ft)	2754.10	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)	220.00	120.00	220.00
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)		10.05	
C & E Loss (ft)	0.08	Cum SA (acres)		4.13	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2757.87	Element			
Vel Head (ft)	0.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.76	Reach Len. (ft)	355.70	355.70	355.70
Crit W.S. (ft)	2755.61	Flow Area (sq ft)		246.41	
E.G. Slope (ft/ft)	0.000811	Area (sq ft)		246.41	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	74.71	Top Width (ft)		74.71	
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)		2.64	
Max Chl Dpth (ft)	3.66	Hydr. Depth (ft)		3.30	
Conv. Total (cfs)	22831.1	Conv. (cfs)		22831.1	

Length Wtd. (ft)	355.70	Wetted Per. (ft)		76.43	
Min Ch El (ft)	2754.10	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	220.00	120.00	220.00
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)		7.51	
C & E Loss (ft)	0.06	Cum SA (acres)		3.97	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2906.2

INPUT
Description: Section 29+06.2
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2765.95	120	2765.95	142.5	2754.8	202.5	2754.8	225	2765.95

Manning's n Values num= 2

Sta	n Val	Sta	n Val
100	.016	120	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
120	225	11.4	11.4	11.4	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2761.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.96	Wt. n-Val.		0.035	
W.S. Elev (ft)	2759.17	Reach Len. (ft)	11.40	11.40	11.40
Crit W.S. (ft)	2759.17	Flow Area (sq ft)		301.07	
E.G. Slope (ft/ft)	0.011887	Area (sq ft)		301.07	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	77.65	Top Width (ft)		77.65	
Vel Total (ft/s)	11.23	Avg. Vel. (ft/s)		11.23	
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)		3.88	
Conv. Total (cfs)	31001.7	Conv. (cfs)		31001.7	
Length Wtd. (ft)	11.40	Wetted Per. (ft)		79.70	
Min Ch El (ft)	2754.80	Shear (lb/sq ft)		2.80	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.26	12.40	0.03
C & E Loss (ft)	0.39	Cum SA (acres)	0.37	3.73	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2760.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.72	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.59	Reach Len. (ft)	11.40	11.40	11.40
Crit W.S. (ft)	2758.59	Flow Area (sq ft)		256.35	
E.G. Slope (ft/ft)	0.012395	Area (sq ft)		256.35	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	75.29	Top Width (ft)		75.29	
Vel Total (ft/s)	10.53	Avg. Vel. (ft/s)		10.53	
Max Chl Dpth (ft)	3.79	Hydr. Depth (ft)		3.40	
Conv. Total (cfs)	24251.3	Conv. (cfs)		24251.3	
Length Wtd. (ft)	11.40	Wetted Per. (ft)		77.07	
Min Ch El (ft)	2754.80	Shear (lb/sq ft)		2.57	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.11	12.21	0.01
C & E Loss (ft)	0.35	Cum SA (acres)	0.22	3.75	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2758.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.40	Reach Len. (ft)	11.40	11.40	11.40
Crit W.S. (ft)	2757.40	Flow Area (sq ft)		169.58	
E.G. Slope (ft/ft)	0.013777	Area (sq ft)		169.58	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	70.49	Top Width (ft)		70.49	
Vel Total (ft/s)	8.85	Avg. Vel. (ft/s)		8.85	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		2.41	
Conv. Total (cfs)	12779.3	Conv. (cfs)		12779.3	
Length Wtd. (ft)	11.40	Wetted Per. (ft)		71.71	
Min Ch El (ft)	2754.80	Shear (lb/sq ft)		2.03	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		8.95	
C & E Loss (ft)	0.26	Cum SA (acres)		3.59	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2755.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.50	Reach Len. (ft)	11.40	11.40	11.40
Crit W.S. (ft)	2755.50	Flow Area (sq ft)		42.68	
E.G. Slope (ft/ft)	0.020534	Area (sq ft)		42.68	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	62.81	Top Width (ft)		62.81	
Vel Total (ft/s)	4.69	Avg. Vel. (ft/s)		4.69	
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	1395.7	Conv. (cfs)		1395.7	
Length Wtd. (ft)	11.40	Wetted Per. (ft)		63.13	
Min Ch El (ft)	2754.80	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		3.33	
C & E Loss (ft)	0.09	Cum SA (acres)		3.16	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2758.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.51	Reach Len. (ft)	11.40	11.40	11.40
Crit W.S. (ft)	2757.51	Flow Area (sq ft)		177.37	
E.G. Slope (ft/ft)	0.013622	Area (sq ft)		177.37	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	70.93	Top Width (ft)		70.93	
Vel Total (ft/s)	9.02	Avg. Vel. (ft/s)		9.02	
Max Chl Dpth (ft)	2.71	Hydr. Depth (ft)		2.50	
Conv. Total (cfs)	13709.0	Conv. (cfs)		13709.0	
Length Wtd. (ft)	11.40	Wetted Per. (ft)		72.20	
Min Ch El (ft)	2754.80	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		9.45	
C & E Loss (ft)	0.27	Cum SA (acres)		3.61	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2757.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.035	
W.S. Elev (ft)	2756.89	Reach Len. (ft)	11.40	11.40	11.40
Crit W.S. (ft)	2756.89	Flow Area (sq ft)		133.92	
E.G. Slope (ft/ft)	0.014741	Area (sq ft)		133.92	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	68.42	Top Width (ft)		68.42	
Vel Total (ft/s)	7.99	Avg. Vel. (ft/s)		7.99	
Max Chl Dpth (ft)	2.09	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	8812.9	Conv. (cfs)		8812.9	
Length Wtd. (ft)	11.40	Wetted Per. (ft)		69.39	
Min Ch El (ft)	2754.80	Shear (lb/sq ft)		1.78	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		8.21	
C & E Loss (ft)	0.22	Cum SA (acres)		3.54	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2757.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.72	Wt. n-Val.		0.035	
W.S. Elev (ft)	2756.31	Reach Len. (ft)	11.40	11.40	11.40
Crit W.S. (ft)	2756.31	Flow Area (sq ft)		95.15	
E.G. Slope (ft/ft)	0.016153	Area (sq ft)		95.15	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	66.09	Top Width (ft)		66.09	
Vel Total (ft/s)	6.83	Avg. Vel. (ft/s)		6.83	

Max Chl Dpth (ft)	1.51	Hydr. Depth (ft)		1.44	
Conv. Total (cfs)	5114.4	Conv. (cfs)		5114.4	
Length Wtd. (ft)	11.40	Wetted Per. (ft)		66.80	
Min Ch El (ft)	2754.80	Shear (lb/sq ft)		1.44	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		6.12	
C & E Loss (ft)	0.17	Cum SA (acres)		3.40	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2894.8

INPUT
Description: Section 28+94.8
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2762.25	120	2762.25	142.5	2751.1	202.5	2751.1	225	2762.25

Manning's n Values num= 2

Sta	n Val	Sta	n Val
100	.016	120	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
120	225	197.6	197.6	197.6	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2760.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.78	Wt. n-Val.		0.035	
W.S. Elev (ft)	2753.59	Reach Len. (ft)	197.60	197.60	197.60
Crit W.S. (ft)	2755.47	Flow Area (sq ft)		161.81	
E.G. Slope (ft/ft)	0.081038	Area (sq ft)		161.81	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	70.04	Top Width (ft)		70.04	
Vel Total (ft/s)	20.89	Avg. Vel. (ft/s)		20.89	
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)		2.31	
Conv. Total (cfs)	11873.3	Conv. (cfs)		11873.3	
Length Wtd. (ft)	197.60	Wetted Per. (ft)		71.21	
Min Ch El (ft)	2751.10	Shear (lb/sq ft)		11.50	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)	0.26	12.34	0.03
C & E Loss (ft)	0.48	Cum SA (acres)	0.37	3.71	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2759.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.36	Wt. n-Val.		0.035	
W.S. Elev (ft)	2753.18	Reach Len. (ft)	197.60	197.60	197.60
Crit W.S. (ft)	2754.89	Flow Area (sq ft)		133.39	
E.G. Slope (ft/ft)	0.095057	Area (sq ft)		133.39	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	68.39	Top Width (ft)		68.39	
Vel Total (ft/s)	20.24	Avg. Vel. (ft/s)		20.24	
Max Chl Dpth (ft)	2.08	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	8757.3	Conv. (cfs)		8757.3	
Length Wtd. (ft)	197.60	Wetted Per. (ft)		69.36	
Min Ch El (ft)	2751.10	Shear (lb/sq ft)		11.41	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	0.11	12.16	0.01
C & E Loss (ft)	0.46	Cum SA (acres)	0.22	3.73	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2756.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.76	Reach Len. (ft)	197.60	197.60	197.60
Crit W.S. (ft)	2753.70	Flow Area (sq ft)		323.49	
E.G. Slope (ft/ft)	0.001882	Area (sq ft)		323.49	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	78.81	Top Width (ft)		78.81	
Vel Total (ft/s)	4.64	Avg. Vel. (ft/s)		4.64	
Max Chl Dpth (ft)	4.66	Hydr. Depth (ft)		4.10	
Conv. Total (cfs)	34572.4	Conv. (cfs)		34572.4	
Length Wtd. (ft)	197.60	Wetted Per. (ft)		80.99	
Min Ch El (ft)	2751.10	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.79	Cum Volume (acre-ft)		8.89	
C & E Loss (ft)	0.09	Cum SA (acres)		3.57	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2752.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.89	Reach Len. (ft)	197.60	197.60	197.60
Crit W.S. (ft)	2751.80	Flow Area (sq ft)		113.74	
E.G. Slope (ft/ft)	0.000865	Area (sq ft)		113.74	

Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	67.22	Top Width (ft)		67.22	
Vel Total (ft/s)	1.76	Avg. Vel. (ft/s)		1.76	
Max Chl Dpth (ft)	1.79	Hydr. Depth (ft)		1.69	
Conv. Total (cfs)	6800.3	Conv. (cfs)		6800.3	
Length Wtd. (ft)	197.60	Wetted Per. (ft)		68.05	
Min Ch El (ft)	2751.10	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)		3.31	
C & E Loss (ft)	0.03	Cum SA (acres)		3.14	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2756.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.91	Reach Len. (ft)	197.60	197.60	197.60
Crit W.S. (ft)	2753.81	Flow Area (sq ft)		335.49	
E.G. Slope (ft/ft)	0.001918	Area (sq ft)		335.49	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	79.42	Top Width (ft)		79.42	
Vel Total (ft/s)	4.77	Avg. Vel. (ft/s)		4.77	
Max Chl Dpth (ft)	4.81	Hydr. Depth (ft)		4.22	
Conv. Total (cfs)	36530.2	Conv. (cfs)		36530.2	
Length Wtd. (ft)	197.60	Wetted Per. (ft)		81.68	
Min Ch El (ft)	2751.10	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)		9.38	
C & E Loss (ft)	0.09	Cum SA (acres)		3.59	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2755.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.25	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.05	Reach Len. (ft)	197.60	197.60	197.60
Crit W.S. (ft)	2753.19	Flow Area (sq ft)		268.56	
E.G. Slope (ft/ft)	0.001688	Area (sq ft)		268.56	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	75.95	Top Width (ft)		75.95	
Vel Total (ft/s)	3.98	Avg. Vel. (ft/s)		3.98	
Max Chl Dpth (ft)	3.95	Hydr. Depth (ft)		3.54	
Conv. Total (cfs)	26042.3	Conv. (cfs)		26042.3	
Length Wtd. (ft)	197.60	Wetted Per. (ft)		77.80	
Min Ch El (ft)	2751.10	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)		8.16	
C & E Loss (ft)	0.07	Cum SA (acres)		3.52	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2754.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.20	Reach Len. (ft)	197.60	197.60	197.60
Crit W.S. (ft)	2752.61	Flow Area (sq ft)		205.58	
E.G. Slope (ft/ft)	0.001420	Area (sq ft)		205.58	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	72.52	Top Width (ft)		72.52	
Vel Total (ft/s)	3.16	Avg. Vel. (ft/s)		3.16	
Max Chl Dpth (ft)	3.10	Hydr. Depth (ft)		2.83	
Conv. Total (cfs)	17251.6	Conv. (cfs)		17251.6	
Length Wtd. (ft)	197.60	Wetted Per. (ft)		73.97	
Min Ch El (ft)	2751.10	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)	225.00	0.00	0.00
Frctn Loss (ft)	0.67	Cum Volume (acre-ft)		6.08	
C & E Loss (ft)	0.06	Cum SA (acres)		3.38	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2697.2

INPUT
Description: Section 26+97.2
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2761.25	120	2761.25	140	2751.4	200	2751.4	220	2761.25

Manning's n Values num= 2

Sta	n Val	Sta	n Val
100	.016	120	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
120	220	18.2	18.2	18.2	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2757.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.96	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.77	Reach Len. (ft)	18.20	18.20	18.20
Crit W.S. (ft)	2755.77	Flow Area (sq ft)		300.91	
E.G. Slope (ft/ft)	0.011923	Area (sq ft)		300.91	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	77.74	Top Width (ft)		77.74	
Vel Total (ft/s)	11.23	Avg. Vel. (ft/s)		11.23	
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)		3.87	
Conv. Total (cfs)	30954.9	Conv. (cfs)		30954.9	
Length Wtd. (ft)	18.20	Wetted Per. (ft)		79.78	
Min Ch El (ft)	2751.40	Shear (lb/sq ft)		2.81	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.26	11.29	0.03
C & E Loss (ft)	0.41	Cum SA (acres)	0.37	3.37	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2756.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.72	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.19	Reach Len. (ft)	18.20	18.20	18.20
Crit W.S. (ft)	2755.19	Flow Area (sq ft)		256.53	
E.G. Slope (ft/ft)	0.012385	Area (sq ft)		256.53	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	75.39	Top Width (ft)		75.39	
Vel Total (ft/s)	10.53	Avg. Vel. (ft/s)		10.53	
Max Chl Dpth (ft)	3.79	Hydr. Depth (ft)		3.40	
Conv. Total (cfs)	24261.8	Conv. (cfs)		24261.8	
Length Wtd. (ft)	18.20	Wetted Per. (ft)		77.15	
Min Ch El (ft)	2751.40	Shear (lb/sq ft)		2.57	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	5.28	Cum Volume (acre-ft)	0.11	11.27	0.01
C & E Loss (ft)	1.39	Cum SA (acres)	0.22	3.40	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2755.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.00	Reach Len. (ft)	18.20	18.20	18.20
Crit W.S. (ft)	2754.00	Flow Area (sq ft)		169.63	
E.G. Slope (ft/ft)	0.013778	Area (sq ft)		169.63	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	70.55	Top Width (ft)		70.55	
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)		8.84	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		2.40	
Conv. Total (cfs)	12778.9	Conv. (cfs)		12778.9	
Length Wtd. (ft)	18.20	Wetted Per. (ft)		71.76	
Min Ch El (ft)	2751.40	Shear (lb/sq ft)		2.03	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		7.77	
C & E Loss (ft)	0.28	Cum SA (acres)		3.23	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2752.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.10	Reach Len. (ft)	18.20	18.20	18.20
Crit W.S. (ft)	2752.10	Flow Area (sq ft)		42.73	
E.G. Slope (ft/ft)	0.020459	Area (sq ft)		42.73	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	62.83	Top Width (ft)		62.83	
Vel Total (ft/s)	4.68	Avg. Vel. (ft/s)		4.68	
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	1398.3	Conv. (cfs)		1398.3	
Length Wtd. (ft)	18.20	Wetted Per. (ft)		63.15	
Min Ch El (ft)	2751.40	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		2.95	
C & E Loss (ft)	0.09	Cum SA (acres)		2.85	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2755.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.11	Reach Len. (ft)	18.20	18.20	18.20
Crit W.S. (ft)	2754.11	Flow Area (sq ft)		177.30	
E.G. Slope (ft/ft)	0.013651	Area (sq ft)		177.30	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	70.99	Top Width (ft)		70.99	
Vel Total (ft/s)	9.02	Avg. Vel. (ft/s)		9.02	
Max Chl Dpth (ft)	2.71	Hydr. Depth (ft)		2.50	
Conv. Total (cfs)	13694.3	Conv. (cfs)		13694.3	

Length Wtd. (ft)	18.20	Wetted Per. (ft)		72.25	
Min Ch El (ft)	2751.40	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		8.22	
C & E Loss (ft)	0.29	Cum SA (acres)		3.25	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2754.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.035	
W.S. Elev (ft)	2753.49	Reach Len. (ft)	18.20	18.20	18.20
Crit W.S. (ft)	2753.49	Flow Area (sq ft)		134.06	
E.G. Slope (ft/ft)	0.014705	Area (sq ft)		134.06	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	68.47	Top Width (ft)		68.47	
Vel Total (ft/s)	7.98	Avg. Vel. (ft/s)		7.98	
Max Chl Dpth (ft)	2.09	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	8823.6	Conv. (cfs)		8823.6	
Length Wtd. (ft)	18.20	Wetted Per. (ft)		69.45	
Min Ch El (ft)	2751.40	Shear (lb/sq ft)		1.77	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		7.25	
C & E Loss (ft)	0.24	Cum SA (acres)		3.19	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2753.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.91	Reach Len. (ft)	18.20	18.20	18.20

Crit W.S. (ft)	2752.91	Flow Area (sq ft)		95.12	
E.G. Slope (ft/ft)	0.016183	Area (sq ft)		95.12	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	66.13	Top Width (ft)		66.13	
Vel Total (ft/s)	6.83	Avg. Vel. (ft/s)		6.83	
Max Chl Dpth (ft)	1.51	Hydr. Depth (ft)		1.44	
Conv. Total (cfs)	5109.6	Conv. (cfs)		5109.6	
Length Wtd. (ft)	18.20	Wetted Per. (ft)		66.83	
Min Ch El (ft)	2751.40	Shear (lb/sq ft)		1.44	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)		5.40	
C & E Loss (ft)	0.18	Cum SA (acres)		3.07	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2679

INPUT
Description: Section 26+79
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2756.25	120	2756.25	140	2745.3	200	2745.3	220	2756.25

Manning's n Values num= 2

Sta	n Val	Sta	n Val
100	.016	120	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
120	220	268.2	268.2	268.2	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2756.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2747.49	Reach Len. (ft)	268.20	268.20	268.20
Crit W.S. (ft)	2749.70	Flow Area (sq ft)		140.14	
E.G. Slope (ft/ft)	0.125770	Area (sq ft)		140.14	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	68.00	Top Width (ft)		68.00	
Vel Total (ft/s)	24.12	Avg. Vel. (ft/s)		24.12	
Max Chl Dpth (ft)	2.19	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	9530.8	Conv. (cfs)		9530.8	
Length Wtd. (ft)	268.20	Wetted Per. (ft)		69.12	
Min Ch El (ft)	2745.30	Shear (lb/sq ft)		15.92	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00

Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	0.26	11.20	0.03
C & E Loss (ft)	0.71	Cum SA (acres)	0.37	3.34	0.06

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2755.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.57	Wt. n-Val.		0.035	
W.S. Elev (ft)	2747.12	Reach Len. (ft)	268.20	268.20	268.20
Crit W.S. (ft)	2749.11	Flow Area (sq ft)		114.96	
E.G. Slope (ft/ft)	0.150648	Area (sq ft)		114.96	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	66.63	Top Width (ft)		66.63	
Vel Total (ft/s)	23.49	Avg. Vel. (ft/s)		23.49	
Max Chl Dpth (ft)	1.82	Hydr. Depth (ft)		1.73	
Conv. Total (cfs)	6956.4	Conv. (cfs)		6956.4	
Length Wtd. (ft)	268.20	Wetted Per. (ft)		67.56	
Min Ch El (ft)	2745.30	Shear (lb/sq ft)		16.00	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)	0.11	11.20	0.01
C & E Loss (ft)	0.68	Cum SA (acres)	0.22	3.37	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2753.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.52	Wt. n-Val.		0.035	
W.S. Elev (ft)	2746.40	Reach Len. (ft)	268.20	268.20	268.20
Crit W.S. (ft)	2747.91	Flow Area (sq ft)		68.17	
E.G. Slope (ft/ft)	0.249927	Area (sq ft)		68.17	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	64.02	Top Width (ft)		64.02	
Vel Total (ft/s)	22.00	Avg. Vel. (ft/s)		22.00	
Max Chl Dpth (ft)	1.10	Hydr. Depth (ft)		1.06	
Conv. Total (cfs)	3000.4	Conv. (cfs)		3000.4	
Length Wtd. (ft)	268.20	Wetted Per. (ft)		64.58	
Min Ch El (ft)	2745.30	Shear (lb/sq ft)		16.47	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.66	Cum Volume (acre-ft)		7.72	
C & E Loss (ft)	0.63	Cum SA (acres)		3.20	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2747.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2747.36	Reach Len. (ft)	268.20	268.20	268.20
Crit W.S. (ft)	2746.00	Flow Area (sq ft)		131.52	
E.G. Slope (ft/ft)	0.000539	Area (sq ft)		131.52	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	67.53	Top Width (ft)		67.53	
Vel Total (ft/s)	1.52	Avg. Vel. (ft/s)		1.52	
Max Chl Dpth (ft)	2.06	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	8618.0	Conv. (cfs)		8618.0	
Length Wtd. (ft)	268.20	Wetted Per. (ft)		68.59	
Min Ch El (ft)	2745.30	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.43	Cum Volume (acre-ft)		2.92	
C & E Loss (ft)	0.03	Cum SA (acres)		2.82	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2754.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.62	Wt. n-Val.		0.035	
W.S. Elev (ft)	2746.46	Reach Len. (ft)	268.20	268.20	268.20
Crit W.S. (ft)	2748.02	Flow Area (sq ft)		72.21	
E.G. Slope (ft/ft)	0.235983	Area (sq ft)		72.21	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	64.25	Top Width (ft)		64.25	
Vel Total (ft/s)	22.16	Avg. Vel. (ft/s)		22.16	
Max Chl Dpth (ft)	1.16	Hydr. Depth (ft)		1.12	
Conv. Total (cfs)	3293.7	Conv. (cfs)		3293.7	
Length Wtd. (ft)	268.20	Wetted Per. (ft)		64.84	
Min Ch El (ft)	2745.30	Shear (lb/sq ft)		16.41	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.65	Cum Volume (acre-ft)		8.16	
C & E Loss (ft)	0.64	Cum SA (acres)		3.23	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2749.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.65	Reach Len. (ft)	268.20	268.20	268.20
Crit W.S. (ft)	2747.39	Flow Area (sq ft)		295.55	
E.G. Slope (ft/ft)	0.001233	Area (sq ft)		295.55	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	

```
  Top Width (ft)             75.89    Top Width (ft)                        75.89
  Vel Total (ft/s)            3.62    Avg. Vel. (ft/s)                       3.62
  Max Chl Dpth (ft)           4.35    Hydr. Depth (ft)                       3.89
  Conv. Total (cfs)        30466.5    Conv. (cfs)                         30466.5
  Length Wtd. (ft)          268.20    Wetted Per. (ft)                      78.12
  Min Ch El (ft)           2745.30    Shear (lb/sq ft)                       0.29
  Alpha                       1.00    Stream Power (lb/ft s)    220.00       0.00       0.00
  Frctn Loss (ft)             0.80    Cum Volume (acre-ft)                   7.16
  C & E Loss (ft)             0.08    Cum SA (acres)                         3.16


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2748.88    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.12    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2748.76    Reach Len. (ft)           268.20     268.20     268.20
  Crit W.S. (ft)           2746.81    Flow Area (sq ft)                    229.16
  E.G. Slope (ft/ft)      0.000996    Area (sq ft)                         229.16
  Q Total (cfs)             650.00    Flow (cfs)                           650.00
  Top Width (ft)             72.62    Top Width (ft)                        72.62
  Vel Total (ft/s)            2.84    Avg. Vel. (ft/s)                       2.84
  Max Chl Dpth (ft)           3.46    Hydr. Depth (ft)                       3.16
  Conv. Total (cfs)        20597.4    Conv. (cfs)                         20597.4
  Length Wtd. (ft)          268.20    Wetted Per. (ft)                      74.39
  Min Ch El (ft)           2745.30    Shear (lb/sq ft)                       0.19
  Alpha                       1.00    Stream Power (lb/ft s)    220.00       0.00       0.00
  Frctn Loss (ft)             0.69    Cum Volume (acre-ft)                   5.33
  C & E Loss (ft)             0.06    Cum SA (acres)                         3.04


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 2410.8

INPUT
Description: Section 24+10.8
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2755.85     120 2755.85     140  2745.9     200  2745.9     220 2755.85

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
     100    .016     120    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           120     220             15.7    15.7    15.7             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2752.23    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.96    Wt. n-Val.                            0.035
```

W.S. Elev (ft)	2750.27	Reach Len. (ft)	15.70	15.70	15.70
Crit W.S. (ft)	2750.28	Flow Area (sq ft)		300.69	
E.G. Slope (ft/ft)	0.011922	Area (sq ft)		300.69	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	77.57	Top Width (ft)		77.57	
Vel Total (ft/s)	11.24	Avg. Vel. (ft/s)		11.24	
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)		3.88	
Conv. Total (cfs)	30956.2	Conv. (cfs)		30956.2	
Length Wtd. (ft)	15.70	Wetted Per. (ft)		79.63	
Min Ch El (ft)	2745.90	Shear (lb/sq ft)		2.81	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.26	9.84	0.03
C & E Loss (ft)	0.39	Cum SA (acres)	0.37	2.90	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2751.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.72	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.69	Reach Len. (ft)	15.70	15.70	15.70
Crit W.S. (ft)	2749.70	Flow Area (sq ft)		256.24	
E.G. Slope (ft/ft)	0.012402	Area (sq ft)		256.24	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	75.23	Top Width (ft)		75.23	
Vel Total (ft/s)	10.54	Avg. Vel. (ft/s)		10.54	
Max Chl Dpth (ft)	3.79	Hydr. Depth (ft)		3.41	
Conv. Total (cfs)	24244.6	Conv. (cfs)		24244.6	
Length Wtd. (ft)	15.70	Wetted Per. (ft)		77.02	
Min Ch El (ft)	2745.90	Shear (lb/sq ft)		2.58	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.11	10.05	0.01
C & E Loss (ft)	0.35	Cum SA (acres)	0.22	2.93	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2749.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.22	Wt. n-Val.		0.035	
W.S. Elev (ft)	2748.50	Reach Len. (ft)	15.70	15.70	15.70
Crit W.S. (ft)	2748.50	Flow Area (sq ft)		169.46	
E.G. Slope (ft/ft)	0.013800	Area (sq ft)		169.46	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	70.44	Top Width (ft)		70.44	
Vel Total (ft/s)	8.85	Avg. Vel. (ft/s)		8.85	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		2.41	
Conv. Total (cfs)	12768.8	Conv. (cfs)		12768.8	
Length Wtd. (ft)	15.70	Wetted Per. (ft)		71.67	
Min Ch El (ft)	2745.90	Shear (lb/sq ft)		2.04	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		6.99	
C & E Loss (ft)	0.27	Cum SA (acres)		2.78	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2746.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2746.60	Reach Len. (ft)	15.70	15.70	15.70
Crit W.S. (ft)	2746.60	Flow Area (sq ft)		42.68	
E.G. Slope (ft/ft)	0.020536	Area (sq ft)		42.68	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	62.79	Top Width (ft)		62.79	
Vel Total (ft/s)	4.69	Avg. Vel. (ft/s)		4.69	
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	1395.6	Conv. (cfs)		1395.6	
Length Wtd. (ft)	15.70	Wetted Per. (ft)		63.12	
Min Ch El (ft)	2745.90	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		2.38	
C & E Loss (ft)	0.09	Cum SA (acres)		2.42	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2749.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.27	Wt. n-Val.		0.035	
W.S. Elev (ft)	2748.61	Reach Len. (ft)	15.70	15.70	15.70
Crit W.S. (ft)	2748.61	Flow Area (sq ft)		177.19	
E.G. Slope (ft/ft)	0.013656	Area (sq ft)		177.19	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	70.88	Top Width (ft)		70.88	
Vel Total (ft/s)	9.03	Avg. Vel. (ft/s)		9.03	
Max Chl Dpth (ft)	2.71	Hydr. Depth (ft)		2.50	
Conv. Total (cfs)	13691.7	Conv. (cfs)		13691.7	
Length Wtd. (ft)	15.70	Wetted Per. (ft)		72.16	
Min Ch El (ft)	2745.90	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	9.52	Cum Volume (acre-ft)		7.40	
C & E Loss (ft)	1.91	Cum SA (acres)		2.81	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2748.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.035	
W.S. Elev (ft)	2747.99	Reach Len. (ft)	15.70	15.70	15.70
Crit W.S. (ft)	2747.99	Flow Area (sq ft)		133.82	
E.G. Slope (ft/ft)	0.014769	Area (sq ft)		133.82	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	68.38	Top Width (ft)		68.38	
Vel Total (ft/s)	8.00	Avg. Vel. (ft/s)		8.00	
Max Chl Dpth (ft)	2.08	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	8804.7	Conv. (cfs)		8804.7	
Length Wtd. (ft)	15.70	Wetted Per. (ft)		69.36	
Min Ch El (ft)	2745.90	Shear (lb/sq ft)		1.78	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)		5.83	
C & E Loss (ft)	0.23	Cum SA (acres)		2.71	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)          2748.13    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              0.73    Wt. n-Val.                            0.035
  W.S. Elev (ft)          2747.41    Reach Len. (ft)            15.70      15.70      15.70
  Crit W.S. (ft)          2747.41    Flow Area (sq ft)                     95.09
  E.G. Slope (ft/ft)     0.016182    Area (sq ft)                          95.09
  Q Total (cfs)            650.00    Flow (cfs)                           650.00
  Top Width (ft)            66.06    Top Width (ft)                        66.06
  Vel Total (ft/s)           6.84    Avg. Vel. (ft/s)                       6.84
  Max Chl Dpth (ft)          1.51    Hydr. Depth (ft)                       1.44
  Conv. Total (cfs)        5109.7    Conv. (cfs)                          5109.7
  Length Wtd. (ft)          15.70    Wetted Per. (ft)                      66.77
  Min Ch El (ft)          2745.90    Shear (lb/sq ft)                       1.44
  Alpha                      1.00    Stream Power (lb/ft s)    220.00       0.00       0.00
  Frctn Loss (ft)            0.05    Cum Volume (acre-ft)                   4.33
  C & E Loss (ft)            0.17    Cum SA (acres)                         2.61


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 2395.1

INPUT
Description: Section 23+95.1
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2751.25     120 2751.25   141.5  2740.6   201.5  2740.6     223 2751.25

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
     100    .016     120    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
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```
          120     223            184.3   184.3   184.3             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2751.17    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               8.31    Wt. n-Val.                           0.035
  W.S. Elev (ft)           2742.86    Reach Len. (ft)           184.30     184.30     184.30
  Crit W.S. (ft)           2744.97    Flow Area (sq ft)                    146.11
  E.G. Slope (ft/ft)      0.111709    Area (sq ft)                         146.11
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             69.14    Top Width (ft)                        69.14
  Vel Total (ft/s)           23.13    Avg. Vel. (ft/s)                      23.13
  Max Chl Dpth (ft)           2.26    Hydr. Depth (ft)                       2.11
  Conv. Total (cfs)        10112.8    Conv. (cfs)                        10112.8
  Length Wtd. (ft)                    Wetted Per. (ft)                      70.20
  Min Ch El (ft)           2740.60    Shear (lb/sq ft)                      14.52
  Alpha                       1.00    Stream Power (lb/ft s)    223.00       0.00       0.00
  Frctn Loss (ft)             0.42    Cum Volume (acre-ft)        0.26       9.76       0.03
  C & E Loss (ft)             0.64    Cum SA (acres)              0.37       2.87       0.06


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2750.35    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               7.87    Wt. n-Val.                           0.035
  W.S. Elev (ft)           2742.48    Reach Len. (ft)           184.30     184.30     184.30
  Crit W.S. (ft)           2744.39    Flow Area (sq ft)                    119.94
  E.G. Slope (ft/ft)      0.133135    Area (sq ft)                         119.94
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             67.59    Top Width (ft)                        67.59
  Vel Total (ft/s)           22.51    Avg. Vel. (ft/s)                      22.51
  Max Chl Dpth (ft)           1.88    Hydr. Depth (ft)                       1.77
  Conv. Total (cfs)         7399.8    Conv. (cfs)                         7399.8
  Length Wtd. (ft)                    Wetted Per. (ft)                      68.47
  Min Ch El (ft)           2740.60    Shear (lb/sq ft)                      14.56
  Alpha                       1.00    Stream Power (lb/ft s)    223.00       0.00       0.00
  Frctn Loss (ft)             0.46    Cum Volume (acre-ft)        0.11       9.99       0.01
  C & E Loss (ft)             0.61    Cum SA (acres)              0.22       2.91       0.03


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2748.60    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               6.85    Wt. n-Val.                           0.035
  W.S. Elev (ft)           2741.75    Reach Len. (ft)           184.30     184.30     184.30
  Crit W.S. (ft)           2743.20    Flow Area (sq ft)                     71.40
  E.G. Slope (ft/ft)      0.216817    Area (sq ft)                          71.40
```

Q Total (cfs)	1500.00	Flow (cfs)			1500.00	
Top Width (ft)	64.63	Top Width (ft)			64.63	
Vel Total (ft/s)	21.01	Avg. Vel. (ft/s)			21.01	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)			1.10	
Conv. Total (cfs)	3221.4	Conv. (cfs)			3221.4	
Length Wtd. (ft)	184.30	Wetted Per. (ft)			65.16	
Min Ch El (ft)	2740.60	Shear (lb/sq ft)			14.83	
Alpha	1.00	Stream Power (lb/ft s)	223.00		0.00	0.00
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)			6.95	
C & E Loss (ft)	0.56	Cum SA (acres)			2.76	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2742.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.035	
W.S. Elev (ft)	2742.43	Reach Len. (ft)	184.30	184.30	184.30
Crit W.S. (ft)	2741.30	Flow Area (sq ft)		116.60	
E.G. Slope (ft/ft)	0.000799	Area (sq ft)		116.60	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	67.39	Top Width (ft)		67.39	
Vel Total (ft/s)	1.72	Avg. Vel. (ft/s)		1.72	
Max Chl Dpth (ft)	1.83	Hydr. Depth (ft)		1.73	
Conv. Total (cfs)	7074.4	Conv. (cfs)		7074.4	
Length Wtd. (ft)	184.30	Wetted Per. (ft)		68.25	
Min Ch El (ft)	2740.60	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	223.00	0.00	0.00
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)		2.35	
C & E Loss (ft)	0.03	Cum SA (acres)		2.40	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2748.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.95	Wt. n-Val.		0.035	
W.S. Elev (ft)	2741.81	Reach Len. (ft)	184.30	184.30	184.30
Crit W.S. (ft)	2743.31	Flow Area (sq ft)		75.62	
E.G. Slope (ft/ft)	0.204926	Area (sq ft)		75.62	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	64.89	Top Width (ft)		64.89	
Vel Total (ft/s)	21.16	Avg. Vel. (ft/s)		21.16	
Max Chl Dpth (ft)	1.21	Hydr. Depth (ft)		1.17	
Conv. Total (cfs)	3534.4	Conv. (cfs)		3534.4	
Length Wtd. (ft)	184.30	Wetted Per. (ft)		65.46	
Min Ch El (ft)	2740.60	Shear (lb/sq ft)		14.78	
Alpha	1.00	Stream Power (lb/ft s)	223.00	0.00	0.00
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)		7.35	
C & E Loss (ft)	0.57	Cum SA (acres)		2.78	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2747.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	6.36	Wt. n-Val.		0.035	
W.S. Elev (ft)	2741.46	Reach Len. (ft)	184.30	184.30	184.30
Crit W.S. (ft)	2742.69	Flow Area (sq ft)		52.85	
E.G. Slope (ft/ft)	0.292636	Area (sq ft)		52.85	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	63.46	Top Width (ft)		63.46	
Vel Total (ft/s)	20.25	Avg. Vel. (ft/s)		20.25	
Max Chl Dpth (ft)	0.86	Hydr. Depth (ft)		0.83	
Conv. Total (cfs)	1978.0	Conv. (cfs)		1978.0	
Length Wtd. (ft)	184.30	Wetted Per. (ft)		63.86	
Min Ch El (ft)	2740.60	Shear (lb/sq ft)		15.12	
Alpha	1.00	Stream Power (lb/ft s)	223.00	0.00	0.00
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)		5.80	
C & E Loss (ft)	0.54	Cum SA (acres)		2.69	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2746.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.75	Wt. n-Val.		0.035	
W.S. Elev (ft)	2741.15	Reach Len. (ft)	184.30	184.30	184.30
Crit W.S. (ft)	2742.11	Flow Area (sq ft)		33.77	
E.G. Slope (ft/ft)	0.467159	Area (sq ft)		33.77	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	62.23	Top Width (ft)		62.23	
Vel Total (ft/s)	19.25	Avg. Vel. (ft/s)		19.25	
Max Chl Dpth (ft)	0.55	Hydr. Depth (ft)		0.54	
Conv. Total (cfs)	951.0	Conv. (cfs)		951.0	
Length Wtd. (ft)	184.30	Wetted Per. (ft)		62.49	
Min Ch El (ft)	2740.60	Shear (lb/sq ft)		15.76	
Alpha	1.00	Stream Power (lb/ft s)	223.00	0.00	0.00
Frctn Loss (ft)	0.72	Cum Volume (acre-ft)		4.31	
C & E Loss (ft)	0.50	Cum SA (acres)		2.59	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2210.8

INPUT
Description: Section 22+10.8
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2750.85	120	2750.85	140	2741	200	2741	220	2750.85

Manning's n Values num= 2

Sta	n Val	Sta	n Val
100	.016	120	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
120	220	12.5	12.5	12.5	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2747.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.96	Wt. n-Val.		0.035	
W.S. Elev (ft)	2745.37	Reach Len. (ft)	12.50	12.50	12.50
Crit W.S. (ft)	2745.37	Flow Area (sq ft)		301.02	
E.G. Slope (ft/ft)	0.011909	Area (sq ft)		301.02	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	77.75	Top Width (ft)		77.75	
Vel Total (ft/s)	11.23	Avg. Vel. (ft/s)		11.23	
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)		3.87	
Conv. Total (cfs)	30972.7	Conv. (cfs)		30972.7	
Length Wtd. (ft)	12.50	Wetted Per. (ft)		79.78	
Min Ch El (ft)	2741.00	Shear (lb/sq ft)		2.81	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.26	8.81	0.03
C & E Loss (ft)		Cum SA (acres)	0.37	2.56	0.06

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2746.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.72	Wt. n-Val.		0.035	
W.S. Elev (ft)	2744.79	Reach Len. (ft)	12.50	12.50	12.50
Crit W.S. (ft)	2744.79	Flow Area (sq ft)		256.42	
E.G. Slope (ft/ft)	0.012401	Area (sq ft)		256.42	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	75.38	Top Width (ft)		75.38	
Vel Total (ft/s)	10.53	Avg. Vel. (ft/s)		10.53	
Max Chl Dpth (ft)	3.79	Hydr. Depth (ft)		3.40	
Conv. Total (cfs)	24245.8	Conv. (cfs)		24245.8	
Length Wtd. (ft)	12.50	Wetted Per. (ft)		77.15	
Min Ch El (ft)	2741.00	Shear (lb/sq ft)		2.57	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00

Frctn Loss (ft)	Cum Volume (acre-ft)	0.11	9.19	0.01
C & E Loss (ft)	Cum SA (acres)	0.22	2.61	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2744.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.22	Wt. n-Val.		0.035	
W.S. Elev (ft)	2743.60	Reach Len. (ft)	12.50	12.50	12.50
Crit W.S. (ft)	2743.60	Flow Area (sq ft)		169.35	
E.G. Slope (ft/ft)	0.013849	Area (sq ft)		169.35	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	70.54	Top Width (ft)		70.54	
Vel Total (ft/s)	8.86	Avg. Vel. (ft/s)		8.86	
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)		2.40	
Conv. Total (cfs)	12746.4	Conv. (cfs)		12746.4	
Length Wtd. (ft)	12.50	Wetted Per. (ft)		71.75	
Min Ch El (ft)	2741.00	Shear (lb/sq ft)		2.04	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)		6.44	
C & E Loss (ft)	0.28	Cum SA (acres)		2.47	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2742.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2741.70	Reach Len. (ft)	12.50	12.50	12.50
Crit W.S. (ft)	2741.70	Flow Area (sq ft)		42.73	
E.G. Slope (ft/ft)	0.020459	Area (sq ft)		42.73	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	62.83	Top Width (ft)		62.83	
Vel Total (ft/s)	4.68	Avg. Vel. (ft/s)		4.68	
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	1398.3	Conv. (cfs)		1398.3	
Length Wtd. (ft)	12.50	Wetted Per. (ft)		63.15	

Min Ch El (ft)	2741.00	Shear (lb/sq ft)			0.86	
Alpha	1.00	Stream Power (lb/ft s)	220.00		0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)			2.01	
C & E Loss (ft)	0.09	Cum SA (acres)			2.12	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2744.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.		0.035	
W.S. Elev (ft)	2743.71	Reach Len. (ft)	12.50	12.50	12.50
Crit W.S. (ft)	2743.71	Flow Area (sq ft)		177.46	
E.G. Slope (ft/ft)	0.013614	Area (sq ft)		177.46	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	71.00	Top Width (ft)		71.00	
Vel Total (ft/s)	9.02	Avg. Vel. (ft/s)		9.02	
Max Chl Dpth (ft)	2.71	Hydr. Depth (ft)		2.50	
Conv. Total (cfs)	13713.1	Conv. (cfs)		13713.1	
Length Wtd. (ft)	12.50	Wetted Per. (ft)		72.26	
Min Ch El (ft)	2741.00	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	6.34	Cum Volume (acre-ft)		6.82	
C & E Loss (ft)	1.71	Cum SA (acres)		2.50	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2744.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.035	
W.S. Elev (ft)	2743.09	Reach Len. (ft)	12.50	12.50	12.50
Crit W.S. (ft)	2743.09	Flow Area (sq ft)		133.92	
E.G. Slope (ft/ft)	0.014752	Area (sq ft)		133.92	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	68.47	Top Width (ft)		68.47	
Vel Total (ft/s)	7.99	Avg. Vel. (ft/s)		7.99	
Max Chl Dpth (ft)	2.08	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	8809.7	Conv. (cfs)		8809.7	
Length Wtd. (ft)	12.50	Wetted Per. (ft)		69.44	

Min Ch El (ft)	2741.00	Shear (lb/sq ft)		1.78	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	7.25	Cum Volume (acre-ft)		5.41	
C & E Loss (ft)	1.61	Cum SA (acres)		2.41	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2743.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.		0.035	
W.S. Elev (ft)	2742.51	Reach Len. (ft)	12.50	12.50	12.50
Crit W.S. (ft)	2742.51	Flow Area (sq ft)		95.12	
E.G. Slope (ft/ft)	0.016183	Area (sq ft)		95.12	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	66.13	Top Width (ft)		66.13	
Vel Total (ft/s)	6.83	Avg. Vel. (ft/s)		6.83	
Max Chl Dpth (ft)	1.51	Hydr. Depth (ft)		1.44	
Conv. Total (cfs)	5109.6	Conv. (cfs)		5109.6	
Length Wtd. (ft)	12.50	Wetted Per. (ft)		66.83	
Min Ch El (ft)	2741.00	Shear (lb/sq ft)		1.44	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		4.03	
C & E Loss (ft)	0.18	Cum SA (acres)		2.32	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2198.3

INPUT
Description: Section 21+98.3
Station Elevation Data num= 5

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2748	120	2748	142	2736.8	202	2736.8	224	2748

```
Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
     100    .016     120    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           120     224            287.5   287.5   287.5             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2745.02    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.53    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2744.49    Reach Len. (ft)           287.50     287.50     287.50
  Crit W.S. (ft)           2741.18    Flow Area (sq ft)                    577.75
  E.G. Slope (ft/ft)      0.001684    Area (sq ft)                         577.75
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             90.22    Top Width (ft)                        90.22
  Vel Total (ft/s)            5.85    Avg. Vel. (ft/s)                       5.85
  Max Chl Dpth (ft)           7.69    Hydr. Depth (ft)                       6.40
  Conv. Total (cfs)        82355.2    Conv. (cfs)                         82355.2
  Length Wtd. (ft)          287.50    Wetted Per. (ft)                      93.91
  Min Ch El (ft)           2736.80    Shear (lb/sq ft)                       0.65
  Alpha                       1.00    Stream Power (lb/ft s)    224.00       0.00       0.00
  Frctn Loss (ft)             1.04    Cum Volume (acre-ft)        0.26       8.69       0.03
  C & E Loss (ft)             0.15    Cum SA (acres)              0.37       2.53       0.06


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2744.06    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.45    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2743.60    Reach Len. (ft)           287.50     287.50     287.50
  Crit W.S. (ft)           2740.60    Flow Area (sq ft)                    499.07
  E.G. Slope (ft/ft)      0.001654    Area (sq ft)                         499.07
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             86.73    Top Width (ft)                        86.73
  Vel Total (ft/s)            5.41    Avg. Vel. (ft/s)                       5.41
  Max Chl Dpth (ft)           6.80    Hydr. Depth (ft)                       5.75
  Conv. Total (cfs)        66384.1    Conv. (cfs)                         66384.1
  Length Wtd. (ft)          287.50    Wetted Per. (ft)                      89.99
  Min Ch El (ft)           2736.80    Shear (lb/sq ft)                       0.57
  Alpha                       1.00    Stream Power (lb/ft s)    224.00       0.00       0.00
  Frctn Loss (ft)             1.02    Cum Volume (acre-ft)        0.11       9.08       0.01
  C & E Loss (ft)             0.13    Cum SA (acres)              0.22       2.58       0.03


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
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CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2742.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.035	
W.S. Elev (ft)	2741.94	Reach Len. (ft)	287.50	287.50	287.50
Crit W.S. (ft)	2739.40	Flow Area (sq ft)		360.25	
E.G. Slope (ft/ft)	0.001351	Area (sq ft)		360.25	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	80.19	Top Width (ft)		80.19	
Vel Total (ft/s)	4.16	Avg. Vel. (ft/s)		4.16	
Max Chl Dpth (ft)	5.14	Hydr. Depth (ft)		4.49	
Conv. Total (cfs)	40808.0	Conv. (cfs)		40808.0	
Length Wtd. (ft)	287.50	Wetted Per. (ft)		82.66	
Min Ch El (ft)	2736.80	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)		6.36	
C & E Loss (ft)	0.09	Cum SA (acres)		2.45	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2738.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2738.88	Reach Len. (ft)	287.50	287.50	287.50
Crit W.S. (ft)	2737.49	Flow Area (sq ft)		133.37	
E.G. Slope (ft/ft)	0.000520	Area (sq ft)		133.37	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	68.18	Top Width (ft)		68.18	
Vel Total (ft/s)	1.50	Avg. Vel. (ft/s)		1.50	
Max Chl Dpth (ft)	2.08	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	8771.3	Conv. (cfs)		8771.3	
Length Wtd. (ft)	287.50	Wetted Per. (ft)		69.17	
Min Ch El (ft)	2736.80	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	0.45	Cum Volume (acre-ft)		1.99	
C & E Loss (ft)	0.03	Cum SA (acres)		2.10	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2742.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.		0.035	
W.S. Elev (ft)	2742.17	Reach Len. (ft)	287.50	287.50	287.50
Crit W.S. (ft)	2739.51	Flow Area (sq ft)		378.91	
E.G. Slope (ft/ft)	0.001320	Area (sq ft)		378.91	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	81.10	Top Width (ft)		81.10	
Vel Total (ft/s)	4.22	Avg. Vel. (ft/s)		4.22	
Max Chl Dpth (ft)	5.37	Hydr. Depth (ft)		4.67	
Conv. Total (cfs)	44030.8	Conv. (cfs)		44030.8	
Length Wtd. (ft)	287.50	Wetted Per. (ft)		83.68	
Min Ch El (ft)	2736.80	Shear (lb/sq ft)		0.37	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00

Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	6.74
C & E Loss (ft)	0.10	Cum SA (acres)	2.48

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2741.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.		0.035	
W.S. Elev (ft)	2741.27	Reach Len. (ft)	287.50	287.50	287.50
Crit W.S. (ft)	2738.89	Flow Area (sq ft)		307.31	
E.G. Slope (ft/ft)	0.001112	Area (sq ft)		307.31	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	77.55	Top Width (ft)		77.55	
Vel Total (ft/s)	3.48	Avg. Vel. (ft/s)		3.48	
Max Chl Dpth (ft)	4.47	Hydr. Depth (ft)		3.96	
Conv. Total (cfs)	32082.3	Conv. (cfs)		32082.3	
Length Wtd. (ft)	287.50	Wetted Per. (ft)		79.70	
Min Ch El (ft)	2736.80	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	0.81	Cum Volume (acre-ft)		5.34	
C & E Loss (ft)	0.08	Cum SA (acres)		2.39	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2740.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.035	
W.S. Elev (ft)	2740.35	Reach Len. (ft)	287.50	287.50	287.50
Crit W.S. (ft)	2738.31	Flow Area (sq ft)		237.49	
E.G. Slope (ft/ft)	0.000904	Area (sq ft)		237.49	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	73.93	Top Width (ft)		73.93	
Vel Total (ft/s)	2.74	Avg. Vel. (ft/s)		2.74	
Max Chl Dpth (ft)	3.55	Hydr. Depth (ft)		3.21	
Conv. Total (cfs)	21619.8	Conv. (cfs)		21619.8	
Length Wtd. (ft)	287.50	Wetted Per. (ft)		75.63	
Min Ch El (ft)	2736.80	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	224.00	0.00	0.00
Frctn Loss (ft)	0.70	Cum Volume (acre-ft)		3.99	
C & E Loss (ft)	0.06	Cum SA (acres)		2.30	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 1910.8

INPUT
Description: Section 19+10.8
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2747.25     120 2747.25     140  2737.4     200  2737.4     220 2747.25

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
     100    .016     120    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           120     220                9       9       9             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2743.84    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.99    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2741.85    Reach Len. (ft)             9.00       9.00       9.00
  Crit W.S. (ft)           2741.85    Flow Area (sq ft)                    307.36
  E.G. Slope (ft/ft)      0.011850    Area (sq ft)                         307.36
  Q Total (cfs)            3480.00    Flow (cfs)                          3480.00
  Top Width (ft)             78.08    Top Width (ft)                        78.08
  Vel Total (ft/s)           11.32    Avg. Vel. (ft/s)                      11.32
  Max Chl Dpth (ft)           4.45    Hydr. Depth (ft)                       3.94
  Conv. Total (cfs)        31968.4    Conv. (cfs)                        31968.4
  Length Wtd. (ft)            9.00    Wetted Per. (ft)                      80.15
  Min Ch El (ft)           2737.40    Shear (lb/sq ft)                       2.84
  Alpha                       1.00    Stream Power (lb/ft s)    220.00       0.00       0.00
  Frctn Loss (ft)             0.04    Cum Volume (acre-ft)        0.26       5.77       0.03
  C & E Loss (ft)             0.39    Cum SA (acres)              0.37       1.98       0.06


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2742.91    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.72    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2741.19    Reach Len. (ft)             9.00       9.00       9.00
  Crit W.S. (ft)           2741.19    Flow Area (sq ft)                    256.38
  E.G. Slope (ft/ft)      0.012406    Area (sq ft)                         256.38
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             75.38    Top Width (ft)                        75.38
  Vel Total (ft/s)           10.53    Avg. Vel. (ft/s)                      10.53
  Max Chl Dpth (ft)           3.79    Hydr. Depth (ft)                       3.40
  Conv. Total (cfs)        24240.4    Conv. (cfs)                        24240.4
```

Length Wtd. (ft)	9.00	Wetted Per. (ft)		77.15	
Min Ch El (ft)	2737.40	Shear (lb/sq ft)		2.57	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.11	6.59	0.01
C & E Loss (ft)	0.35	Cum SA (acres)	0.22	2.05	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2741.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	2740.00	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	2740.00	Flow Area (sq ft)		169.63	
E.G. Slope (ft/ft)	0.013778	Area (sq ft)		169.63	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	70.55	Top Width (ft)		70.55	
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)		8.84	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		2.40	
Conv. Total (cfs)	12778.9	Conv. (cfs)		12778.9	
Length Wtd. (ft)	9.00	Wetted Per. (ft)		71.76	
Min Ch El (ft)	2737.40	Shear (lb/sq ft)		2.03	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		4.61	
C & E Loss (ft)	0.27	Cum SA (acres)		1.96	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2738.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2738.09	Reach Len. (ft)	9.00	9.00	9.00

Crit W.S. (ft)	2738.09	Flow Area (sq ft)		42.55	
E.G. Slope (ft/ft)	0.020750	Area (sq ft)		42.55	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	62.81	Top Width (ft)		62.81	
Vel Total (ft/s)	4.70	Avg. Vel. (ft/s)		4.70	
Max Chl Dpth (ft)	0.69	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	1388.4	Conv. (cfs)		1388.4	
Length Wtd. (ft)	9.00	Wetted Per. (ft)		63.14	
Min Ch El (ft)	2737.40	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)		1.41	
C & E Loss (ft)	0.09	Cum SA (acres)		1.67	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2741.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.29	Wt. n-Val.		0.035	
W.S. Elev (ft)	2740.16	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	2740.16	Flow Area (sq ft)		181.14	
E.G. Slope (ft/ft)	0.013579	Area (sq ft)		181.14	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	71.21	Top Width (ft)		71.21	
Vel Total (ft/s)	9.11	Avg. Vel. (ft/s)		9.11	
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	14159.8	Conv. (cfs)		14159.8	
Length Wtd. (ft)	9.00	Wetted Per. (ft)		72.50	
Min Ch El (ft)	2737.40	Shear (lb/sq ft)		2.12	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		4.89	
C & E Loss (ft)	0.28	Cum SA (acres)		1.97	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2740.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2739.55	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	2739.55	Flow Area (sq ft)		138.41	
E.G. Slope (ft/ft)	0.014563	Area (sq ft)		138.41	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	68.73	Top Width (ft)		68.73	
Vel Total (ft/s)	8.09	Avg. Vel. (ft/s)		8.09	
Max Chl Dpth (ft)	2.15	Hydr. Depth (ft)		2.01	
Conv. Total (cfs)	9280.9	Conv. (cfs)		9280.9	
Length Wtd. (ft)	9.00	Wetted Per. (ft)		69.73	
Min Ch El (ft)	2737.40	Shear (lb/sq ft)		1.80	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		3.87	
C & E Loss (ft)	0.23	Cum SA (acres)		1.91	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2739.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.		0.035	
W.S. Elev (ft)	2738.95	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	2738.95	Flow Area (sq ft)		97.90	
E.G. Slope (ft/ft)	0.016150	Area (sq ft)		97.90	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	66.30	Top Width (ft)		66.30	
Vel Total (ft/s)	6.95	Avg. Vel. (ft/s)		6.95	
Max Chl Dpth (ft)	1.55	Hydr. Depth (ft)		1.48	
Conv. Total (cfs)	5350.8	Conv. (cfs)		5350.8	
Length Wtd. (ft)	9.00	Wetted Per. (ft)		67.02	
Min Ch El (ft)	2737.40	Shear (lb/sq ft)		1.47	
Alpha	1.00	Stream Power (lb/ft s)	220.00	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)		2.88	
C & E Loss (ft)	0.18	Cum SA (acres)		1.83	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

```
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 1901.8

INPUT
Description: Section 19+01.8
Station Elevation Data    num=       5
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2744.45     120 2744.45     141  2734.1     201  2734.1     222 2744.45

Manning's n Values        num=       2
     Sta   n Val     Sta   n Val
     100    .016     120    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           120     222              462     462     462             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2743.18    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               6.47    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2736.71    Reach Len. (ft)           462.00     462.00     462.00
  Crit W.S. (ft)           2738.56    Flow Area (sq ft)                    170.53
  E.G. Slope (ft/ft)      0.072929    Area (sq ft)                         170.53
  Q Total (cfs)            3480.00    Flow (cfs)                          3480.00
  Top Width (ft)             70.60    Top Width (ft)                        70.60
  Vel Total (ft/s)           20.41    Avg. Vel. (ft/s)                      20.41
  Max Chl Dpth (ft)           2.61    Hydr. Depth (ft)                       2.42
  Conv. Total (cfs)        12886.4    Conv. (cfs)                         12886.4
  Length Wtd. (ft)          462.00    Wetted Per. (ft)                      71.82
  Min Ch El (ft)           2734.10    Shear (lb/sq ft)                      10.81
  Alpha                       1.00    Stream Power (lb/ft s)    222.00       0.00       0.00
  Frctn Loss (ft)             0.22    Cum Volume (acre-ft)        0.26       5.72       0.03
  C & E Loss (ft)             0.45    Cum SA (acres)              0.37       1.96       0.06


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2740.88    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.55    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2740.33    Reach Len. (ft)           462.00     462.00     462.00
  Crit W.S. (ft)           2737.89    Flow Area (sq ft)                    452.59
  E.G. Slope (ft/ft)      0.002230    Area (sq ft)                         452.59
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             85.28    Top Width (ft)                        85.28
  Vel Total (ft/s)            5.97    Avg. Vel. (ft/s)                       5.97
  Max Chl Dpth (ft)           6.23    Hydr. Depth (ft)                       5.31
  Conv. Total (cfs)        57169.9    Conv. (cfs)                         57169.9
  Length Wtd. (ft)          462.00    Wetted Per. (ft)                      88.19
```

Min Ch El (ft)	2734.10	Shear (lb/sq ft)		0.71	
Alpha	1.00	Stream Power (lb/ft s)	222.00	0.00	0.00
Frctn Loss (ft)	1.79	Cum Volume (acre-ft)	0.11	6.51	0.01
C & E Loss (ft)	0.09	Cum SA (acres)	0.22	2.03	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2739.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.035	
W.S. Elev (ft)	2738.88	Reach Len. (ft)	462.00	462.00	462.00
Crit W.S. (ft)	2736.70	Flow Area (sq ft)		333.20	
E.G. Slope (ft/ft)	0.001724	Area (sq ft)		333.20	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	79.40	Top Width (ft)		79.40	
Vel Total (ft/s)	4.50	Avg. Vel. (ft/s)		4.50	
Max Chl Dpth (ft)	4.78	Hydr. Depth (ft)		4.20	
Conv. Total (cfs)	36130.9	Conv. (cfs)		36130.9	
Length Wtd. (ft)	462.00	Wetted Per. (ft)		81.63	
Min Ch El (ft)	2734.10	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)	222.00	0.00	0.00
Frctn Loss (ft)	1.61	Cum Volume (acre-ft)		4.56	
C & E Loss (ft)	0.08	Cum SA (acres)		1.94	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2736.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2735.95	Reach Len. (ft)	462.00	462.00	462.00
Crit W.S. (ft)	2734.79	Flow Area (sq ft)		117.95	
E.G. Slope (ft/ft)	0.000771	Area (sq ft)		117.95	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	67.51	Top Width (ft)		67.51	
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)		1.70	
Max Chl Dpth (ft)	1.85	Hydr. Depth (ft)		1.75	
Conv. Total (cfs)	7203.1	Conv. (cfs)		7203.1	
Length Wtd. (ft)	462.00	Wetted Per. (ft)		68.37	
Min Ch El (ft)	2734.10	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	222.00	0.00	0.00
Frctn Loss (ft)	0.95	Cum Volume (acre-ft)		1.39	
C & E Loss (ft)	0.03	Cum SA (acres)		1.66	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2739.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2739.10	Reach Len. (ft)	462.00	462.00	462.00
Crit W.S. (ft)	2736.87	Flow Area (sq ft)		350.78	
E.G. Slope (ft/ft)	0.001786	Area (sq ft)		350.78	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	80.29	Top Width (ft)		80.29	
Vel Total (ft/s)	4.70	Avg. Vel. (ft/s)		4.70	
Max Chl Dpth (ft)	5.00	Hydr. Depth (ft)		4.37	
Conv. Total (cfs)	39047.2	Conv. (cfs)		39047.2	
Length Wtd. (ft)	462.00	Wetted Per. (ft)		82.62	
Min Ch El (ft)	2734.10	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)	222.00	0.00	0.00
Frctn Loss (ft)	1.65	Cum Volume (acre-ft)		4.83	
C & E Loss (ft)	0.08	Cum SA (acres)		1.96	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2738.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.035	
W.S. Elev (ft)	2738.27	Reach Len. (ft)	462.00	462.00	462.00
Crit W.S. (ft)	2736.25	Flow Area (sq ft)		285.50	
E.G. Slope (ft/ft)	0.001536	Area (sq ft)		285.50	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	76.92	Top Width (ft)		76.92	
Vel Total (ft/s)	3.92	Avg. Vel. (ft/s)		3.92	
Max Chl Dpth (ft)	4.17	Hydr. Depth (ft)		3.71	
Conv. Total (cfs)	28575.7	Conv. (cfs)		28575.7	
Length Wtd. (ft)	462.00	Wetted Per. (ft)		78.87	
Min Ch El (ft)	2734.10	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)	222.00	0.00	0.00
Frctn Loss (ft)	1.51	Cum Volume (acre-ft)		3.83	
C & E Loss (ft)	0.07	Cum SA (acres)		1.89	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2737.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.035	
W.S. Elev (ft)	2737.40	Reach Len. (ft)	462.00	462.00	462.00
Crit W.S. (ft)	2735.65	Flow Area (sq ft)		219.96	
E.G. Slope (ft/ft)	0.001261	Area (sq ft)		219.96	
Q Total (cfs)	680.00	Flow (cfs)		680.00	

Top Width (ft)	73.38	Top Width (ft)		73.38	
Vel Total (ft/s)	3.09	Avg. Vel. (ft/s)		3.09	
Max Chl Dpth (ft)	3.30	Hydr. Depth (ft)		3.00	
Conv. Total (cfs)	19146.3	Conv. (cfs)		19146.3	
Length Wtd. (ft)	462.00	Wetted Per. (ft)		74.92	
Min Ch El (ft)	2734.10	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	222.00	0.00	0.00
Frctn Loss (ft)	1.34	Cum Volume (acre-ft)		2.85	
C & E Loss (ft)	0.05	Cum SA (acres)		1.82	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1439.8

INPUT
Description: Section 14+39.8
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2742	107.5	2741	111.85	2740	143.55	2740	147.09	2740
165.85	2739	188.8	2738	197.34	2737	212.85	2737	215.92	2736
220.42	2735	239.97	2734	295.44	2734	296.47	2735	298.51	2737
303.47	2738	310.44	2739	317.39	2740	325.51	2741	332.31	2742

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	212.85	.03	298.51	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
212.85	298.51	482.3	482.3	482.3	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2739.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.68	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	2738.11	Reach Len. (ft)	482.30	482.30	482.30
Crit W.S. (ft)	2738.11	Flow Area (sq ft)	22.61	323.40	3.08
E.G. Slope (ft/ft)	0.007829	Area (sq ft)	22.61	323.40	3.08
Q Total (cfs)	3480.00	Flow (cfs)	76.05	3396.41	7.53
Top Width (ft)	118.01	Top Width (ft)	26.61	85.66	5.74
Vel Total (ft/s)	9.97	Avg. Vel. (ft/s)	3.36	10.50	2.45
Max Chl Dpth (ft)	4.11	Hydr. Depth (ft)	0.85	3.78	0.54
Conv. Total (cfs)	39331.3	Conv. (cfs)	859.6	38386.6	85.2
Length Wtd. (ft)	482.30	Wetted Per. (ft)	26.67	87.18	5.85
Min Ch El (ft)	2734.00	Shear (lb/sq ft)	0.41	1.81	0.26
Alpha	1.09	Stream Power (lb/ft s)	332.31	0.00	0.00
Frctn Loss (ft)	3.68	Cum Volume (acre-ft)	0.14	3.10	0.02
C & E Loss (ft)	0.15	Cum SA (acres)	0.23	1.13	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2739.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.46	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	2737.55	Reach Len. (ft)	482.30	482.30	482.30
Crit W.S. (ft)	2737.55	Flow Area (sq ft)	9.78	275.13	0.75
E.G. Slope (ft/ft)	0.008326	Area (sq ft)	9.78	275.13	0.75
Q Total (cfs)	2700.00	Flow (cfs)	23.36	2675.44	1.20
Top Width (ft)	108.57	Top Width (ft)	20.19	85.66	2.72
Vel Total (ft/s)	9.45	Avg. Vel. (ft/s)	2.39	9.72	1.61
Max Chl Dpth (ft)	3.55	Hydr. Depth (ft)	0.48	3.21	0.27
Conv. Total (cfs)	29590.5	Conv. (cfs)	256.0	29321.3	13.2
Length Wtd. (ft)	482.30	Wetted Per. (ft)	20.22	87.18	2.77
Min Ch El (ft)	2734.00	Shear (lb/sq ft)	0.25	1.64	0.14
Alpha	1.05	Stream Power (lb/ft s)	332.31	0.00	0.00
Frctn Loss (ft)	4.04	Cum Volume (acre-ft)	0.05	2.66	0.00
C & E Loss (ft)	0.11	Cum SA (acres)	0.11	1.13	0.02

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2737.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.09	Wt. n-Val.		0.030	
W.S. Elev (ft)	2736.42	Reach Len. (ft)	482.30	482.30	482.30
Crit W.S. (ft)	2736.42	Flow Area (sq ft)		179.04	
E.G. Slope (ft/ft)	0.010508	Area (sq ft)		179.04	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	83.28	Top Width (ft)		83.28	
Vel Total (ft/s)	8.38	Avg. Vel. (ft/s)		8.38	
Max Chl Dpth (ft)	2.42	Hydr. Depth (ft)		2.15	
Conv. Total (cfs)	14633.2	Conv. (cfs)		14633.2	
Length Wtd. (ft)	482.30	Wetted Per. (ft)		84.47	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		1.39	
Alpha	1.00	Stream Power (lb/ft s)	332.31	0.00	0.00
Frctn Loss (ft)	5.21	Cum Volume (acre-ft)		1.84	
C & E Loss (ft)	0.07	Cum SA (acres)		1.08	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2735.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.030	
W.S. Elev (ft)	2734.71	Reach Len. (ft)	482.30	482.30	482.30
Crit W.S. (ft)	2734.70	Flow Area (sq ft)		44.77	
E.G. Slope (ft/ft)	0.014885	Area (sq ft)		44.77	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	70.14	Top Width (ft)		70.14	
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)		4.47	
Max Chl Dpth (ft)	0.71	Hydr. Depth (ft)		0.64	
Conv. Total (cfs)	1639.3	Conv. (cfs)		1639.3	
Length Wtd. (ft)	482.30	Wetted Per. (ft)		70.45	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		0.59	
Alpha	1.00	Stream Power (lb/ft s)	332.31	0.00	0.00
Frctn Loss (ft)	7.21	Cum Volume (acre-ft)		0.53	
C & E Loss (ft)	0.02	Cum SA (acres)		0.93	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2737.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2736.57	Reach Len. (ft)	482.30	482.30	482.30
Crit W.S. (ft)	2736.57	Flow Area (sq ft)		191.31	
E.G. Slope (ft/ft)	0.010305	Area (sq ft)		191.31	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	83.88	Top Width (ft)		83.88	
Vel Total (ft/s)	8.62	Avg. Vel. (ft/s)		8.62	
Max Chl Dpth (ft)	2.56	Hydr. Depth (ft)		2.28	
Conv. Total (cfs)	16254.0	Conv. (cfs)		16254.0	
Length Wtd. (ft)	482.30	Wetted Per. (ft)		85.15	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		1.45	
Alpha	1.00	Stream Power (lb/ft s)	332.31	0.00	0.00
Frctn Loss (ft)	5.11	Cum Volume (acre-ft)		1.96	
C & E Loss (ft)	0.07	Cum SA (acres)		1.09	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2736.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.030	
W.S. Elev (ft)	2736.02	Reach Len. (ft)	482.30	482.30	482.30

Crit W.S. (ft)	2736.02	Flow Area (sq ft)		146.26	
E.G. Slope (ft/ft)	0.011160	Area (sq ft)		146.26	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	81.65	Top Width (ft)		81.65	
Vel Total (ft/s)	7.66	Avg. Vel. (ft/s)		7.66	
Max Chl Dpth (ft)	2.02	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	10602.1	Conv. (cfs)		10602.1	
Length Wtd. (ft)	482.30	Wetted Per. (ft)		82.62	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		1.23	
Alpha	1.00	Stream Power (lb/ft s)	332.31	0.00	0.00
Frctn Loss (ft)	5.54	Cum Volume (acre-ft)		1.54	
C & E Loss (ft)	0.05	Cum SA (acres)		1.05	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2736.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.030	
W.S. Elev (ft)	2735.49	Reach Len. (ft)	482.30	482.30	482.30
Crit W.S. (ft)	2735.49	Flow Area (sq ft)		103.63	
E.G. Slope (ft/ft)	0.012313	Area (sq ft)		103.63	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	78.75	Top Width (ft)		78.75	
Vel Total (ft/s)	6.56	Avg. Vel. (ft/s)		6.56	
Max Chl Dpth (ft)	1.49	Hydr. Depth (ft)		1.32	
Conv. Total (cfs)	6128.2	Conv. (cfs)		6128.2	
Length Wtd. (ft)	482.30	Wetted Per. (ft)		79.44	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		1.00	
Alpha	1.00	Stream Power (lb/ft s)	332.31	0.00	0.00
Frctn Loss (ft)	6.09	Cum Volume (acre-ft)		1.13	
C & E Loss (ft)	0.04	Cum SA (acres)		1.01	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 957.5

INPUT
Description: Section 9+57.5 - D/S Boundary

```
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2731  118.37    2730  179.97    2729  197.72    2727  264.51    2727
  287.05    2727  303.36    2730  308.76    2731

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  179.97     .03  303.36    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        179.97  303.36                0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2732.61    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               3.37    Wt. n-Val.                 0.035      0.030
  W.S. Elev (ft)           2729.24    Reach Len. (ft)
  Crit W.S. (ft)           2730.35    Flow Area (sq ft)           1.81     236.01
  E.G. Slope (ft/ft)      0.035728    Area (sq ft)                1.81     236.01
  Q Total (cfs)            3480.00    Flow (cfs)                  3.55    3476.45
  Top Width (ft)            134.19    Top Width (ft)             14.92     119.27
  Vel Total (ft/s)           14.63    Avg. Vel. (ft/s)            1.96      14.73
  Max Chl Dpth (ft)           2.24    Hydr. Depth (ft)            0.12       1.98
  Conv. Total (cfs)        18411.0    Conv. (cfs)                 18.8    18392.2
  Length Wtd. (ft)                    Wetted Per. (ft)           14.92     119.59
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)            0.27       4.40
  Alpha                       1.01    Stream Power (lb/ft s)    308.76       0.00       0.00
  Frctn Loss (ft)             7.01    Cum Volume (acre-ft)
  C & E Loss (ft)             0.17    Cum SA (acres)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2731.68    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               2.71    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2728.98    Reach Len. (ft)
  Crit W.S. (ft)           2729.88    Flow Area (sq ft)                    204.49
  E.G. Slope (ft/ft)      0.034100    Area (sq ft)                         204.49
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)            117.61    Top Width (ft)                       117.61
  Vel Total (ft/s)           13.20    Avg. Vel. (ft/s)                      13.20
  Max Chl Dpth (ft)           1.98    Hydr. Depth (ft)                       1.74
  Conv. Total (cfs)        14621.3    Conv. (cfs)                         14621.3
  Length Wtd. (ft)                    Wetted Per. (ft)                     117.91
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                       3.69
  Alpha                       1.00    Stream Power (lb/ft s)    308.76       0.00       0.00
  Frctn Loss (ft)             7.19    Cum Volume (acre-ft)
  C & E Loss (ft)             0.13    Cum SA (acres)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
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Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2730.01    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.47    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2728.54    Reach Len. (ft)
  Crit W.S. (ft)           2728.95    Flow Area (sq ft)                   154.03
  E.G. Slope (ft/ft)      0.025136    Area (sq ft)                        154.03
  Q Total (cfs)            1500.00    Flow (cfs)                         1500.00
  Top Width (ft)            111.30    Top Width (ft)                      111.30
  Vel Total (ft/s)            9.74    Avg. Vel. (ft/s)                      9.74
  Max Chl Dpth (ft)           1.54    Hydr. Depth (ft)                      1.38
  Conv. Total (cfs)         9461.0    Conv. (cfs)                         9461.0
  Length Wtd. (ft)                    Wetted Per. (ft)                    111.53
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                      2.17
  Alpha                       1.00    Stream Power (lb/ft s)    308.76      0.00       0.00
  Frctn Loss (ft)             7.46    Cum Volume (acre-ft)
  C & E Loss (ft)             0.04    Cum SA (acres)


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT  Profile #10-yr FIS

  E.G. Elev (ft)           2727.79    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.24    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2727.55    Reach Len. (ft)
  Crit W.S. (ft)           2727.53    Flow Area (sq ft)                    50.80
  E.G. Slope (ft/ft)      0.015007    Area (sq ft)                         50.80
  Q Total (cfs)             200.00    Flow (cfs)                          200.00
  Top Width (ft)             97.13    Top Width (ft)                       97.13
  Vel Total (ft/s)            3.94    Avg. Vel. (ft/s)                      3.94
  Max Chl Dpth (ft)           0.54    Hydr. Depth (ft)                      0.52
  Conv. Total (cfs)         1632.6    Conv. (cfs)                         1632.6
  Length Wtd. (ft)                    Wetted Per. (ft)                     97.21
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                      0.49
  Alpha                       1.00    Stream Power (lb/ft s)    308.76      0.00       0.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)
  C & E Loss (ft)                     Cum SA (acres)


CROSS SECTION OUTPUT  Profile #10-yr SBCFCD

  E.G. Elev (ft)           2730.21    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.60    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2728.61    Reach Len. (ft)
  Crit W.S. (ft)           2729.06    Flow Area (sq ft)                   162.30
  E.G. Slope (ft/ft)      0.025875    Area (sq ft)                        162.30
  Q Total (cfs)            1650.00    Flow (cfs)                         1650.00
  Top Width (ft)            112.36    Top Width (ft)                      112.36
  Vel Total (ft/s)           10.17    Avg. Vel. (ft/s)                     10.17
  Max Chl Dpth (ft)           1.61    Hydr. Depth (ft)                      1.44
  Conv. Total (cfs)        10257.6    Conv. (cfs)                        10257.6
  Length Wtd. (ft)                    Wetted Per. (ft)                    112.60
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                      2.33
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  Alpha                       1.00    Stream Power (lb/ft s)    308.76       0.00       0.00
  Frctn Loss (ft)             7.46    Cum Volume (acre-ft)
  C & E Loss (ft)             0.05    Cum SA (acres)


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT  Profile #5-yr SBCFCD

  E.G. Elev (ft)           2729.46    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.13    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2728.33    Reach Len. (ft)
  Crit W.S. (ft)           2728.61    Flow Area (sq ft)                    131.48
  E.G. Slope (ft/ft)      0.022914    Area (sq ft)                         131.48
  Q Total (cfs)            1120.00    Flow (cfs)                          1120.00
  Top Width (ft)            108.37    Top Width (ft)                       108.37
  Vel Total (ft/s)            8.52    Avg. Vel. (ft/s)                       8.52
  Max Chl Dpth (ft)           1.33    Hydr. Depth (ft)                       1.21
  Conv. Total (cfs)         7398.8    Conv. (cfs)                          7398.8
  Length Wtd. (ft)                    Wetted Per. (ft)                     108.56
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                       1.73
  Alpha                       1.00    Stream Power (lb/ft s)    308.76       0.00       0.00
  Frctn Loss (ft)             7.45    Cum Volume (acre-ft)
  C & E Loss (ft)             0.02    Cum SA (acres)


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2728.75    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.71    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2728.04    Reach Len. (ft)
  Crit W.S. (ft)           2728.18    Flow Area (sq ft)                    100.49
  E.G. Slope (ft/ft)      0.019623    Area (sq ft)                         100.49
  Q Total (cfs)             680.00    Flow (cfs)                           680.00
  Top Width (ft)            104.19    Top Width (ft)                       104.19
  Vel Total (ft/s)            6.77    Avg. Vel. (ft/s)                       6.77
  Max Chl Dpth (ft)           1.04    Hydr. Depth (ft)                       0.96
  Conv. Total (cfs)         4854.3    Conv. (cfs)                          4854.3
  Length Wtd. (ft)                    Wetted Per. (ft)                     104.35
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)                       1.18
  Alpha                       1.00    Stream Power (lb/ft s)    308.76       0.00       0.00
  Frctn Loss (ft)             7.40    Cum Volume (acre-ft)
  C & E Loss (ft)             0.00    Cum SA (acres)


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.
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SUMMARY OF MANNING'S N VALUES

River:Desert Knolls Wa

Reach	River Sta.	n1	n2	n3	n4	n5
Main	12028.1	.035	.03	.035		
Main	11915	.035	.016	.035		
Main	11864	.035	.016	.035		
Main	11841	.035	.016	.035	.016	.035
Main	11792	.035	.035	.016	.035	
Main	11788	.035	.035	.016	.035	
Main	11785	.035	.035	.016	.035	
Main	11663.9	.035	.016	.03	.016	.035
Main	11313.9	.035	.016	.03	.016	.035
Main	11170	.035	.016	.035	.016	.035
Main	11116	.035	.016	.035	.016	.035
Main	11083	.035	.016	.035	.016	.035
Main	11031	.035	.016	.035	.016	.035
Main	11027	.035	.016	.035	.016	.035
Main	11024	.035	.016	.03	.016	.035
Main	10720.4	.035	.013	.035		
Main	10694.4	Culvert				
Main	10659.4	.035	.03	.035		
Main	10614.1	.035	.016	.03	.016	.035
Main	10613.9	.035	.03	.035		
Main	10213.9	.035	.016	.03	.016	.035
Main	9863.9	.035	.016	.03	.016	.035
Main	9850	.035	.016	.013	.016	.035
Main	9747	.035	.013	.035		
Main	9536.1	.035	.016	.013	.016	.035
Main	9525.6	Culvert				
Main	9515.2	.035	.016	.013	.016	.035
Main	9313.9	.035	.016	.03	.016	.035
Main	9300	.035	.016	.03	.016	.035
Main	9035.8	.035	.013	.035		
Main	9020.4	Culvert				
Main	9005	.035	.013	.035		
Main	8713.9	.035	.016	.013	.016	.035
Main	8470	.035	.035	.035		
Main	8416	.035	.035	.035		
Main	8382	.035	.035	.035		
Main	8330	.035	.016	.035	.016	.035
Main	8326	.035	.035	.016	.035	
Main	8323	.035	.016	.03	.016	.035
Main	8113.9	.035	.016	.03	.016	.035
Main	7800	.035	.016	.013	.016	.035
Main	7761.1	.035	.016	.013	.016	.035
Main	7749.9	Culvert				
Main	7738.6	.035	.013	.035		
Main	7456.8	.035	.016	.03	.016	.035
Main	7267	.035	.013	.035		
Main	7249.1	Culvert				
Main	7231.3	.035	.016	.013	.016	.035
Main	7010.2	.035	.016	.03	.016	.035
Main	6801.5	.035	.013	.035		
Main	6785.6	Culvert				
Main	6769.7	.035	.013	.035		
Main	6769.1	.035	.016	.03	.016	.035
Main	6555.8	.035	.016	.03	.016	.035
Main	6540	.035	.016	.03	.016	
Main	6535	.035	.016	.03	.016	
Main	6385	.035	.016	.013	.016	
Main	6344.7	.035	.013	.035		

Main	6328.7	Culvert				
Main	6312.5	.035	.013	.035		
Main	6275	.035	.016	.03	.016	.035
Main	6170	.035	.016	.035	.016	.035
Main	6114	.035	.016	.035	.016	.035
Main	6084	.035	.016	.035	.016	.035
Main	6031	.035	.016	.035	.016	.035
Main	6027	.035	.016	.035	.016	.035
Main	6024	.035	.016	.03	.016	.035
Main	5742.1	.035	.013	.035		
Main	5742	.035	.013	.035		
Main	5679.8	Culvert				
Main	5609.6	.035	.013	.035		
Main	5581.3	.035	.016	.013	.016	.035
Main	5515.3	.013	.016	.013	.016	.013
Main	5135	.013	.013	.013		
Main	4875	.013	.013	.013		
Main	4635	.013	.013	.013		
Main	4385	.013	.013	.013		
Main	4135	.013	.013	.013		
Main	3969.6	.035	.013	.035		
Main	3835	.013	.013	.013		
Main	3695.2	.016	.035			
Main	3680.9	.016	.035			
Main	3488.2	.016	.035			
Main	3473.9	.016	.035			
Main	3281.2	.016	.035			
Main	3261.9	.016	.035			
Main	2906.2	.016	.035			
Main	2894.8	.016	.035			
Main	2697.2	.016	.035			
Main	2679	.016	.035			
Main	2410.8	.016	.035			
Main	2395.1	.016	.035			
Main	2210.8	.016	.035			
Main	2198.3	.016	.035			
Main	1910.8	.016	.035			
Main	1901.8	.016	.035			
Main	1439.8	.035	.03	.035		
Main	957.5	.035	.03	.035		

SUMMARY OF REACH LENGTHS

River: Desert Knolls Wa

Reach	River Sta.	Left	Channel	Right
Main	12028.1	113	113	113
Main	11915	51	51	51
Main	11864	23	23	23
Main	11841	49	49	49
Main	11792	4	4	4
Main	11788	3	3	3
Main	11785	121.1	121.1	121.1
Main	11663.9	350	350	350
Main	11313.9	143.9	143.9	143.9
Main	11170	54	54	54
Main	11116	33	33	33
Main	11083	52	52	52
Main	11031	4	4	4
Main	11027	3	3	3
Main	11024	303.6	303.6	303.6

Main	10720.4	61	61	61
Main	10694.4	Culvert		
Main	10659.4	45.3	45.3	45.3
Main	10614.1	.2	.2	.2
Main	10613.9	400	400	400
Main	10213.9	350	350	350
Main	9863.9	13.9	13.9	13.9
Main	9850	103	103	103
Main	9747	210.9	210.9	210.9
Main	9536.1	20.9	20.9	20.9
Main	9525.6	Culvert		
Main	9515.2	201.3	201.3	201.3
Main	9313.9	13.9	13.9	13.9
Main	9300	264.2	264.2	264.2
Main	9035.8	30.8	30.8	30.8
Main	9020.4	Culvert		
Main	9005	291.2	291.2	291.2
Main	8713.9	243.9	243.9	243.9
Main	8470	54	54	54
Main	8416	34	34	34
Main	8382	52	52	52
Main	8330	4	4	4
Main	8326	3	3	3
Main	8323	209.1	209.1	209.1
Main	8113.9	313.9	313.9	313.9
Main	7800	38.9	38.9	38.9
Main	7761.1	22.5	22.5	22.5
Main	7749.9	Culvert		
Main	7738.6	281.8	281.8	281.8
Main	7456.8	189.8	189.8	189.8
Main	7267	35.7	35.7	35.7
Main	7249.1	Culvert		
Main	7231.3	221.1	221.1	221.1
Main	7010.2	208.7	208.7	208.7
Main	6801.5	31.8	31.8	31.8
Main	6785.6	Culvert		
Main	6769.7	.6	.6	.6
Main	6769.1	213.3	213.3	213.3
Main	6555.8	15.8	15.8	15.8
Main	6540	15	15	15
Main	6535	150	150	150
Main	6385	40.3	40.3	40.3
Main	6344.7	32	32	32
Main	6328.7	Culvert		
Main	6312.5	37.5	37.5	37.5
Main	6275	105	105	105
Main	6170	56	56	56
Main	6114	30	30	30
Main	6084	53	53	53
Main	6031	4	4	4
Main	6027	3	3	3
Main	6024	281.9	281.9	281.9
Main	5742.1	.1	.1	.1
Main	5742	132.4	132.4	132.4
Main	5679.8	Culvert		
Main	5609.6	28.3	28.3	28.3
Main	5581.3	66.1	66.1	66.1
Main	5515.3	50.3	50.3	50.3
Main	5135	260	260	260
Main	4875	240	240	240
Main	4635	250	250	250
Main	4385	250	250	250
Main	4135	165.4	165.4	165.4
Main	3969.6	134.6	134.6	134.6
Main	3835	139.8	139.8	139.8

Main	3695.2	14.3	14.3	14.3
Main	3680.9	192.7	192.7	192.7
Main	3488.2	14.3	14.3	14.3
Main	3473.9	192.7	192.7	192.7
Main	3281.2	19.3	19.3	19.3
Main	3261.9	355.7	355.7	355.7
Main	2906.2	11.4	11.4	11.4
Main	2894.8	197.6	197.6	197.6
Main	2697.2	18.2	18.2	18.2
Main	2679	268.2	268.2	268.2
Main	2410.8	15.7	15.7	15.7
Main	2395.1	184.3	184.3	184.3
Main	2210.8	12.5	12.5	12.5
Main	2198.3	287.5	287.5	287.5
Main	1910.8	9	9	9
Main	1901.8	462	462	462
Main	1439.8	482.3	482.3	482.3
Main	957.5	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Desert Knolls Wa

Reach	River Sta.	Contr.	Expan.
Main	12028.1	.3	.5
Main	11915	.1	.3
Main	11864	.1	.3
Main	11841	.1	.3
Main	11792	.1	.3
Main	11788	.1	.3
Main	11785	.1	.3
Main	11663.9	.1	.3
Main	11313.9	.1	.3
Main	11170	.1	.3
Main	11116	.1	.3
Main	11083	.1	.3
Main	11031	.1	.3
Main	11027	.1	.3
Main	11024	.1	.3
Main	10720.4	.3	.5
Main	10694.4	Culvert	
Main	10659.4	.3	.5
Main	10614.1	.1	.3
Main	10613.9	.1	.3
Main	10213.9	.1	.3
Main	9863.9	.1	.3
Main	9850	.1	.3
Main	9747	.3	.5
Main	9536.1	.3	.5
Main	9525.6	Culvert	
Main	9515.2	.3	.5
Main	9313.9	.1	.3
Main	9300	.1	.3
Main	9035.8	.3	.5
Main	9020.4	Culvert	
Main	9005	.3	.5
Main	8713.9	.1	.3
Main	8470	.1	.3
Main	8416	.1	.3
Main	8382	.1	.3
Main	8330	.1	.3

Main	8326		.1	.3
Main	8323		.1	.3
Main	8113.9		.1	.3
Main	7800		.1	.3
Main	7761.1		.3	.5
Main	7749.9	Culvert		
Main	7738.6		.3	.5
Main	7456.8		.1	.3
Main	7267		.3	.5
Main	7249.1	Culvert		
Main	7231.3		.3	.5
Main	7010.2		.1	.3
Main	6801.5		.3	.5
Main	6785.6	Culvert		
Main	6769.7		.3	.5
Main	6769.1		.3	.5
Main	6555.8		.1	.3
Main	6540		.1	.3
Main	6535		.1	.3
Main	6385		.3	.5
Main	6344.7		.3	.5
Main	6328.7	Culvert		
Main	6312.5		.3	.5
Main	6275		.1	.3
Main	6170		.1	.3
Main	6114		.1	.3
Main	6084		.1	.3
Main	6031		.1	.3
Main	6027		.1	.3
Main	6024		.1	.3
Main	5742.1		.3	.5
Main	5742		.3	.5
Main	5679.8	Culvert		
Main	5609.6		.3	.5
Main	5581.3		.1	.3
Main	5515.3		.1	.3
Main	5135		.1	.3
Main	4875		.1	.3
Main	4635		.1	.3
Main	4385		.1	.3
Main	4135		.1	.3
Main	3969.6		.1	.3
Main	3835		.1	.3
Main	3695.2		.1	.3
Main	3680.9		.1	.3
Main	3488.2		.1	.3
Main	3473.9		.1	.3
Main	3281.2		.1	.3
Main	3261.9		.1	.3
Main	2906.2		.1	.3
Main	2894.8		.1	.3
Main	2697.2		.1	.3
Main	2679		.1	.3
Main	2410.8		.1	.3
Main	2395.1		.1	.3
Main	2210.8		.1	.3
Main	2198.3		.1	.3
Main	1910.8		.1	.3
Main	1901.8		.1	.3
Main	1439.8		.1	.3
Main	957.5		.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	12028.1	100-yr SBCFCD	1730.00	2859.00	2865.92	2860.22	2865.94	0.000038	1.07	1623.65	240.86	0.07
Main	12028.1	100-yr FIS	700.00	2859.00	2862.92	2859.67	2862.93	0.000041	0.77	909.23	235.42	0.07
Main	12028.1	50-yr FIS	500.00	2859.00	2862.11	2859.53	2862.12	0.000045	0.70	718.84	233.95	0.07
Main	12028.1	10-yr FIS	100.00	2859.00	2859.79	2859.17	2859.79	0.000175	0.56	180.10	229.74	0.11
Main	12028.1	10-yr SBCFCD	810.00	2859.00	2863.32	2859.72	2863.33	0.000040	0.81	1003.46	236.14	0.07
Main	12028.1	5-yr SBCFCD	550.00	2859.00	2862.33	2859.56	2862.33	0.000044	0.72	769.14	234.34	0.07
Main	12028.1	2-yr SBCFCD	340.00	2859.00	2861.34	2859.41	2861.35	0.000054	0.63	539.40	232.55	0.07
Main	11915	100-yr SBCFCD	1730.00	2858.30	2863.42	2863.42	2865.35	0.012483	11.15	155.11	40.62	1.01
Main	11915	100-yr FIS	700.00	2858.30	2861.31	2861.31	2862.55	0.014197	8.92	78.50	32.13	1.01
Main	11915	50-yr FIS	500.00	2858.30	2860.75	2860.75	2861.79	0.015009	8.18	61.15	29.88	1.01
Main	11915	10-yr FIS	100.00	2858.30	2859.19	2859.19	2859.60	0.019750	5.17	19.35	23.58	1.01
Main	11915	10-yr SBCFCD	810.00	2858.30	2861.58	2861.58	2862.92	0.013942	9.27	87.40	33.23	1.01
Main	11915	5-yr SBCFCD	550.00	2858.30	2860.90	2860.90	2861.99	0.014737	8.38	65.67	30.48	1.01
Main	11915	2-yr SBCFCD	340.00	2858.30	2860.23	2860.23	2861.07	0.015950	7.36	46.18	27.79	1.01
Main	11864	100-yr SBCFCD	1730.00	2856.70	2860.79	2861.82	2864.27	0.028566	14.96	115.64	36.49	1.48
Main	11864	100-yr FIS	700.00	2856.70	2859.02	2859.71	2861.34	0.035787	12.23	57.21	29.34	1.54
Main	11864	50-yr FIS	500.00	2856.70	2858.57	2859.15	2860.54	0.038748	11.26	44.41	27.53	1.56
Main	11864	10-yr FIS	100.00	2856.70	2857.39	2857.59	2858.10	0.045705	6.75	14.82	22.79	1.47
Main	11864	10-yr SBCFCD	810.00	2856.70	2859.25	2859.99	2861.74	0.034487	12.66	63.99	30.26	1.53
Main	11864	5-yr SBCFCD	550.00	2856.70	2858.69	2859.30	2860.75	0.037831	11.53	47.72	28.01	1.56
Main	11864	2-yr SBCFCD	340.00	2856.70	2858.16	2858.63	2859.76	0.041765	10.13	33.55	25.89	1.57
Main	11841	100-yr SBCFCD	1730.00	2850.50	2859.66	2855.66	2860.04	0.001304	4.93	351.17	56.65	0.35
Main	11841	100-yr FIS	700.00	2850.50	2858.29	2853.52	2858.38	0.000409	2.53	276.91	51.14	0.19
Main	11841	50-yr FIS	500.00	2850.50	2856.66	2852.97	2856.75	0.000520	2.51	198.89	44.62	0.21
Main	11841	10-yr FIS	100.00	2850.50	2854.12	2851.38	2854.14	0.000150	1.01	98.63	34.48	0.11
Main	11841	10-yr SBCFCD	810.00	2850.50	2857.44	2853.81	2857.62	0.000861	3.45	234.93	47.74	0.27
Main	11841	5-yr SBCFCD	550.00	2850.50	2856.54	2853.12	2856.66	0.000677	2.84	193.70	44.15	0.24
Main	11841	2-yr SBCFCD	340.00	2850.50	2855.64	2852.44	2855.71	0.000478	2.19	155.44	40.54	0.20
Main	11792	100-yr SBCFCD	1730.00	2850.50	2859.56		2859.97	0.001426	5.13	337.23	54.44	0.36
Main	11792	100-yr FIS	700.00	2850.50	2858.26		2858.36	0.000431	2.60	269.57	49.49	0.20
Main	11792	50-yr FIS	500.00	2850.50	2856.62		2856.73	0.000548	2.58	193.74	43.28	0.21
Main	11792	10-yr FIS	100.00	2850.50	2854.11		2854.13	0.000154	1.03	97.05	33.73	0.11
Main	11792	10-yr SBCFCD	810.00	2850.50	2857.38		2857.58	0.000922	3.56	227.47	46.15	0.28
Main	11792	5-yr SBCFCD	550.00	2850.50	2856.50		2856.63	0.000718	2.92	188.25	42.79	0.25
Main	11792	2-yr SBCFCD	340.00	2850.50	2855.61		2855.69	0.000502	2.24	151.70	39.41	0.20
Main	11788	100-yr SBCFCD	1730.00	2852.50	2858.78	2857.65	2859.89	0.005723	8.43	205.23	45.32	0.70
Main	11788	100-yr FIS	700.00	2852.50	2858.10	2855.54	2858.35	0.001458	4.00	175.05	42.55	0.35
Main	11788	50-yr FIS	500.00	2852.50	2856.36	2854.96	2856.70	0.002953	4.66	107.28	35.56	0.47
Main	11788	10-yr FIS	100.00	2852.50	2853.98	2853.38	2854.12	0.003454	2.94	34.05	25.97	0.45
Main	11788	10-yr SBCFCD	810.00	2852.50	2856.89	2855.79	2857.52	0.004859	6.40	126.48	37.67	0.62
Main	11788	5-yr SBCFCD	550.00	2852.50	2856.10	2855.11	2856.59	0.004621	5.61	98.05	34.50	0.59
Main	11788	2-yr SBCFCD	340.00	2852.50	2855.31	2854.45	2855.65	0.004303	4.72	72.01	31.31	0.55
Main	11785	100-yr SBCFCD	1730.00	2852.50	2858.76	2857.65	2859.87	0.005818	8.48	204.01	45.21	0.70
Main	11785	100-yr FIS	700.00	2852.50	2858.09	2855.54	2858.34	0.001463	4.00	174.84	42.53	0.35
Main	11785	50-yr FIS	500.00	2852.50	2856.35	2854.96	2856.69	0.002983	4.68	106.91	35.52	0.48

Main	11785	10-yr FIS	100.00	2852.50	2853.97	2853.38	2854.10	0.003576	2.97	33.66	25.91	0.46
Main	11785	10-yr SBCFCD	810.00	2852.50	2856.86	2855.79	2857.51	0.004957	6.45	125.59	37.57	0.62
Main	11785	5-yr SBCFCD	550.00	2852.50	2856.08	2855.11	2856.57	0.004725	5.65	97.29	34.41	0.59
Main	11785	2-yr SBCFCD	340.00	2852.50	2855.29	2854.45	2855.64	0.004414	4.76	71.39	31.23	0.56
Main	11663.9	100-yr SBCFCD	1730.00	2852.00	2857.79		2859.15	0.005701	9.38	184.41	43.75	0.81
Main	11663.9	100-yr FIS	700.00	2852.00	2858.00		2858.20	0.000815	3.61	193.68	44.61	0.31
Main	11663.9	50-yr FIS	500.00	2852.00	2856.13		2856.41	0.001689	4.26	117.46	36.94	0.42
Main	11663.9	10-yr FIS	100.00	2852.00	2852.89	2852.89	2853.30	0.014390	5.15	19.42	23.65	1.00
Main	11663.9	10-yr SBCFCD	810.00	2852.00	2855.28	2855.28	2856.61	0.010245	9.25	87.59	33.45	1.01
Main	11663.9	5-yr SBCFCD	550.00	2852.00	2854.60	2854.60	2855.68	0.010859	8.37	65.74	30.66	1.01
Main	11663.9	2-yr SBCFCD	340.00	2852.00	2853.93	2853.93	2854.77	0.011731	7.35	46.24	27.92	1.01
Main	11313.9	100-yr SBCFCD	1960.00	2851.30	2858.66	2852.86	2858.69	0.000063	1.39	1406.50	206.44	0.09
Main	11313.9	100-yr FIS	1700.00	2851.30	2858.08	2852.72	2858.11	0.000062	1.32	1289.04	204.07	0.09
Main	11313.9	50-yr FIS	1000.00	2851.30	2856.27	2852.30	2856.29	0.000061	1.08	925.63	196.56	0.09
Main	11313.9	10-yr FIS	150.00	2851.30	2852.68	2851.58	2852.68	0.000101	0.61	246.53	181.70	0.09
Main	11313.9	10-yr SBCFCD	920.00	2851.30	2856.02	2852.25	2856.04	0.000061	1.05	877.62	195.55	0.09
Main	11313.9	5-yr SBCFCD	620.00	2851.30	2855.00	2852.03	2855.01	0.000064	0.91	678.67	191.29	0.09
Main	11313.9	2-yr SBCFCD	380.00	2851.30	2853.98	2851.83	2853.99	0.000070	0.78	486.94	187.10	0.09
Main	11170	100-yr SBCFCD	1960.00	2850.90	2856.40	2856.40	2858.45	0.012291	11.50	170.37	41.99	1.01
Main	11170	100-yr FIS	1700.00	2850.90	2855.99	2855.99	2857.89	0.012358	11.07	153.58	40.36	1.00
Main	11170	50-yr FIS	1000.00	2850.90	2854.63	2854.63	2856.11	0.013434	9.76	102.47	34.92	1.00
Main	11170	10-yr FIS	150.00	2850.90	2852.05	2852.05	2852.58	0.018333	5.83	25.71	24.61	1.01
Main	11170	10-yr SBCFCD	920.00	2850.90	2854.45	2854.45	2855.87	0.013618	9.56	96.21	34.20	1.00
Main	11170	5-yr SBCFCD	620.00	2850.90	2853.70	2853.70	2854.86	0.014457	8.65	71.70	31.20	1.01
Main	11170	2-yr SBCFCD	380.00	2850.90	2852.98	2852.98	2853.87	0.015579	7.58	50.12	28.30	1.00
Main	11116	100-yr SBCFCD	1960.00	2849.20	2853.60	2854.70	2857.32	0.028286	15.48	126.62	37.59	1.49
Main	11116	100-yr FIS	1700.00	2849.20	2853.23	2854.27	2856.74	0.029291	15.03	113.12	36.12	1.50
Main	11116	50-yr FIS	1000.00	2849.20	2852.09	2852.93	2854.88	0.033487	13.40	74.62	31.58	1.54
Main	11116	10-yr FIS	150.00	2849.20	2850.07	2850.35	2851.04	0.046865	7.89	19.01	23.50	1.55
Main	11116	10-yr SBCFCD	920.00	2849.20	2851.95	2852.75	2854.63	0.034203	13.15	69.96	30.98	1.54
Main	11116	5-yr SBCFCD	620.00	2849.20	2851.33	2852.00	2853.56	0.037591	11.97	51.80	28.54	1.57
Main	11116	2-yr SBCFCD	380.00	2849.20	2850.76	2851.28	2852.48	0.041808	10.54	36.07	26.24	1.58
Main	11083	100-yr SBCFCD	1960.00	2840.00	2849.84	2845.54	2850.23	0.001253	5.02	390.60	59.37	0.34
Main	11083	100-yr FIS	1700.00	2840.00	2849.22	2845.06	2849.57	0.001231	4.80	354.18	56.86	0.34
Main	11083	50-yr FIS	1000.00	2840.00	2847.27	2843.74	2847.51	0.001094	3.98	250.98	49.07	0.31
Main	11083	10-yr FIS	150.00	2840.00	2843.75	2841.14	2843.78	0.000297	1.46	103.08	35.00	0.15
Main	11083	10-yr SBCFCD	920.00	2840.00	2847.01	2843.57	2847.24	0.001064	3.86	238.57	48.05	0.30
Main	11083	5-yr SBCFCD	620.00	2840.00	2845.99	2842.82	2846.15	0.000888	3.24	191.48	43.95	0.27
Main	11083	2-yr SBCFCD	380.00	2840.00	2845.03	2842.08	2845.13	0.000647	2.52	151.08	40.11	0.23
Main	11031	100-yr SBCFCD	1960.00	2840.00	2849.77		2850.17	0.001293	5.08	386.08	59.06	0.35
Main	11031	100-yr FIS	1700.00	2840.00	2849.14		2849.51	0.001272	4.86	349.94	56.56	0.34
Main	11031	50-yr FIS	1000.00	2840.00	2847.20		2847.46	0.001133	4.04	247.80	48.81	0.32
Main	11031	10-yr FIS	150.00	2840.00	2843.73		2843.77	0.000302	1.46	102.52	34.93	0.15
Main	11031	10-yr SBCFCD	920.00	2840.00	2846.95		2847.19	0.001102	3.91	235.57	47.80	0.31
Main	11031	5-yr SBCFCD	620.00	2840.00	2845.94		2846.10	0.000918	3.28	189.24	43.75	0.28
Main	11031	2-yr SBCFCD	380.00	2840.00	2844.99		2845.09	0.000664	2.54	149.63	39.96	0.23
Main	11027	100-yr SBCFCD	1960.00	2842.00	2849.07		2850.09	0.004677	8.12	241.40	48.28	0.64
Main	11027	100-yr FIS	1700.00	2842.00	2848.43		2849.43	0.005090	8.05	211.19	45.71	0.66
Main	11027	50-yr FIS	1000.00	2842.00	2846.42		2847.38	0.007236	7.85	127.40	37.67	0.75
Main	11027	10-yr FIS	150.00	2842.00	2843.37	2843.16	2843.73	0.010188	4.82	31.14	25.48	0.77

Main	11027	10-yr SBCFCD	920.00	2842.00	2846.15		2847.10	0.007685	7.82	117.58	36.62	0.77
Main	11027	5-yr SBCFCD	620.00	2842.00	2845.17	2844.80	2846.03	0.009313	7.43	83.45	32.67	0.82
Main	11027	2-yr SBCFCD	380.00	2842.00	2844.39	2844.07	2845.03	0.009460	6.41	59.32	29.57	0.80
Main	11024	100-yr SBCFCD	1960.00	2842.00	2849.01		2850.08	0.003598	8.28	236.70	47.50	0.65
Main	11024	100-yr FIS	1700.00	2842.00	2848.37		2849.42	0.003931	8.22	206.83	44.97	0.68
Main	11024	50-yr FIS	1000.00	2842.00	2846.34		2847.35	0.005732	8.08	123.73	37.02	0.78
Main	11024	10-yr FIS	150.00	2842.00	2843.16	2843.16	2843.68	0.013406	5.83	25.72	24.53	1.00
Main	11024	10-yr SBCFCD	920.00	2842.00	2846.07		2847.08	0.006143	8.08	113.86	35.96	0.80
Main	11024	5-yr SBCFCD	620.00	2842.00	2844.87	2844.81	2845.97	0.009759	8.42	73.66	31.27	0.97
Main	11024	2-yr SBCFCD	380.00	2842.00	2844.07	2844.07	2844.97	0.011518	7.61	49.92	28.13	1.01
Main	10720.4	100-yr SBCFCD	1960.00	2841.00	2849.67	2843.32	2849.75	0.000028	2.31	849.72	98.00	0.14
Main	10720.4	100-yr FIS	1700.00	2841.00	2849.02	2843.11	2849.09	0.000027	2.16	786.03	98.00	0.13
Main	10720.4	50-yr FIS	1000.00	2841.00	2846.99	2842.48	2847.04	0.000024	1.70	587.31	98.00	0.12
Main	10720.4	10-yr FIS	150.00	2841.00	2843.03	2841.42	2843.04	0.000018	0.76	198.54	98.00	0.09
Main	10720.4	10-yr SBCFCD	920.00	2841.00	2846.72	2842.40	2846.77	0.000023	1.64	560.99	98.00	0.12
Main	10720.4	5-yr SBCFCD	620.00	2841.00	2845.59	2842.08	2845.62	0.000021	1.38	450.26	98.00	0.11
Main	10720.4	2-yr SBCFCD	380.00	2841.00	2844.48	2841.78	2844.50	0.000020	1.11	341.42	98.00	0.11
Main	10694.4		Culvert									
Main	10659.4	100-yr SBCFCD	1960.00	2841.00	2848.81	2844.12	2848.98	0.000405	3.39	578.55	88.25	0.23
Main	10659.4	100-yr FIS	1700.00	2841.00	2848.27	2843.84	2848.43	0.000390	3.20	531.80	86.31	0.23
Main	10659.4	50-yr FIS	1000.00	2841.00	2846.54	2843.01	2846.65	0.000345	2.58	388.16	80.06	0.21
Main	10659.4	10-yr FIS	150.00	2841.00	2842.94	2841.56	2842.96	0.000276	1.22	122.93	67.01	0.16
Main	10659.4	10-yr SBCFCD	920.00	2841.00	2846.31	2842.91	2846.41	0.000339	2.49	369.53	79.21	0.20
Main	10659.4	5-yr SBCFCD	620.00	2841.00	2845.31	2842.48	2845.38	0.000316	2.12	291.83	75.58	0.19
Main	10659.4	2-yr SBCFCD	380.00	2841.00	2844.30	2842.07	2844.34	0.000294	1.75	217.38	71.93	0.18
Main	10614.1	100-yr SBCFCD	1960.00	2841.00	2846.53	2846.53	2848.42	0.008883	11.03	177.66	46.85	1.00
Main	10614.1	100-yr FIS	1700.00	2841.00	2846.13	2846.13	2847.90	0.008997	10.66	159.43	44.73	1.00
Main	10614.1	50-yr FIS	1000.00	2841.00	2844.85	2844.85	2846.22	0.009580	9.41	106.27	37.88	0.99
Main	10614.1	10-yr FIS	150.00	2841.00	2842.25	2842.25	2842.77	0.012867	5.82	25.79	24.03	0.99
Main	10614.1	10-yr SBCFCD	920.00	2841.00	2844.66	2844.66	2845.99	0.009764	9.25	99.44	36.90	0.99
Main	10614.1	5-yr SBCFCD	620.00	2841.00	2843.93	2843.93	2845.03	0.010309	8.41	73.70	32.98	0.99
Main	10614.1	2-yr SBCFCD	380.00	2841.00	2843.19	2843.19	2844.06	0.011268	7.49	50.74	29.04	1.00
Main	10613.9	100-yr SBCFCD	2590.00	2837.00	2841.80	2843.76	2847.99	0.032635	19.97	129.71	36.65	1.87
Main	10613.9	100-yr FIS	2700.00	2837.00	2842.24	2843.93	2847.54	0.025458	18.48	146.12	38.40	1.67
Main	10613.9	50-yr FIS	1500.00	2837.00	2840.32	2842.01	2845.81	0.043070	18.80	79.80	30.70	2.05
Main	10613.9	10-yr FIS	200.00	2837.00	2837.62	2838.50	2842.34	0.263283	17.45	11.46	19.87	4.05
Main	10613.9	10-yr SBCFCD	1220.00	2837.00	2839.76	2841.45	2845.54	0.055625	19.30	63.20	28.45	2.28
Main	10613.9	5-yr SBCFCD	820.00	2837.00	2839.02	2840.54	2844.57	0.075346	18.90	43.38	25.51	2.55
Main	10613.9	2-yr SBCFCD	500.00	2837.00	2838.35	2839.64	2843.61	0.113482	18.40	27.17	22.82	2.97
Main	10213.9	100-yr SBCFCD	2590.00	2836.70	2841.19	2839.36	2841.61	0.001688	5.19	498.95	120.38	0.45
Main	10213.9	100-yr FIS	2700.00	2836.70	2841.30	2839.43	2841.73	0.001686	5.27	512.61	120.85	0.45
Main	10213.9	50-yr FIS	1500.00	2836.70	2839.95	2838.56	2840.23	0.001691	4.25	352.60	115.29	0.43
Main	10213.9	10-yr FIS	200.00	2836.70	2837.71	2837.19	2837.77	0.001509	1.90	105.01	106.13	0.34
Main	10213.9	10-yr SBCFCD	1220.00	2836.70	2839.57	2838.32	2839.81	0.001686	3.94	309.90	113.77	0.42
Main	10213.9	5-yr SBCFCD	820.00	2836.70	2838.98	2837.95	2839.15	0.001662	3.38	242.91	111.33	0.40
Main	10213.9	2-yr SBCFCD	500.00	2836.70	2838.40	2837.60	2838.52	0.001634	2.78	179.77	108.98	0.38
Main	9863.9	100-yr SBCFCD	2590.00	2835.60	2838.83	2838.83	2840.33	0.009405	9.85	263.01	88.10	1.00
Main	9863.9	100-yr FIS	2700.00	2835.60	2838.91	2838.91	2840.46	0.009351	9.98	270.60	88.45	1.01
Main	9863.9	50-yr FIS	1500.00	2835.60	2837.86	2837.86	2838.94	0.010506	8.35	179.69	84.17	1.01

Main	9863.9	10-yr FIS	200.00	2835.60	2836.20	2836.20	2836.50	0.016019	4.39	45.55	77.43	1.01
Main	9863.9	10-yr SBCFCD	1220.00	2835.60	2837.57	2837.57	2838.52	0.010930	7.82	155.91	83.02	1.01
Main	9863.9	5-yr SBCFCD	820.00	2835.60	2837.12	2837.12	2837.86	0.011859	6.91	118.69	81.18	1.01
Main	9863.9	2-yr SBCFCD	500.00	2835.60	2836.70	2836.70	2837.24	0.013023	5.88	84.97	79.47	1.00
Main	9850	100-yr SBCFCD	2590.00	2831.00	2838.43	2833.54	2838.55	0.000049	2.79	927.43	139.71	0.19
Main	9850	100-yr FIS	2700.00	2831.00	2838.67	2833.63	2838.79	0.000048	2.81	960.83	140.67	0.19
Main	9850	50-yr FIS	1500.00	2831.00	2835.85	2832.77	2835.96	0.000071	2.58	580.68	129.40	0.21
Main	9850	10-yr FIS	200.00	2831.00	2831.11	2831.47	2835.46	0.416349	16.74	11.95	110.43	8.97
Main	9850	10-yr SBCFCD	1220.00	2831.00	2835.10	2832.54	2835.20	0.000083	2.52	484.35	126.39	0.23
Main	9850	5-yr SBCFCD	820.00	2831.00	2833.92	2832.20	2834.01	0.000117	2.43	337.71	121.66	0.26
Main	9850	2-yr SBCFCD	500.00	2831.00	2831.25	2831.87	2836.35	0.160925	18.12	27.60	111.00	6.40
Main	9747	100-yr SBCFCD	2590.00	2830.70	2838.24	2833.90	2838.53	0.000120	4.29	603.09	80.00	0.28
Main	9747	100-yr FIS	2700.00	2830.70	2838.47	2834.00	2838.76	0.000119	4.34	621.72	80.00	0.27
Main	9747	50-yr FIS	1500.00	2830.70	2835.72	2832.93	2835.93	0.000146	3.74	401.29	80.00	0.29
Main	9747	10-yr FIS	200.00	2830.70	2831.48	2831.28	2831.64	0.001114	3.20	62.56	80.00	0.64
Main	9747	10-yr SBCFCD	1220.00	2830.70	2834.98	2832.63	2835.18	0.000160	3.57	342.21	80.00	0.30
Main	9747	5-yr SBCFCD	820.00	2830.70	2833.82	2832.18	2833.98	0.000201	3.29	249.28	80.00	0.33
Main	9747	2-yr SBCFCD	500.00	2830.70	2832.74	2831.76	2832.89	0.000296	3.06	163.36	80.00	0.38
Main	9536.1	100-yr SBCFCD	2590.00	2830.00	2838.29	2832.78	2838.44	0.000057	3.19	812.02	98.00	0.20
Main	9536.1	100-yr FIS	2700.00	2830.00	2838.52	2832.89	2838.68	0.000057	3.23	834.94	98.00	0.20
Main	9536.1	50-yr FIS	1500.00	2830.00	2835.75	2831.89	2835.86	0.000061	2.66	563.52	98.00	0.20
Main	9536.1	10-yr FIS	200.00	2830.00	2831.50	2830.51	2831.53	0.000085	1.36	147.24	98.00	0.20
Main	9536.1	10-yr SBCFCD	1220.00	2830.00	2835.01	2831.70	2835.10	0.000063	2.49	490.81	98.00	0.20
Main	9536.1	5-yr SBCFCD	820.00	2830.00	2833.84	2831.29	2833.91	0.000067	2.18	376.35	98.00	0.20
Main	9536.1	2-yr SBCFCD	500.00	2830.00	2832.76	2830.94	2832.81	0.000073	1.85	270.53	98.00	0.20
Main	9525.6		Culvert									
Main	9515.2	100-yr SBCFCD	2620.00	2830.00	2833.99	2833.42	2835.09	0.001009	8.43	310.80	85.94	0.78
Main	9515.2	100-yr FIS	2700.00	2830.00	2834.07	2833.48	2835.19	0.000997	8.49	318.14	86.29	0.78
Main	9515.2	50-yr FIS	1500.00	2830.00	2832.83	2832.37	2833.59	0.001056	7.01	214.10	81.32	0.76
Main	9515.2	10-yr FIS	200.00	2830.00	2830.85	2830.64	2831.02	0.001079	3.30	60.68	73.39	0.64
Main	9515.2	10-yr SBCFCD	1230.00	2830.00	2832.52	2832.07	2833.18	0.001053	6.51	188.95	80.07	0.75
Main	9515.2	5-yr SBCFCD	830.00	2830.00	2831.98	2831.61	2832.48	0.001078	5.67	146.40	77.92	0.73
Main	9515.2	2-yr SBCFCD	510.00	2830.00	2831.48	2831.18	2831.83	0.001081	4.72	107.98	75.92	0.70
Main	9313.9	100-yr SBCFCD	2620.00	2829.50	2832.94	2832.94	2834.50	0.009071	10.03	261.28	82.62	0.99
Main	9313.9	100-yr FIS	2700.00	2829.50	2832.99	2832.99	2834.59	0.009147	10.16	265.67	82.82	1.00
Main	9313.9	50-yr FIS	1500.00	2829.50	2831.90	2831.90	2833.01	0.010000	8.44	177.67	78.66	0.99
Main	9313.9	10-yr FIS	200.00	2829.50	2830.14	2830.14	2830.44	0.015030	4.43	45.10	71.93	0.99
Main	9313.9	10-yr SBCFCD	1230.00	2829.50	2831.59	2831.59	2832.59	0.010619	7.99	153.88	77.49	1.00
Main	9313.9	5-yr SBCFCD	830.00	2829.50	2831.13	2831.13	2831.89	0.011210	7.01	118.35	75.72	0.99
Main	9313.9	2-yr SBCFCD	510.00	2829.50	2830.68	2830.68	2831.24	0.012397	6.01	84.86	74.02	0.99
Main	9300	100-yr SBCFCD	2620.00	2825.50	2833.72	2827.80	2833.79	0.000139	2.18	1203.41	162.87	0.14
Main	9300	100-yr FIS	2700.00	2825.50	2833.88	2827.86	2833.95	0.000138	2.20	1229.67	163.52	0.14
Main	9300	50-yr FIS	1500.00	2825.50	2831.21	2827.10	2831.26	0.000157	1.86	806.94	152.83	0.14
Main	9300	10-yr FIS	200.00	2825.50	2826.76	2825.91	2826.78	0.000442	1.20	167.08	135.04	0.19
Main	9300	10-yr SBCFCD	1230.00	2825.50	2830.49	2826.91	2830.54	0.000166	1.76	698.86	149.97	0.14
Main	9300	5-yr SBCFCD	830.00	2825.50	2829.30	2826.58	2829.34	0.000189	1.59	523.24	145.21	0.15
Main	9300	2-yr SBCFCD	510.00	2825.50	2828.17	2826.27	2828.20	0.000234	1.41	361.38	140.68	0.16
Main	9035.8	100-yr SBCFCD	2620.00	2825.00	2833.43	2828.53	2833.74	0.000117	4.44	589.99	70.00	0.27
Main	9035.8	100-yr FIS	2700.00	2825.00	2833.58	2828.61	2833.90	0.000118	4.49	600.81	70.00	0.27

Main	9035.8	50-yr FIS	1500.00	2825.00	2831.01	2827.44	2831.21	0.000110	3.56	420.97	70.00	0.26
Main	9035.8	10-yr FIS	200.00	2825.00	2826.68	2825.64	2826.73	0.000118	1.70	117.71	70.00	0.23
Main	9035.8	10-yr SBCFCD	1230.00	2825.00	2830.32	2827.14	2830.49	0.000108	3.30	372.70	70.00	0.25
Main	9035.8	5-yr SBCFCD	830.00	2825.00	2829.17	2826.65	2829.30	0.000107	2.84	291.95	70.00	0.25
Main	9035.8	2-yr SBCFCD	510.00	2825.00	2828.07	2826.19	2828.16	0.000108	2.38	214.72	70.00	0.24
Main	9020.4		Culvert									
Main	9005	100-yr SBCFCD	2620.00	2825.00	2832.38	2828.49	2832.78	0.000177	5.07	516.78	70.00	0.33
Main	9005	100-yr FIS	2700.00	2825.00	2832.51	2828.58	2832.92	0.000178	5.14	525.62	70.00	0.33
Main	9005	50-yr FIS	1500.00	2825.00	2830.37	2827.42	2830.62	0.000157	3.99	375.72	70.00	0.30
Main	9005	10-yr FIS	200.00	2825.00	2826.53	2825.63	2826.59	0.000160	1.87	107.19	70.00	0.27
Main	9005	10-yr SBCFCD	1230.00	2825.00	2829.78	2827.12	2829.99	0.000153	3.68	334.23	70.00	0.30
Main	9005	5-yr SBCFCD	830.00	2825.00	2828.77	2826.64	2828.92	0.000148	3.15	263.68	70.00	0.29
Main	9005	2-yr SBCFCD	510.00	2825.00	2827.79	2826.19	2827.89	0.000148	2.62	194.96	70.00	0.28
Main	8713.9	100-yr SBCFCD	2620.00	2825.00	2832.41	2828.09	2832.68	0.000114	4.16	629.57	85.00	0.27
Main	8713.9	100-yr FIS	2700.00	2825.00	2832.54	2828.17	2832.81	0.000114	4.22	640.45	85.00	0.27
Main	8713.9	50-yr FIS	1500.00	2825.00	2830.37	2827.14	2830.54	0.000103	3.29	456.50	85.00	0.25
Main	8713.9	10-yr FIS	200.00	2825.00	2826.50	2825.55	2826.54	0.000115	1.57	127.50	85.00	0.23
Main	8713.9	10-yr SBCFCD	1230.00	2825.00	2829.77	2826.87	2829.92	0.000101	3.03	405.66	85.00	0.24
Main	8713.9	5-yr SBCFCD	830.00	2825.00	2828.76	2826.43	2828.86	0.000099	2.60	319.29	85.00	0.24
Main	8713.9	2-yr SBCFCD	510.00	2825.00	2827.77	2826.05	2827.84	0.000101	2.17	235.16	85.00	0.23
Main	8470	100-yr SBCFCD	2620.00	2824.80	2830.24	2830.24	2832.40	0.011734	11.77	222.56	51.77	1.00
Main	8470	100-yr FIS	2700.00	2824.80	2830.33	2830.33	2832.53	0.011802	11.90	226.83	52.10	1.01
Main	8470	50-yr FIS	1500.00	2824.80	2828.68	2828.68	2830.31	0.012886	10.23	146.56	45.52	1.01
Main	8470	10-yr FIS	200.00	2824.80	2825.88	2825.88	2826.40	0.018460	5.76	34.74	34.32	1.01
Main	8470	10-yr SBCFCD	1230.00	2824.80	2828.24	2828.24	2829.70	0.013313	9.71	126.64	43.74	1.01
Main	8470	5-yr SBCFCD	830.00	2824.80	2827.49	2827.49	2828.67	0.014232	8.73	95.08	40.75	1.01
Main	8470	2-yr SBCFCD	510.00	2824.80	2826.78	2826.78	2827.67	0.015427	7.60	67.15	37.91	1.01
Main	8416	100-yr SBCFCD	2620.00	2823.10	2827.39	2828.53	2831.28	0.027543	15.82	165.57	47.17	1.49
Main	8416	100-yr FIS	2700.00	2823.10	2827.48	2828.63	2831.41	0.027313	15.93	169.52	47.50	1.49
Main	8416	50-yr FIS	1500.00	2823.10	2826.08	2826.99	2829.12	0.032501	14.00	107.16	41.92	1.54
Main	8416	10-yr FIS	200.00	2823.10	2823.92	2824.18	2824.85	0.047263	7.74	25.84	33.27	1.55
Main	8416	10-yr SBCFCD	1230.00	2823.10	2825.72	2826.54	2828.48	0.034255	13.34	92.22	40.47	1.56
Main	8416	5-yr SBCFCD	830.00	2823.10	2825.12	2825.79	2827.38	0.037933	12.06	68.80	38.08	1.58
Main	8416	2-yr SBCFCD	510.00	2823.10	2824.57	2825.08	2826.30	0.042459	10.54	48.38	35.88	1.60
Main	8382	100-yr SBCFCD	2620.00	2813.50	2816.13	2818.93	2828.57	0.153731	28.31	92.56	40.50	3.30
Main	8382	100-yr FIS	2700.00	2813.50	2816.19	2819.03	2828.73	0.150939	28.42	95.01	40.74	3.28
Main	8382	50-yr FIS	1500.00	2813.50	2820.91	2817.40	2821.23	0.001239	4.52	331.98	59.63	0.34
Main	8382	10-yr FIS	200.00	2813.50	2817.13	2814.58	2817.16	0.000290	1.48	135.17	44.51	0.15
Main	8382	10-yr SBCFCD	1230.00	2813.50	2820.33	2816.94	2820.60	0.001125	4.12	298.36	57.33	0.32
Main	8382	5-yr SBCFCD	830.00	2813.50	2819.35	2816.19	2819.53	0.000905	3.40	244.09	53.41	0.28
Main	8382	2-yr SBCFCD	510.00	2813.50	2818.39	2815.48	2818.50	0.000655	2.62	194.46	49.55	0.23
Main	8330	100-yr SBCFCD	2620.00	2813.50	2822.83	2818.81	2823.28	0.001393	5.36	488.97	74.79	0.37
Main	8330	100-yr FIS	2700.00	2813.50	2822.96	2818.90	2823.41	0.001405	5.42	498.21	75.38	0.37
Main	8330	50-yr FIS	1500.00	2813.50	2820.87		2821.15	0.001140	4.27	351.44	65.37	0.32
Main	8330	10-yr FIS	200.00	2813.50	2817.12		2817.15	0.000279	1.43	139.81	47.35	0.15
Main	8330	10-yr SBCFCD	1230.00	2813.50	2820.30		2820.53	0.001044	3.91	314.67	62.62	0.31
Main	8330	5-yr SBCFCD	830.00	2813.50	2819.32		2819.48	0.000851	3.24	255.78	57.93	0.27
Main	8330	2-yr SBCFCD	510.00	2813.50	2818.36		2818.46	0.000623	2.52	202.56	53.33	0.23
Main	8326	100-yr SBCFCD	2620.00	2815.50	2820.94	2820.94	2823.10	0.011768	11.78	222.33	51.76	1.00

Main	8326	100-yr FIS	2700.00	2815.50	2821.03	2821.03	2823.23	0.011781	11.90	226.97	52.11	1.00
Main	8326	50-yr FIS	1500.00	2815.50	2819.38	2819.38	2821.01	0.012895	10.24	146.53	45.52	1.01
Main	8326	10-yr FIS	200.00	2815.50	2816.58	2816.58	2817.10	0.018446	5.76	34.74	34.32	1.01
Main	8326	10-yr SBCFCD	1230.00	2815.50	2818.94	2818.94	2820.40	0.013310	9.71	126.65	43.74	1.01
Main	8326	5-yr SBCFCD	830.00	2815.50	2818.19	2818.19	2819.37	0.014197	8.72	95.16	40.76	1.01
Main	8326	2-yr SBCFCD	510.00	2815.50	2817.48	2817.48	2818.37	0.015356	7.58	67.25	37.92	1.00
Main	8323	100-yr SBCFCD	2620.00	2815.50	2821.78	2818.77	2822.14	0.001020	4.82	543.57	99.22	0.36
Main	8323	100-yr FIS	2700.00	2815.50	2821.89	2818.84	2822.25	0.001021	4.87	554.37	99.65	0.36
Main	8323	50-yr FIS	1500.00	2815.50	2820.04	2817.78	2820.28	0.001016	3.98	377.24	92.24	0.35
Main	8323	10-yr FIS	200.00	2815.50	2816.84	2816.11	2816.89	0.001120	1.95	102.37	79.36	0.30
Main	8323	10-yr SBCFCD	1230.00	2815.50	2819.54	2817.50	2819.75	0.001019	3.71	331.40	90.22	0.34
Main	8323	5-yr SBCFCD	830.00	2815.50	2818.69	2817.05	2818.86	0.001027	3.23	256.75	86.83	0.33
Main	8323	2-yr SBCFCD	510.00	2815.50	2817.88	2816.63	2818.00	0.001044	2.72	187.57	83.57	0.32
Main	8113.9	100-yr SBCFCD	2620.00	2815.00	2819.61	2819.61	2821.51	0.008849	11.07	236.71	62.81	1.00
Main	8113.9	100-yr FIS	2700.00	2815.00	2819.69	2819.69	2821.62	0.008805	11.15	242.06	63.23	1.00
Main	8113.9	50-yr FIS	1500.00	2815.00	2818.27	2818.27	2819.68	0.009673	9.53	157.39	56.20	1.00
Main	8113.9	10-yr FIS	200.00	2815.00	2816.00	2815.90	2816.35	0.009773	4.70	42.60	44.97	0.85
Main	8113.9	10-yr SBCFCD	1230.00	2815.00	2817.89	2817.89	2819.16	0.009991	9.02	136.39	54.32	1.00
Main	8113.9	5-yr SBCFCD	830.00	2815.00	2817.25	2817.25	2818.27	0.010814	8.09	102.54	51.14	1.01
Main	8113.9	2-yr SBCFCD	510.00	2815.00	2816.65	2816.65	2817.41	0.011751	7.01	72.80	48.18	1.00
Main	7800	100-yr SBCFCD	2620.00	2814.00	2819.29	2816.36	2819.50	0.000127	3.68	712.11	145.17	0.29
Main	7800	100-yr FIS	2700.00	2814.00	2819.47	2816.41	2819.68	0.000120	3.66	738.69	145.90	0.29
Main	7800	50-yr FIS	1500.00	2814.00	2816.60	2815.64	2816.91	0.000457	4.47	335.67	134.39	0.50
Main	7800	10-yr FIS	200.00	2814.00	2814.43	2814.43	2814.65	0.003299	3.72	53.74	125.72	1.00
Main	7800	10-yr SBCFCD	1230.00	2814.00	2815.01	2815.44	2816.47	0.007317	9.69	126.88	128.03	1.72
Main	7800	5-yr SBCFCD	830.00	2814.00	2814.85	2815.11	2815.79	0.005931	7.79	106.48	127.39	1.50
Main	7800	2-yr SBCFCD	510.00	2814.00	2814.69	2814.80	2815.23	0.004371	5.87	86.94	126.77	1.25
Main	7761.1	100-yr SBCFCD	2620.00	2811.00	2819.29	2814.39	2819.50	0.000081	3.65	717.70	103.16	0.24
Main	7761.1	100-yr FIS	2700.00	2811.00	2819.47	2814.46	2819.68	0.000080	3.67	736.23	103.87	0.24
Main	7761.1	50-yr FIS	1500.00	2811.00	2816.69	2813.36	2816.86	0.000098	3.24	463.45	92.78	0.26
Main	7761.1	10-yr FIS	200.00	2811.00	2812.48	2811.63	2812.53	0.000167	1.86	107.79	75.91	0.27
Main	7761.1	10-yr SBCFCD	1230.00	2811.00	2815.98	2813.08	2816.13	0.000104	3.09	398.29	89.92	0.26
Main	7761.1	5-yr SBCFCD	830.00	2811.00	2814.82	2812.61	2814.94	0.000117	2.80	296.74	85.29	0.26
Main	7761.1	2-yr SBCFCD	510.00	2811.00	2813.76	2812.17	2813.85	0.000133	2.45	208.16	81.03	0.27
Main	7749.9		Culvert									
Main	7738.6	100-yr SBCFCD	2970.00	2811.00	2816.76	2814.08	2817.14	0.000214	4.94	601.58	116.02	0.38
Main	7738.6	100-yr FIS	2700.00	2811.00	2816.04	2813.90	2816.46	0.000279	5.20	519.17	113.15	0.43
Main	7738.6	50-yr FIS	1500.00	2811.00	2813.42	2812.99	2814.04	0.001028	6.34	236.41	102.67	0.74
Main	7738.6	10-yr FIS	200.00	2811.00	2811.51	2811.51	2811.78	0.003407	4.20	47.60	95.03	1.05
Main	7738.6	10-yr SBCFCD	1400.00	2811.00	2813.20	2812.89	2813.86	0.001227	6.53	214.32	101.80	0.79
Main	7738.6	5-yr SBCFCD	930.00	2811.00	2812.45	2812.45	2813.15	0.002190	6.69	139.07	98.80	0.99
Main	7738.6	2-yr SBCFCD	570.00	2811.00	2812.04	2812.04	2812.56	0.002525	5.78	98.60	97.15	1.01
Main	7456.8	100-yr SBCFCD	2970.00	2809.00	2816.69		2817.00	0.000688	4.43	669.77	102.62	0.31
Main	7456.8	100-yr FIS	2700.00	2809.00	2815.96		2816.28	0.000805	4.53	595.91	99.67	0.33
Main	7456.8	50-yr FIS	1500.00	2809.00	2813.25		2813.55	0.001361	4.41	340.09	88.68	0.40
Main	7456.8	10-yr FIS	200.00	2809.00	2809.60	2809.62	2809.93	0.017242	4.57	43.74	73.93	1.05
Main	7456.8	10-yr SBCFCD	1400.00	2809.00	2813.01		2813.31	0.001443	4.39	319.07	87.71	0.41
Main	7456.8	5-yr SBCFCD	930.00	2809.00	2811.78	2810.70	2812.08	0.002190	4.33	214.71	82.76	0.47
Main	7456.8	2-yr SBCFCD	570.00	2809.00	2810.68	2810.24	2811.00	0.004519	4.53	125.69	78.29	0.63

Main	7267	100-yr SBCFCD	2970.00	2808.00	2816.83	2810.60	2816.92	0.000029	2.39	1241.89	158.32	0.15
Main	7267	100-yr FIS	2700.00	2808.00	2816.11	2810.44	2816.20	0.000032	2.39	1128.52	155.43	0.16
Main	7267	50-yr FIS	1500.00	2808.00	2813.39	2809.66	2813.46	0.000040	2.08	720.88	144.55	0.16
Main	7267	10-yr FIS	200.00	2808.00	2809.44	2808.43	2809.46	0.000060	1.11	180.91	128.75	0.16
Main	7267	10-yr SBCFCD	1400.00	2808.00	2813.15	2809.58	2813.21	0.000040	2.04	686.41	143.60	0.16
Main	7267	5-yr SBCFCD	930.00	2808.00	2811.93	2809.20	2811.98	0.000045	1.81	513.73	138.70	0.17
Main	7267	2-yr SBCFCD	570.00	2808.00	2810.84	2808.88	2810.88	0.000050	1.56	365.82	134.37	0.17
Main	7249.1		Culvert									
Main	7231.3	100-yr SBCFCD	3150.00	2808.00	2814.94	2810.70	2815.11	0.000074	3.32	950.01	150.76	0.23
Main	7231.3	100-yr FIS	2700.00	2808.00	2814.04	2810.43	2814.21	0.000088	3.31	815.21	147.14	0.25
Main	7231.3	50-yr FIS	1500.00	2808.00	2811.40	2809.67	2811.58	0.000189	3.40	440.64	136.58	0.33
Main	7231.3	10-yr FIS	200.00	2808.00	2808.43	2808.43	2808.65	0.003353	3.75	53.31	124.72	1.01
Main	7231.3	10-yr SBCFCD	1480.00	2808.00	2811.35	2809.63	2811.53	0.000193	3.41	434.11	136.39	0.34
Main	7231.3	5-yr SBCFCD	990.00	2808.00	2810.09	2809.26	2810.31	0.000416	3.72	266.40	131.38	0.46
Main	7231.3	2-yr SBCFCD	610.00	2808.00	2808.97	2808.91	2809.36	0.002098	5.05	120.72	126.87	0.91
Main	7010.2	100-yr SBCFCD	3150.00	2807.00	2814.99	2808.88	2815.03	0.000085	1.72	1828.35	244.94	0.11
Main	7010.2	100-yr FIS	2700.00	2807.00	2814.08	2808.71	2814.12	0.000093	1.68	1607.96	241.31	0.11
Main	7010.2	50-yr FIS	1500.00	2807.00	2811.43	2808.16	2811.47	0.000139	1.53	983.11	230.72	0.13
Main	7010.2	10-yr FIS	200.00	2807.00	2807.43	2807.30	2807.51	0.005816	2.16	92.73	214.73	0.58
Main	7010.2	10-yr SBCFCD	1480.00	2807.00	2811.38	2808.14	2811.42	0.000140	1.52	972.07	230.53	0.13
Main	7010.2	5-yr SBCFCD	990.00	2807.00	2810.13	2807.87	2810.16	0.000195	1.45	685.10	225.50	0.15
Main	7010.2	2-yr SBCFCD	610.00	2807.00	2809.00	2807.63	2809.03	0.000331	1.41	433.35	220.99	0.18
Main	6801.5	100-yr SBCFCD	3150.00	2806.00	2814.93	2808.60	2815.02	0.000028	2.42	1302.68	154.00	0.15
Main	6801.5	100-yr FIS	2700.00	2806.00	2814.03	2808.34	2814.11	0.000029	2.32	1163.80	154.00	0.15
Main	6801.5	50-yr FIS	1500.00	2806.00	2811.39	2807.60	2811.45	0.000036	1.98	758.97	151.56	0.16
Main	6801.5	10-yr FIS	200.00	2806.00	2807.43	2806.42	2807.45	0.000054	1.05	190.58	135.74	0.16
Main	6801.5	10-yr SBCFCD	1480.00	2806.00	2811.34	2807.58	2811.40	0.000036	1.97	751.72	151.37	0.16
Main	6801.5	5-yr SBCFCD	990.00	2806.00	2810.09	2807.21	2810.14	0.000039	1.75	565.53	146.37	0.16
Main	6801.5	2-yr SBCFCD	610.00	2806.00	2808.97	2806.88	2809.01	0.000044	1.51	404.05	141.89	0.16
Main	6785.6		Culvert									
Main	6769.7	100-yr SBCFCD	3150.00	2806.00	2809.33	2809.33	2810.93	0.001728	10.15	310.35	96.65	1.00
Main	6769.7	100-yr FIS	2700.00	2806.00	2809.02	2809.02	2810.45	0.001752	9.62	280.78	96.04	0.99
Main	6769.7	50-yr FIS	1500.00	2806.00	2808.05	2808.05	2809.03	0.001966	7.96	188.50	94.10	0.99
Main	6769.7	10-yr FIS	200.00	2806.00	2806.53	2806.53	2806.80	0.003092	4.15	48.23	91.07	1.00
Main	6769.7	10-yr SBCFCD	1480.00	2806.00	2808.03	2808.03	2809.00	0.001977	7.93	186.62	94.06	0.99
Main	6769.7	5-yr SBCFCD	990.00	2806.00	2807.56	2807.56	2808.31	0.002119	6.93	142.79	93.12	0.99
Main	6769.7	2-yr SBCFCD	610.00	2806.00	2807.13	2807.13	2807.68	0.002372	5.94	102.70	92.25	0.99
Main	6769.1	100-yr SBCFCD	3150.00	2804.30	2807.21	2808.17	2810.43	0.023104	14.41	218.61	81.25	1.55
Main	6769.1	100-yr FIS	2700.00	2804.30	2806.88	2807.81	2809.96	0.025679	14.09	191.61	79.84	1.60
Main	6769.1	50-yr FIS	1500.00	2804.30	2805.89	2806.69	2808.53	0.040164	13.04	115.04	75.70	1.86
Main	6769.1	10-yr FIS	200.00	2804.30	2804.57	2804.93	2806.34	0.270701	10.68	18.73	70.13	3.64
Main	6769.1	10-yr SBCFCD	1480.00	2804.30	2805.87	2806.68	2808.50	0.040608	13.02	113.69	75.62	1.87
Main	6769.1	5-yr SBCFCD	990.00	2804.30	2805.42	2806.14	2807.81	0.056983	12.41	79.79	73.71	2.10
Main	6769.1	2-yr SBCFCD	610.00	2804.30	2805.03	2805.63	2807.19	0.088429	11.78	51.79	72.09	2.45
Main	6555.8	100-yr SBCFCD	3150.00	2802.80	2807.83	2805.38	2808.13	0.001012	4.38	719.86	153.13	0.36
Main	6555.8	100-yr FIS	2700.00	2802.80	2806.95	2805.13	2807.28	0.001425	4.61	586.09	149.59	0.41
Main	6555.8	50-yr FIS	1500.00	2802.80	2805.09	2804.38	2805.44	0.003229	4.76	315.10	142.16	0.56
Main	6555.8	10-yr FIS	200.00	2802.80	2803.44	2803.22	2803.52	0.004084	2.33	85.83	135.56	0.52
Main	6555.8	10-yr SBCFCD	1480.00	2802.80	2805.07	2804.36	2805.42	0.003238	4.74	312.22	142.08	0.56

Main	6555.8	5-yr SBCFCD	990.00	2802.80	2804.55	2803.99	2804.82	0.003432	4.13	239.49	140.02	0.56
Main	6555.8	2-yr SBCFCD	610.00	2802.80	2804.08	2803.66	2804.27	0.003702	3.51	174.03	138.13	0.55
Main	6540	100-yr SBCFCD	3150.00	2802.70	2807.69	2805.57	2808.10	0.001448	5.12	615.26	135.49	0.42
Main	6540	100-yr FIS	2700.00	2802.70	2806.77	2805.30	2807.24	0.002131	5.48	492.35	130.96	0.50
Main	6540	50-yr FIS	1500.00	2802.70	2804.46	2804.46	2805.31	0.011203	7.41	202.32	119.61	1.00
Main	6540	10-yr FIS	200.00	2802.70	2803.17	2803.17	2803.39	0.016808	3.83	52.24	113.29	0.99
Main	6540	10-yr SBCFCD	1480.00	2802.70	2804.44	2804.44	2805.29	0.011165	7.37	200.86	119.55	1.00
Main	6540	5-yr SBCFCD	990.00	2802.70	2804.03	2804.03	2804.69	0.012237	6.50	152.41	117.54	1.01
Main	6540	2-yr SBCFCD	610.00	2802.70	2803.68	2803.68	2804.15	0.012999	5.48	111.22	115.81	0.99
Main	6535	100-yr SBCFCD	3150.00	2800.00	2807.87	2802.84	2808.01	0.000289	3.03	1038.43	148.47	0.20
Main	6535	100-yr FIS	2700.00	2800.00	2806.99	2802.57	2807.13	0.000319	2.97	909.44	144.96	0.21
Main	6535	50-yr FIS	1500.00	2800.00	2804.46	2801.75	2804.58	0.000457	2.70	555.83	134.85	0.23
Main	6535	10-yr FIS	200.00	2800.00	2800.15	2800.47	2802.42	0.762145	12.08	16.55	112.04	5.54
Main	6535	10-yr SBCFCD	1480.00	2800.00	2804.42	2801.73	2804.53	0.000461	2.69	549.51	134.66	0.23
Main	6535	5-yr SBCFCD	990.00	2800.00	2803.19	2801.33	2803.29	0.000626	2.55	387.51	129.76	0.26
Main	6535	2-yr SBCFCD	610.00	2800.00	2802.09	2800.97	2802.19	0.001007	2.47	247.46	125.37	0.31
Main	6385	100-yr SBCFCD	3150.00	2799.50	2807.86	2802.39	2808.00	0.000048	2.95	1067.65	144.44	0.19
Main	6385	100-yr FIS	2700.00	2799.50	2806.98	2802.08	2807.11	0.000052	2.87	942.21	140.92	0.20
Main	6385	50-yr FIS	1500.00	2799.50	2804.45	2801.27	2804.55	0.000065	2.51	598.74	130.81	0.21
Main	6385	10-yr FIS	200.00	2799.50	2800.57	2799.96	2800.61	0.000200	1.66	120.50	115.26	0.29
Main	6385	10-yr SBCFCD	1480.00	2799.50	2804.41	2801.24	2804.50	0.000065	2.50	592.58	130.62	0.21
Main	6385	5-yr SBCFCD	990.00	2799.50	2803.18	2800.85	2803.26	0.000077	2.27	435.43	125.72	0.22
Main	6385	2-yr SBCFCD	610.00	2799.50	2802.08	2800.48	2802.14	0.000096	2.04	299.52	121.31	0.23
Main	6344.7	100-yr SBCFCD	3150.00	2799.20	2807.88	2801.63	2807.97	0.000030	2.45	1284.45	148.00	0.15
Main	6344.7	100-yr FIS	2700.00	2799.20	2807.00	2801.38	2807.09	0.000031	2.34	1154.37	148.00	0.15
Main	6344.7	50-yr FIS	1500.00	2799.20	2804.47	2800.66	2804.53	0.000034	1.92	780.04	148.00	0.15
Main	6344.7	10-yr FIS	200.00	2799.20	2800.58	2799.59	2800.59	0.000049	0.98	203.61	148.00	0.15
Main	6344.7	10-yr SBCFCD	1480.00	2799.20	2804.42	2800.67	2804.48	0.000034	1.91	773.06	148.00	0.15
Main	6344.7	5-yr SBCFCD	990.00	2799.20	2803.20	2800.32	2803.24	0.000036	1.67	591.31	148.00	0.15
Main	6344.7	2-yr SBCFCD	610.00	2799.20	2802.09	2800.01	2802.12	0.000040	1.42	428.14	148.00	0.15
Main	6328.7		Culvert									
Main	6312.5	100-yr SBCFCD	3150.00	2799.00	2804.75	2801.94	2805.13	0.000206	4.93	638.55	111.00	0.36
Main	6312.5	100-yr FIS	2700.00	2799.00	2804.10	2801.64	2804.45	0.000224	4.77	565.62	111.00	0.37
Main	6312.5	50-yr FIS	1500.00	2799.00	2802.03	2800.80	2802.34	0.000374	4.47	335.90	111.00	0.45
Main	6312.5	10-yr FIS	200.00	2799.00	2799.46	2799.46	2799.70	0.003380	3.93	50.89	111.00	1.02
Main	6312.5	10-yr SBCFCD	1480.00	2799.00	2801.99	2800.78	2802.30	0.000380	4.46	331.54	111.00	0.46
Main	6312.5	5-yr SBCFCD	990.00	2799.00	2800.92	2800.36	2801.25	0.000727	4.65	212.84	111.00	0.59
Main	6312.5	2-yr SBCFCD	610.00	2799.00	2799.99	2799.99	2800.47	0.002490	5.58	109.32	111.00	0.99
Main	6275	100-yr SBCFCD	3150.00	2798.00	2804.81	2800.99	2805.05	0.000573	3.90	807.94	132.24	0.28
Main	6275	100-yr FIS	2700.00	2798.00	2804.15	2800.70	2804.37	0.000596	3.74	721.45	129.60	0.28
Main	6275	50-yr FIS	1500.00	2798.00	2802.08	2799.84	2802.24	0.000740	3.25	461.67	121.32	0.29
Main	6275	10-yr FIS	200.00	2798.00	2798.82	2798.47	2798.90	0.002820	2.28	87.72	108.29	0.45
Main	6275	10-yr SBCFCD	1480.00	2798.00	2802.04	2799.82	2802.20	0.000744	3.24	456.91	121.16	0.29
Main	6275	5-yr SBCFCD	990.00	2798.00	2800.99	2799.38	2801.12	0.000923	2.99	331.29	116.94	0.31
Main	6275	2-yr SBCFCD	610.00	2798.00	2800.03	2799.02	2800.15	0.001273	2.75	221.67	113.13	0.35
Main	6170	100-yr SBCFCD	3150.00	2796.80	2802.40	2802.40	2804.68	0.011621	12.11	260.11	57.83	1.01
Main	6170	100-yr FIS	2700.00	2796.80	2801.91	2801.91	2804.01	0.011860	11.63	232.17	55.82	1.00
Main	6170	50-yr FIS	1500.00	2796.80	2800.37	2800.37	2801.90	0.012983	9.94	150.86	49.54	1.00
Main	6170	10-yr FIS	200.00	2796.80	2797.78	2797.78	2798.25	0.018784	5.51	36.32	39.00	1.01

Main	6170	10-yr SBCFCD	1480.00	2796.80	2800.34	2800.34	2801.86	0.013036	9.91	149.30	49.41	1.00
Main	6170	5-yr SBCFCD	990.00	2796.80	2799.55	2799.55	2800.77	0.014000	8.88	111.52	46.19	1.01
Main	6170	2-yr SBCFCD	610.00	2796.80	2798.82	2798.82	2799.75	0.015203	7.72	79.05	43.23	1.01
Main	6114	100-yr SBCFCD	3150.00	2795.00	2799.39	2800.61	2803.54	0.027828	16.35	192.62	52.86	1.51
Main	6114	100-yr FIS	2700.00	2795.00	2798.97	2800.11	2802.84	0.029098	15.80	170.84	51.15	1.52
Main	6114	50-yr FIS	1500.00	2795.00	2797.69	2798.57	2800.64	0.034669	13.79	108.76	45.94	1.58
Main	6114	10-yr FIS	200.00	2795.00	2795.73	2795.98	2796.60	0.049841	7.46	26.79	37.99	1.57
Main	6114	10-yr SBCFCD	1480.00	2795.00	2797.66	2798.54	2800.60	0.034794	13.75	107.67	45.85	1.58
Main	6114	5-yr SBCFCD	990.00	2795.00	2797.04	2797.75	2799.43	0.038975	12.41	79.75	43.30	1.61
Main	6114	2-yr SBCFCD	610.00	2795.00	2796.48	2797.02	2798.31	0.043797	10.84	56.25	41.03	1.63
Main	6084	100-yr SBCFCD	3150.00	2786.90	2798.59	2792.52	2798.92	0.000750	4.58	687.35	82.38	0.28
Main	6084	100-yr FIS	2700.00	2786.90	2797.86	2792.05	2798.15	0.000708	4.30	627.94	79.47	0.27
Main	6084	50-yr FIS	1500.00	2786.90	2795.48	2790.50	2795.65	0.000554	3.33	450.08	69.94	0.23
Main	6084	10-yr FIS	200.00	2786.90	2790.97	2787.88	2790.99	0.000145	1.13	176.31	51.59	0.11
Main	6084	10-yr SBCFCD	1480.00	2786.90	2795.43	2790.47	2795.60	0.000551	3.31	446.83	69.75	0.23
Main	6084	5-yr SBCFCD	990.00	2786.90	2794.15	2789.66	2794.27	0.000451	2.74	360.73	64.52	0.20
Main	6084	2-yr SBCFCD	610.00	2786.90	2792.90	2788.94	2792.97	0.000341	2.15	283.25	59.43	0.17
Main	6031	100-yr SBCFCD	3150.00	2786.90	2798.55	2792.52	2798.88	0.000761	4.61	683.73	82.21	0.28
Main	6031	100-yr FIS	2700.00	2786.90	2797.82	2792.05	2798.11	0.000719	4.32	624.65	79.31	0.27
Main	6031	50-yr FIS	1500.00	2786.90	2795.45	2790.50	2795.62	0.000562	3.35	447.87	69.81	0.23
Main	6031	10-yr FIS	200.00	2786.90	2790.97	2787.88	2790.99	0.000146	1.14	175.91	51.55	0.11
Main	6031	10-yr SBCFCD	1480.00	2786.90	2795.40	2790.47	2795.57	0.000558	3.33	444.63	69.62	0.23
Main	6031	5-yr SBCFCD	990.00	2786.90	2794.12	2789.66	2794.24	0.000457	2.76	359.09	64.42	0.21
Main	6031	2-yr SBCFCD	610.00	2786.90	2792.88	2788.94	2792.95	0.000345	2.16	282.12	59.36	0.17
Main	6027	100-yr SBCFCD	3150.00	2788.90	2798.24	2794.53	2798.85	0.001775	6.24	504.59	73.04	0.42
Main	6027	100-yr FIS	2700.00	2788.90	2797.53	2794.05	2798.08	0.001759	5.95	453.43	70.13	0.41
Main	6027	50-yr FIS	1500.00	2788.90	2795.21	2792.50	2795.60	0.001714	4.96	302.13	60.71	0.39
Main	6027	10-yr FIS	200.00	2788.90	2790.87	2789.88	2790.98	0.001785	2.60	76.83	43.02	0.34
Main	6027	10-yr SBCFCD	1480.00	2788.90	2795.17	2792.47	2795.55	0.001713	4.94	299.41	60.53	0.39
Main	6027	5-yr SBCFCD	990.00	2788.90	2793.93	2791.66	2794.22	0.001694	4.35	227.37	55.47	0.38
Main	6027	2-yr SBCFCD	610.00	2788.90	2792.72	2790.94	2792.94	0.001696	3.73	163.36	50.55	0.37
Main	6024	100-yr SBCFCD	3150.00	2788.90	2796.12	2796.12	2798.64	0.008263	12.74	247.18	48.45	0.99
Main	6024	100-yr FIS	2700.00	2788.90	2795.54	2795.54	2797.89	0.008433	12.31	219.42	46.14	0.99
Main	6024	50-yr FIS	1500.00	2788.90	2793.66	2793.66	2795.45	0.009128	10.72	139.93	38.76	0.99
Main	6024	10-yr FIS	200.00	2788.90	2790.29	2790.29	2790.91	0.012776	6.34	31.52	25.46	1.00
Main	6024	10-yr SBCFCD	1480.00	2788.90	2793.62	2793.62	2795.40	0.009222	10.72	138.09	38.57	1.00
Main	6024	5-yr SBCFCD	990.00	2788.90	2792.61	2792.61	2794.09	0.009961	9.78	101.23	34.60	1.01
Main	6024	2-yr SBCFCD	610.00	2788.90	2791.68	2791.68	2792.83	0.010638	8.62	70.75	30.94	1.00
Main	5742.1	100-yr SBCFCD	3150.00	2785.00	2794.62	2790.12	2795.25	0.000227	6.36	495.13	55.89	0.38
Main	5742.1	100-yr FIS	2700.00	2785.00	2793.38	2789.60	2794.00	0.000259	6.33	426.24	54.74	0.40
Main	5742.1	50-yr FIS	1500.00	2785.00	2790.39	2788.12	2790.88	0.000329	5.62	266.76	51.98	0.44
Main	5742.1	10-yr FIS	200.00	2785.00	2785.47	2785.82	2786.71	0.016974	8.94	22.38	47.44	2.29
Main	5742.1	10-yr SBCFCD	1480.00	2785.00	2790.34	2788.12	2790.82	0.000331	5.61	263.91	51.93	0.44
Main	5742.1	5-yr SBCFCD	990.00	2785.00	2786.28	2787.37	2790.37	0.015495	16.24	60.98	48.18	2.54
Main	5742.1	2-yr SBCFCD	610.00	2785.00	2785.93	2786.71	2788.91	0.017024	13.85	44.04	47.86	2.54
Main	5742	100-yr SBCFCD	3150.00	2785.00	2794.57	2790.23	2795.24	0.000268	6.58	478.86	59.29	0.41
Main	5742	100-yr FIS	2700.00	2785.00	2793.29	2789.71	2793.98	0.000318	6.67	404.91	56.25	0.44
Main	5742	50-yr FIS	1500.00	2785.00	2790.30	2788.18	2790.86	0.000398	6.02	249.03	47.83	0.47
Main	5742	10-yr FIS	200.00	2785.00	2785.48	2785.82	2786.71	0.016782	8.92	22.42	47.00	2.28
Main	5742	10-yr SBCFCD	1480.00	2785.00	2790.24	2788.15	2790.80	0.000400	6.00	246.48	47.68	0.47

Main	5742	5-yr SBCFCD	990.00	2785.00	2786.30	2787.42	2790.37	0.015150	16.18	61.18	47.00	2.50
Main	5742	2-yr SBCFCD	610.00	2785.00	2785.94	2786.75	2788.90	0.016715	13.81	44.17	47.00	2.51
Main	5679.8		Culvert									
Main	5609.6	100-yr SBCFCD	3150.00	2784.00	2793.73	2789.28	2794.39	0.000359	6.52	483.22	74.93	0.45
Main	5609.6	100-yr FIS	2700.00	2784.00	2792.80	2788.77	2793.46	0.000395	6.52	414.37	69.27	0.47
Main	5609.6	50-yr FIS	1500.00	2784.00	2790.03	2787.23	2790.48	0.000279	5.41	277.20	46.00	0.39
Main	5609.6	10-yr FIS	200.00	2784.00	2784.84	2784.84	2785.26	0.002675	5.15	38.81	46.00	0.99
Main	5609.6	10-yr SBCFCD	1480.00	2784.00	2789.98	2787.20	2790.43	0.000278	5.38	274.88	46.00	0.39
Main	5609.6	5-yr SBCFCD	990.00	2784.00	2786.44	2786.44	2787.65	0.002086	8.84	112.04	46.00	1.00
Main	5609.6	2-yr SBCFCD	610.00	2784.00	2785.78	2785.78	2786.64	0.002194	7.47	81.66	46.00	0.99
Main	5581.3	100-yr SBCFCD	3150.00	2783.60	2790.79	2790.79	2793.70	0.001834	13.68	230.19	39.35	1.00
Main	5581.3	100-yr FIS	2700.00	2783.60	2790.10	2790.10	2792.82	0.001876	13.26	203.69	36.97	1.00
Main	5581.3	50-yr FIS	1500.00	2783.60	2787.92	2787.92	2789.98	0.002044	11.52	130.20	31.06	0.99
Main	5581.3	10-yr FIS	200.00	2783.60	2784.72	2784.72	2785.27	0.002563	5.95	33.62	30.02	0.99
Main	5581.3	10-yr SBCFCD	1480.00	2783.60	2787.87	2787.87	2789.93	0.002068	11.52	128.52	31.00	1.00
Main	5581.3	5-yr SBCFCD	990.00	2783.60	2786.85	2786.85	2788.45	0.002126	10.15	97.56	30.03	0.99
Main	5581.3	2-yr SBCFCD	610.00	2783.60	2785.95	2785.95	2787.11	0.002221	8.64	70.57	30.02	0.99
Main	5515.3	100-yr SBCFCD	3150.00	2783.00	2787.05	2788.94	2793.17	0.006259	19.86	158.57	46.68	1.90
Main	5515.3	100-yr FIS	2700.00	2783.00	2786.68	2788.43	2792.32	0.006422	19.06	141.65	45.36	1.90
Main	5515.3	50-yr FIS	1500.00	2783.00	2785.57	2786.79	2789.56	0.006887	16.03	93.55	41.31	1.88
Main	5515.3	10-yr FIS	200.00	2783.00	2783.69	2784.06	2784.90	0.010362	8.81	22.70	34.13	1.90
Main	5515.3	10-yr SBCFCD	1480.00	2783.00	2785.55	2786.76	2789.51	0.006894	15.97	92.70	41.23	1.88
Main	5515.3	5-yr SBCFCD	990.00	2783.00	2784.99	2785.93	2788.07	0.007157	14.06	70.39	39.16	1.85
Main	5515.3	2-yr SBCFCD	610.00	2783.00	2784.47	2785.16	2786.74	0.007644	12.10	50.43	37.17	1.83
Main	5135	100-yr SBCFCD	3150.00	2782.21	2786.70	2788.63	2792.90	0.004477	20.80	164.78	43.46	1.73
Main	5135	100-yr FIS	2700.00	2782.21	2786.26	2788.03	2792.03	0.004750	20.00	145.88	42.13	1.75
Main	5135	50-yr FIS	1500.00	2782.21	2784.94	2786.24	2789.22	0.005815	17.02	93.06	38.19	1.82
Main	5135	10-yr FIS	200.00	2782.21	2782.89	2783.31	2784.32	0.011998	9.66	21.01	32.03	2.07
Main	5135	10-yr SBCFCD	1480.00	2782.21	2784.91	2786.21	2789.17	0.005850	16.97	92.08	38.11	1.82
Main	5135	5-yr SBCFCD	990.00	2782.21	2784.28	2785.31	2787.69	0.006642	15.11	68.36	36.20	1.85
Main	5135	2-yr SBCFCD	610.00	2782.21	2783.69	2784.48	2786.31	0.007866	13.18	47.75	34.45	1.91
Main	4875	100-yr SBCFCD	3150.00	2779.75	2783.87	2786.17	2791.42	0.006074	22.88	148.92	42.35	1.99
Main	4875	100-yr FIS	2700.00	2779.75	2783.46	2785.57	2790.48	0.006448	21.99	131.90	41.13	2.01
Main	4875	50-yr FIS	1500.00	2779.75	2782.26	2783.78	2787.40	0.007767	18.61	84.79	37.53	2.07
Main	4875	10-yr FIS	200.00	2779.75	2780.50	2780.84	2781.65	0.008377	8.66	23.46	32.26	1.76
Main	4875	10-yr SBCFCD	1480.00	2779.75	2782.24	2783.75	2787.34	0.007801	18.54	83.94	37.47	2.07
Main	4875	5-yr SBCFCD	990.00	2779.75	2781.67	2782.85	2785.67	0.008595	16.35	63.00	35.75	2.08
Main	4875	2-yr SBCFCD	610.00	2779.75	2781.16	2782.02	2784.06	0.009262	13.85	45.37	34.24	2.05
Main	4635	100-yr SBCFCD	3150.00	2777.45	2781.38	2783.87	2789.76	0.007137	24.06	141.20	41.80	2.14
Main	4635	100-yr FIS	2700.00	2777.45	2781.00	2783.27	2788.75	0.007522	23.07	125.41	40.65	2.16
Main	4635	50-yr FIS	1500.00	2777.45	2779.88	2781.48	2785.39	0.008699	19.27	81.76	37.29	2.18
Main	4635	10-yr FIS	200.00	2777.45	2778.17	2778.54	2779.45	0.010001	9.14	22.22	32.15	1.90
Main	4635	10-yr SBCFCD	1480.00	2777.45	2779.86	2781.45	2785.33	0.008727	19.19	80.98	37.23	2.18
Main	4635	5-yr SBCFCD	990.00	2777.45	2779.33	2780.55	2783.51	0.009220	16.70	61.61	35.63	2.15
Main	4635	2-yr SBCFCD	610.00	2777.45	2778.85	2779.72	2781.80	0.009523	13.97	44.98	34.20	2.08
Main	4385	100-yr SBCFCD	3150.00	2775.05	2778.87	2781.47	2787.82	0.007917	24.85	136.45	41.46	2.24
Main	4385	100-yr FIS	2700.00	2775.05	2778.51	2780.87	2786.74	0.008267	23.76	121.59	40.37	2.25
Main	4385	50-yr FIS	1500.00	2775.05	2777.45	2779.08	2783.14	0.009155	19.57	80.44	37.18	2.23
Main	4385	10-yr FIS	200.00	2775.05	2775.78	2776.14	2777.01	0.009382	8.97	22.66	32.19	1.85

Main	4385	10-yr SBCFCD	1480.00	2775.05	2777.43	2779.05	2783.07	0.009175	19.49	79.69	37.12	2.23
Main	4385	5-yr SBCFCD	990.00	2775.05	2776.91	2778.15	2781.17	0.009467	16.84	61.10	35.59	2.17
Main	4385	2-yr SBCFCD	610.00	2775.05	2776.45	2777.32	2779.41	0.009597	14.00	44.87	34.19	2.09
Main	4135	100-yr SBCFCD	3150.00	2772.65	2776.40	2779.07	2785.74	0.008459	25.37	133.51	41.24	2.31
Main	4135	100-yr FIS	2700.00	2772.65	2776.05	2778.47	2784.58	0.008741	24.17	119.40	40.20	2.31
Main	4135	50-yr FIS	1500.00	2772.65	2775.03	2776.68	2780.81	0.009388	19.73	79.79	37.13	2.25
Main	4135	10-yr FIS	200.00	2772.65	2773.37	2773.74	2774.63	0.009707	9.06	22.42	32.16	1.88
Main	4135	10-yr SBCFCD	1480.00	2772.65	2775.01	2776.65	2780.74	0.009400	19.63	79.08	37.07	2.25
Main	4135	5-yr SBCFCD	990.00	2772.65	2774.51	2775.75	2778.79	0.009570	16.89	60.89	35.57	2.18
Main	4135	2-yr SBCFCD	610.00	2772.65	2774.05	2774.92	2777.01	0.009603	14.00	44.86	34.19	2.09
Main	3969.6	100-yr SBCFCD	3380.00	2771.00	2774.83	2777.51	2784.20	0.010134	24.57	137.57	41.83	2.39
Main	3969.6	100-yr FIS	2700.00	2771.00	2774.26	2776.67	2782.93	0.011260	23.63	114.25	40.08	2.47
Main	3969.6	50-yr FIS	1500.00	2771.00	2773.31	2774.96	2779.11	0.011223	19.32	77.64	37.17	2.36
Main	3969.6	10-yr FIS	200.00	2771.00	2771.71	2772.09	2772.97	0.010357	9.00	22.22	32.24	1.91
Main	3969.6	10-yr SBCFCD	1600.00	2771.00	2773.49	2775.12	2779.10	0.009971	19.01	84.18	37.70	2.24
Main	3969.6	5-yr SBCFCD	1070.00	2771.00	2772.97	2774.20	2777.16	0.009813	16.43	65.14	36.12	2.16
Main	3969.6	2-yr SBCFCD	650.00	2771.00	2772.47	2773.33	2775.39	0.009802	13.73	47.34	34.57	2.07
Main	3835	100-yr SBCFCD	3380.00	2769.77	2773.79	2776.48	2782.96	0.007585	25.18	144.97	42.07	2.21
Main	3835	100-yr FIS	2700.00	2769.77	2773.21	2775.59	2781.51	0.008377	23.85	121.07	40.33	2.27
Main	3835	50-yr FIS	1500.00	2769.77	2772.21	2773.80	2777.69	0.008636	19.23	81.96	37.31	2.17
Main	3835	10-yr FIS	200.00	2769.77	2770.52	2770.87	2771.68	0.008525	8.71	23.34	32.25	1.77
Main	3835	10-yr SBCFCD	1600.00	2769.77	2772.35	2773.97	2777.86	0.008057	19.29	87.34	37.74	2.12
Main	3835	5-yr SBCFCD	1070.00	2769.77	2771.80	2773.03	2775.94	0.008272	16.65	66.99	36.08	2.06
Main	3835	2-yr SBCFCD	650.00	2769.77	2771.28	2772.13	2774.16	0.008465	13.81	48.56	34.52	1.98
Main	3695.2	100-yr SBCFCD	3380.00	2769.30	2771.54	2773.67	2780.07	0.116471	23.45	144.17	68.99	2.86
Main	3695.2	100-yr FIS	2700.00	2769.30	2771.30	2773.09	2778.23	0.108908	21.13	127.76	68.02	2.72
Main	3695.2	50-yr FIS	1500.00	2769.30	2770.87	2771.90	2774.42	0.075153	15.11	99.24	66.32	2.18
Main	3695.2	10-yr FIS	200.00	2769.30	2770.00	2770.00	2770.34	0.020488	4.68	42.71	62.80	1.00
Main	3695.2	10-yr SBCFCD	1600.00	2769.30	2770.90	2772.01	2774.77	0.079992	15.79	101.33	66.44	2.25
Main	3695.2	5-yr SBCFCD	1070.00	2769.30	2770.71	2771.39	2772.98	0.055123	12.08	88.54	65.67	1.83
Main	3695.2	2-yr SBCFCD	650.00	2769.30	2770.57	2770.81	2771.61	0.028889	8.19	79.40	65.10	1.31
Main	3680.9	100-yr SBCFCD	3380.00	2764.50	2766.46	2768.87	2777.74	0.181510	26.96	125.39	68.02	3.50
Main	3680.9	100-yr FIS	2700.00	2764.50	2766.20	2768.29	2775.95	0.187516	25.05	107.76	66.95	3.48
Main	3680.9	50-yr FIS	1500.00	2764.50	2765.65	2767.10	2772.41	0.212122	20.86	71.91	64.72	3.49
Main	3680.9	10-yr FIS	200.00	2764.50	2766.35	2765.20	2766.39	0.000777	1.70	117.70	67.55	0.23
Main	3680.9	10-yr SBCFCD	1600.00	2764.50	2765.71	2767.21	2772.72	0.208028	21.25	75.29	64.93	3.48
Main	3680.9	5-yr SBCFCD	1070.00	2764.50	2765.40	2766.59	2771.17	0.249662	19.28	55.51	63.67	3.64
Main	3680.9	2-yr SBCFCD	650.00	2764.50	2767.66	2766.01	2767.81	0.001329	3.09	210.19	72.94	0.32
Main	3488.2	100-yr SBCFCD	3380.00	2764.90	2769.27	2769.27	2771.23	0.011897	11.23	301.11	77.74	1.01
Main	3488.2	100-yr FIS	2700.00	2764.90	2768.69	2768.69	2770.41	0.012383	10.53	256.53	75.38	1.01
Main	3488.2	50-yr FIS	1500.00	2764.90	2767.50	2767.50	2768.71	0.013770	8.84	169.65	70.55	1.00
Main	3488.2	10-yr FIS	200.00	2764.90	2765.59	2765.59	2765.94	0.021046	4.72	42.36	62.80	1.01
Main	3488.2	10-yr SBCFCD	1600.00	2764.90	2767.61	2767.61	2768.87	0.013610	9.02	177.46	70.99	1.00
Main	3488.2	5-yr SBCFCD	1070.00	2764.90	2766.99	2766.99	2767.98	0.014753	7.99	133.92	68.46	1.01
Main	3488.2	2-yr SBCFCD	650.00	2764.90	2766.41	2766.41	2767.13	0.016087	6.82	95.29	66.13	1.00
Main	3473.9	100-yr SBCFCD	3380.00	2760.10	2762.42	2764.47	2770.26	0.102102	22.47	150.44	69.51	2.69
Main	3473.9	100-yr FIS	2700.00	2760.10	2762.03	2763.89	2769.44	0.121027	21.83	123.67	67.91	2.85
Main	3473.9	50-yr FIS	1500.00	2760.10	2761.28	2762.70	2767.70	0.195415	20.34	73.76	64.84	3.36
Main	3473.9	10-yr FIS	200.00	2760.10	2761.94	2760.80	2761.99	0.000781	1.70	117.52	67.54	0.23
Main	3473.9	10-yr SBCFCD	1600.00	2760.10	2761.35	2762.81	2767.87	0.185093	20.49	78.07	65.11	3.30

Main	3473.9	5-yr SBCFCD	1070.00	2760.10	2760.99	2762.19	2766.93	0.261852	19.56	54.70	63.62	3.72
Main	3473.9	2-yr SBCFCD	650.00	2760.10	2760.67	2761.61	2766.04	0.416448	18.58	34.98	62.34	4.37
Main	3281.2	100-yr SBCFCD	3380.00	2760.50	2764.87	2764.88	2766.83	0.011906	11.24	300.82	77.58	1.01
Main	3281.2	100-yr FIS	2700.00	2760.50	2764.29	2764.29	2766.01	0.012399	10.54	256.26	75.24	1.01
Main	3281.2	50-yr FIS	1500.00	2760.50	2763.10	2763.10	2764.32	0.013826	8.86	169.35	70.44	1.01
Main	3281.2	10-yr FIS	200.00	2760.50	2761.20	2761.20	2761.54	0.020536	4.69	42.68	62.79	1.00
Main	3281.2	10-yr SBCFCD	1600.00	2760.50	2763.21	2763.21	2764.47	0.013614	9.02	177.36	70.89	1.01
Main	3281.2	5-yr SBCFCD	1070.00	2760.50	2762.59	2762.59	2763.58	0.014687	7.98	134.05	68.39	1.00
Main	3281.2	2-yr SBCFCD	650.00	2760.50	2762.01	2762.01	2762.73	0.016182	6.84	95.09	66.06	1.00
Main	3261.9	100-yr SBCFCD	3380.00	2754.10	2761.97	2758.49	2762.47	0.001546	5.67	596.39	91.63	0.39
Main	3261.9	100-yr FIS	2700.00	2754.10	2761.17	2757.90	2761.58	0.001437	5.15	524.64	88.42	0.37
Main	3261.9	50-yr FIS	1500.00	2754.10	2759.46	2756.69	2759.70	0.001162	3.95	379.48	81.55	0.32
Main	3261.9	10-yr FIS	200.00	2754.10	2756.31	2754.78	2756.34	0.000427	1.41	142.04	68.86	0.17
Main	3261.9	10-yr SBCFCD	1600.00	2754.10	2759.63	2756.83	2759.88	0.001191	4.07	392.93	82.21	0.33
Main	3261.9	5-yr SBCFCD	1070.00	2754.10	2758.69	2756.20	2758.86	0.001013	3.37	317.49	78.44	0.30
Main	3261.9	2-yr SBCFCD	650.00	2754.10	2757.76	2755.61	2757.87	0.000811	2.64	246.41	74.71	0.26
Main	2906.2	100-yr SBCFCD	3380.00	2754.80	2759.17	2759.17	2761.13	0.011887	11.23	301.07	77.65	1.00
Main	2906.2	100-yr FIS	2700.00	2754.80	2758.59	2758.59	2760.31	0.012395	10.53	256.35	75.29	1.01
Main	2906.2	50-yr FIS	1500.00	2754.80	2757.40	2757.40	2758.61	0.013777	8.85	169.58	70.49	1.01
Main	2906.2	10-yr FIS	200.00	2754.80	2755.50	2755.50	2755.84	0.020534	4.69	42.68	62.81	1.00
Main	2906.2	10-yr SBCFCD	1600.00	2754.80	2757.51	2757.51	2758.77	0.013622	9.02	177.37	70.93	1.01
Main	2906.2	5-yr SBCFCD	1070.00	2754.80	2756.89	2756.89	2757.88	0.014741	7.99	133.92	68.42	1.01
Main	2906.2	2-yr SBCFCD	650.00	2754.80	2756.31	2756.31	2757.03	0.016153	6.83	95.15	66.09	1.00
Main	2894.8	100-yr SBCFCD	3380.00	2751.10	2753.59	2755.47	2760.36	0.081038	20.89	161.81	70.04	2.42
Main	2894.8	100-yr FIS	2700.00	2751.10	2753.18	2754.89	2759.54	0.095057	20.24	133.39	68.39	2.55
Main	2894.8	50-yr FIS	1500.00	2751.10	2755.76	2753.70	2756.10	0.001882	4.64	323.49	78.81	0.40
Main	2894.8	10-yr FIS	200.00	2751.10	2752.89	2751.80	2752.94	0.000865	1.76	113.74	67.22	0.24
Main	2894.8	10-yr SBCFCD	1600.00	2751.10	2755.91	2753.81	2756.27	0.001918	4.77	335.49	79.42	0.41
Main	2894.8	5-yr SBCFCD	1070.00	2751.10	2755.05	2753.19	2755.30	0.001688	3.98	268.56	75.95	0.37
Main	2894.8	2-yr SBCFCD	650.00	2751.10	2754.20	2752.61	2754.36	0.001420	3.16	205.58	72.52	0.33
Main	2697.2	100-yr SBCFCD	3380.00	2751.40	2755.77	2755.77	2757.73	0.011923	11.23	300.91	77.74	1.01
Main	2697.2	100-yr FIS	2700.00	2751.40	2755.19	2755.19	2756.91	0.012385	10.53	256.53	75.39	1.01
Main	2697.2	50-yr FIS	1500.00	2751.40	2754.00	2754.00	2755.21	0.013778	8.84	169.63	70.55	1.01
Main	2697.2	10-yr FIS	200.00	2751.40	2752.10	2752.10	2752.44	0.020459	4.68	42.73	62.83	1.00
Main	2697.2	10-yr SBCFCD	1600.00	2751.40	2754.11	2754.11	2755.37	0.013651	9.02	177.30	70.99	1.01
Main	2697.2	5-yr SBCFCD	1070.00	2751.40	2753.49	2753.49	2754.48	0.014705	7.98	134.06	68.47	1.01
Main	2697.2	2-yr SBCFCD	650.00	2751.40	2752.91	2752.91	2753.63	0.016183	6.83	95.12	66.13	1.00
Main	2679	100-yr SBCFCD	3380.00	2745.30	2747.49	2749.70	2756.52	0.125770	24.12	140.14	68.00	2.96
Main	2679	100-yr FIS	2700.00	2745.30	2747.12	2749.11	2755.68	0.150648	23.49	114.96	66.63	3.15
Main	2679	50-yr FIS	1500.00	2745.30	2746.40	2747.91	2753.92	0.249927	22.00	68.17	64.02	3.76
Main	2679	10-yr FIS	200.00	2745.30	2747.36	2746.00	2747.40	0.000539	1.52	131.52	67.53	0.19
Main	2679	10-yr SBCFCD	1600.00	2745.30	2746.46	2748.02	2754.09	0.235983	22.16	72.21	64.25	3.68
Main	2679	5-yr SBCFCD	1070.00	2745.30	2749.65	2747.39	2749.85	0.001233	3.62	295.55	75.89	0.32
Main	2679	2-yr SBCFCD	650.00	2745.30	2748.76	2746.81	2748.88	0.000996	2.84	229.16	72.62	0.28
Main	2410.8	100-yr SBCFCD	3380.00	2745.90	2750.27	2750.28	2752.23	0.011922	11.24	300.69	77.57	1.01
Main	2410.8	100-yr FIS	2700.00	2745.90	2749.69	2749.70	2751.41	0.012402	10.54	256.24	75.23	1.01
Main	2410.8	50-yr FIS	1500.00	2745.90	2748.50	2748.50	2749.72	0.013800	8.85	169.46	70.44	1.01
Main	2410.8	10-yr FIS	200.00	2745.90	2746.60	2746.60	2746.94	0.020536	4.69	42.68	62.79	1.00
Main	2410.8	10-yr SBCFCD	1600.00	2745.90	2748.61	2748.61	2749.87	0.013656	9.03	177.19	70.88	1.01
Main	2410.8	5-yr SBCFCD	1070.00	2745.90	2747.99	2747.99	2748.98	0.014769	8.00	133.82	68.38	1.01

Main	2410.8	2-yr SBCFCD	650.00	2745.90	2747.41	2747.41	2748.13	0.016182	6.84	95.09	66.06	1.00
Main	2395.1	100-yr SBCFCD	3380.00	2740.60	2742.86	2744.97	2751.17	0.111709	23.13	146.11	69.14	2.80
Main	2395.1	100-yr FIS	2700.00	2740.60	2742.48	2744.39	2750.35	0.133135	22.51	119.94	67.59	2.98
Main	2395.1	50-yr FIS	1500.00	2740.60	2741.75	2743.20	2748.60	0.216817	21.01	71.40	64.63	3.52
Main	2395.1	10-yr FIS	200.00	2740.60	2742.43	2741.30	2742.48	0.000799	1.72	116.60	67.39	0.23
Main	2395.1	10-yr SBCFCD	1600.00	2740.60	2741.81	2743.31	2748.76	0.204926	21.16	75.62	64.89	3.45
Main	2395.1	5-yr SBCFCD	1070.00	2740.60	2741.46	2742.69	2747.82	0.292636	20.25	52.85	63.46	3.91
Main	2395.1	2-yr SBCFCD	650.00	2740.60	2741.15	2742.11	2746.91	0.467159	19.25	33.77	62.23	4.61
Main	2210.8	100-yr SBCFCD	3380.00	2741.00	2745.37	2745.37	2747.33	0.011909	11.23	301.02	77.75	1.01
Main	2210.8	100-yr FIS	2700.00	2741.00	2744.79	2744.79	2746.51	0.012401	10.53	256.42	75.38	1.01
Main	2210.8	50-yr FIS	1500.00	2741.00	2743.60	2743.60	2744.81	0.013849	8.86	169.35	70.54	1.01
Main	2210.8	10-yr FIS	200.00	2741.00	2741.70	2741.70	2742.04	0.020459	4.68	42.73	62.83	1.00
Main	2210.8	10-yr SBCFCD	1600.00	2741.00	2743.71	2743.71	2744.97	0.013614	9.02	177.46	71.00	1.01
Main	2210.8	5-yr SBCFCD	1070.00	2741.00	2743.09	2743.09	2744.08	0.014752	7.99	133.92	68.47	1.01
Main	2210.8	2-yr SBCFCD	650.00	2741.00	2742.51	2742.51	2743.23	0.016183	6.83	95.12	66.13	1.00
Main	2198.3	100-yr SBCFCD	3380.00	2736.80	2744.49	2741.18	2745.02	0.001684	5.85	577.75	90.22	0.41
Main	2198.3	100-yr FIS	2700.00	2736.80	2743.60	2740.60	2744.06	0.001654	5.41	499.07	86.73	0.40
Main	2198.3	50-yr FIS	1500.00	2736.80	2741.94	2739.40	2742.21	0.001351	4.16	360.25	80.19	0.35
Main	2198.3	10-yr FIS	200.00	2736.80	2738.88	2737.49	2738.92	0.000520	1.50	133.37	68.18	0.19
Main	2198.3	10-yr SBCFCD	1600.00	2736.80	2742.17	2739.51	2742.45	0.001320	4.22	378.91	81.10	0.34
Main	2198.3	5-yr SBCFCD	1070.00	2736.80	2741.27	2738.89	2741.46	0.001112	3.48	307.31	77.55	0.31
Main	2198.3	2-yr SBCFCD	650.00	2736.80	2740.35	2738.31	2740.46	0.000904	2.74	237.49	73.93	0.27
Main	1910.8	100-yr SBCFCD	3480.00	2737.40	2741.85	2741.85	2743.84	0.011850	11.32	307.36	78.08	1.01
Main	1910.8	100-yr FIS	2700.00	2737.40	2741.19	2741.19	2742.91	0.012406	10.53	256.38	75.38	1.01
Main	1910.8	50-yr FIS	1500.00	2737.40	2740.00	2740.00	2741.21	0.013778	8.84	169.63	70.55	1.01
Main	1910.8	10-yr FIS	200.00	2737.40	2738.09	2738.09	2738.44	0.020750	4.70	42.55	62.81	1.01
Main	1910.8	10-yr SBCFCD	1650.00	2737.40	2740.16	2740.16	2741.45	0.013579	9.11	181.14	71.21	1.01
Main	1910.8	5-yr SBCFCD	1120.00	2737.40	2739.55	2739.55	2740.57	0.014563	8.09	138.41	68.73	1.00
Main	1910.8	2-yr SBCFCD	680.00	2737.40	2738.95	2738.95	2739.70	0.016150	6.95	97.90	66.30	1.01
Main	1901.8	100-yr SBCFCD	3480.00	2734.10	2736.71	2738.56	2743.18	0.072929	20.41	170.53	70.60	2.31
Main	1901.8	100-yr FIS	2700.00	2734.10	2740.33	2737.89	2740.88	0.002230	5.97	452.59	85.28	0.46
Main	1901.8	50-yr FIS	1500.00	2734.10	2738.88	2736.70	2739.20	0.001724	4.50	333.20	79.40	0.39
Main	1901.8	10-yr FIS	200.00	2734.10	2735.95	2734.79	2736.00	0.000771	1.70	117.95	67.51	0.23
Main	1901.8	10-yr SBCFCD	1650.00	2734.10	2739.10	2736.87	2739.44	0.001786	4.70	350.78	80.29	0.40
Main	1901.8	5-yr SBCFCD	1120.00	2734.10	2738.27	2736.25	2738.51	0.001536	3.92	285.50	76.92	0.36
Main	1901.8	2-yr SBCFCD	680.00	2734.10	2737.40	2735.65	2737.55	0.001261	3.09	219.96	73.38	0.31
Main	1439.8	100-yr SBCFCD	3480.00	2734.00	2738.11	2738.11	2739.79	0.007829	10.50	349.09	118.01	0.95
Main	1439.8	100-yr FIS	2700.00	2734.00	2737.55	2737.55	2739.00	0.008326	9.72	285.66	108.57	0.96
Main	1439.8	50-yr FIS	1500.00	2734.00	2736.42	2736.42	2737.51	0.010508	8.38	179.04	83.28	1.01
Main	1439.8	10-yr FIS	200.00	2734.00	2734.71	2734.70	2735.02	0.014885	4.47	44.77	70.14	0.99
Main	1439.8	10-yr SBCFCD	1650.00	2734.00	2736.57	2736.57	2737.72	0.010305	8.62	191.31	83.88	1.01
Main	1439.8	5-yr SBCFCD	1120.00	2734.00	2736.02	2736.02	2736.93	0.011160	7.66	146.26	81.65	1.01
Main	1439.8	2-yr SBCFCD	680.00	2734.00	2735.49	2735.49	2736.16	0.012313	6.56	103.63	78.75	1.01
Main	957.5	100-yr SBCFCD	3480.00	2727.00	2729.24	2730.35	2732.61	0.035728	14.73	237.82	134.19	1.85
Main	957.5	100-yr FIS	2700.00	2727.00	2728.98	2729.88	2731.68	0.034100	13.20	204.49	117.61	1.76
Main	957.5	50-yr FIS	1500.00	2727.00	2728.54	2728.95	2730.01	0.025136	9.74	154.03	111.30	1.46
Main	957.5	10-yr FIS	200.00	2727.00	2727.55	2727.53	2727.79	0.015007	3.94	50.80	97.13	0.96
Main	957.5	10-yr SBCFCD	1650.00	2727.00	2728.61	2729.06	2730.21	0.025875	10.17	162.30	112.36	1.49
Main	957.5	5-yr SBCFCD	1120.00	2727.00	2728.33	2728.61	2729.46	0.022914	8.52	131.48	108.37	1.36
Main	957.5	2-yr SBCFCD	680.00	2727.00	2728.04	2728.18	2728.75	0.019623	6.77	100.49	104.19	1.21

Profile Output Table - Standard Table 2

Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Main	12028.1	100-yr SBCFCD	2865.94	2865.92	0.02	0.02	0.57		1730.00		240.86
Main	12028.1	100-yr FIS	2862.93	2862.92	0.01	0.02	0.37		700.00		235.42
Main	12028.1	50-yr FIS	2862.12	2862.11	0.01	0.02	0.31		500.00		233.95
Main	12028.1	10-yr FIS	2859.79	2859.79	0.00	0.07	0.12		100.00		229.74
Main	12028.1	10-yr SBCFCD	2863.33	2863.32	0.01	0.02	0.40		810.00		236.14
Main	12028.1	5-yr SBCFCD	2862.33	2862.33	0.01	0.02	0.32		550.00		234.34
Main	12028.1	2-yr SBCFCD	2861.35	2861.34	0.01	0.02	0.25		340.00		232.55
Main	11915	100-yr SBCFCD	2865.35	2863.42	1.93	0.64	0.00		1730.00		40.62
Main	11915	100-yr FIS	2862.55	2861.31	1.23	0.72	0.00		700.00		32.13
Main	11915	50-yr FIS	2861.79	2860.75	1.04	0.77	0.00		500.00		29.88
Main	11915	10-yr FIS	2859.60	2859.19	0.41	1.01	0.00		100.00		23.58
Main	11915	10-yr SBCFCD	2862.92	2861.58	1.33	0.71	0.00		810.00		33.23
Main	11915	5-yr SBCFCD	2861.99	2860.90	1.09	0.75	0.00		550.00		30.48
Main	11915	2-yr SBCFCD	2861.07	2860.23	0.84	0.81	0.00		340.00		27.79
Main	11864	100-yr SBCFCD	2864.27	2860.79	3.48	0.92	0.15		1730.00		36.49
Main	11864	100-yr FIS	2861.34	2859.02	2.32	1.09	0.11		700.00		29.34
Main	11864	50-yr FIS	2860.54	2858.57	1.97	1.16	0.09		500.00		27.53
Main	11864	10-yr FIS	2858.10	2857.39	0.71	1.47	0.03		100.00		22.79
Main	11864	10-yr SBCFCD	2861.74	2859.25	2.49	1.06	0.12		810.00		30.26
Main	11864	5-yr SBCFCD	2860.75	2858.69	2.06	1.14	0.10		550.00		28.01
Main	11864	2-yr SBCFCD	2859.76	2858.16	1.59	1.24	0.08		340.00		25.89
Main	11841	100-yr SBCFCD	2860.04	2859.66	0.38	0.07	0.00		1730.00		56.65
Main	11841	100-yr FIS	2858.38	2858.29	0.10	0.02	0.00		700.00		51.14
Main	11841	50-yr FIS	2856.75	2856.66	0.10	0.03	0.00		500.00		44.62
Main	11841	10-yr FIS	2854.14	2854.12	0.02	0.01	0.00		100.00		34.48
Main	11841	10-yr SBCFCD	2857.62	2857.44	0.18	0.04	0.00		810.00		47.74
Main	11841	5-yr SBCFCD	2856.66	2856.54	0.13	0.03	0.00		550.00		44.15
Main	11841	2-yr SBCFCD	2855.71	2855.64	0.07	0.02	0.00		340.00		40.54
Main	11792	100-yr SBCFCD	2859.97	2859.56	0.41	0.01	0.07		1730.00		54.44
Main	11792	100-yr FIS	2858.36	2858.26	0.10	0.00	0.01		700.00		49.49
Main	11792	50-yr FIS	2856.73	2856.62	0.10	0.00	0.02		500.00		43.28
Main	11792	10-yr FIS	2854.13	2854.11	0.02	0.00	0.01		100.00		33.73
Main	11792	10-yr SBCFCD	2857.58	2857.38	0.20	0.01	0.04		810.00		46.15
Main	11792	5-yr SBCFCD	2856.63	2856.50	0.13	0.01	0.04		550.00		42.79
Main	11792	2-yr SBCFCD	2855.69	2855.61	0.08	0.00	0.03		340.00		39.41
Main	11788	100-yr SBCFCD	2859.89	2858.78	1.10	0.02	0.00		1730.00		45.32
Main	11788	100-yr FIS	2858.35	2858.10	0.25	0.00	0.00		700.00		42.55
Main	11788	50-yr FIS	2856.70	2856.36	0.34	0.01	0.00		500.00		35.56
Main	11788	10-yr FIS	2854.12	2853.98	0.13	0.01	0.00		100.00		25.97
Main	11788	10-yr SBCFCD	2857.52	2856.89	0.64	0.01	0.00		810.00		37.67
Main	11788	5-yr SBCFCD	2856.59	2856.10	0.49	0.01	0.00		550.00		34.50

Main	11788	2-yr SBCFCD	2855.65	2855.31	0.35	0.01	0.00	340.00	31.31
Main	11785	100-yr SBCFCD	2859.87	2858.76	1.12	0.70	0.02	1730.00	45.21
Main	11785	100-yr FIS	2858.34	2858.09	0.25	0.13	0.01	700.00	42.53
Main	11785	50-yr FIS	2856.69	2856.35	0.34	0.27	0.02	500.00	35.52
Main	11785	10-yr FIS	2854.10	2853.97	0.14	0.77	0.03	100.00	25.91
Main	11785	10-yr SBCFCD	2857.51	2856.86	0.65	0.84	0.07	810.00	37.57
Main	11785	5-yr SBCFCD	2856.57	2856.08	0.50	0.83	0.06	550.00	34.41
Main	11785	2-yr SBCFCD	2855.64	2855.29	0.35	0.82	0.05	340.00	31.23
Main	11663.9	100-yr SBCFCD	2859.15	2857.79	1.37	0.07	0.40	1730.00	43.75
Main	11663.9	100-yr FIS	2858.20	2858.00	0.20	0.03	0.05	700.00	44.61
Main	11663.9	50-yr FIS	2856.41	2856.13	0.28	0.04	0.08	500.00	36.94
Main	11663.9	10-yr FIS	2853.30	2852.89	0.41	0.09	0.12	100.00	23.65
Main	11663.9	10-yr SBCFCD	2856.61	2855.28	1.33	0.07	0.39	810.00	33.45
Main	11663.9	5-yr SBCFCD	2855.68	2854.60	1.09	0.07	0.32	550.00	30.66
Main	11663.9	2-yr SBCFCD	2854.77	2853.93	0.84	0.08	0.25	340.00	27.92
Main	11313.9	100-yr SBCFCD	2858.69	2858.66	0.03	0.03	0.20	1960.00	206.44
Main	11313.9	100-yr FIS	2858.11	2858.08	0.03	0.03	0.19	1700.00	204.07
Main	11313.9	50-yr FIS	2856.29	2856.27	0.02	0.03	0.15	1000.00	196.56
Main	11313.9	10-yr FIS	2852.68	2852.68	0.01	0.05	0.05	150.00	181.70
Main	11313.9	10-yr SBCFCD	2856.04	2856.02	0.02	0.03	0.14	920.00	195.55
Main	11313.9	5-yr SBCFCD	2855.01	2855.00	0.01	0.03	0.11	620.00	191.29
Main	11313.9	2-yr SBCFCD	2853.99	2853.98	0.01	0.04	0.09	380.00	187.10
Main	11170	100-yr SBCFCD	2858.45	2856.40	2.06	0.66	0.00	1960.00	41.99
Main	11170	100-yr FIS	2857.89	2855.99	1.90	0.67	0.00	1700.00	40.36
Main	11170	50-yr FIS	2856.11	2854.63	1.48	0.72	0.00	1000.00	34.92
Main	11170	10-yr FIS	2852.58	2852.05	0.53	0.99	0.00	150.00	24.61
Main	11170	10-yr SBCFCD	2855.87	2854.45	1.42	0.74	0.00	920.00	34.20
Main	11170	5-yr SBCFCD	2854.86	2853.70	1.16	0.78	0.00	620.00	31.20
Main	11170	2-yr SBCFCD	2853.87	2852.98	0.89	0.84	0.00	380.00	28.30
Main	11116	100-yr SBCFCD	2857.32	2853.60	3.72	0.96	0.17	1960.00	37.59
Main	11116	100-yr FIS	2856.74	2853.23	3.51	0.99	0.16	1700.00	36.12
Main	11116	50-yr FIS	2854.88	2852.09	2.79	1.09	0.13	1000.00	31.58
Main	11116	10-yr FIS	2851.04	2850.07	0.97	1.50	0.04	150.00	23.50
Main	11116	10-yr SBCFCD	2854.63	2851.95	2.69	1.11	0.13	920.00	30.98
Main	11116	5-yr SBCFCD	2853.56	2851.33	2.22	1.19	0.11	620.00	28.54
Main	11116	2-yr SBCFCD	2852.48	2850.76	1.72	1.30	0.08	380.00	26.24
Main	11083	100-yr SBCFCD	2850.23	2849.84	0.39	0.07	0.00	1960.00	59.37
Main	11083	100-yr FIS	2849.57	2849.22	0.36	0.07	0.00	1700.00	56.86
Main	11083	50-yr FIS	2847.51	2847.27	0.25	0.06	0.00	1000.00	49.07
Main	11083	10-yr FIS	2843.78	2843.75	0.03	0.02	0.00	150.00	35.00
Main	11083	10-yr SBCFCD	2847.24	2847.01	0.23	0.06	0.00	920.00	48.05
Main	11083	5-yr SBCFCD	2846.15	2845.99	0.16	0.05	0.00	620.00	43.95
Main	11083	2-yr SBCFCD	2845.13	2845.03	0.10	0.03	0.00	380.00	40.11
Main	11031	100-yr SBCFCD	2850.17	2849.77	0.40	0.01	0.06	1960.00	59.06
Main	11031	100-yr FIS	2849.51	2849.14	0.37	0.01	0.06	1700.00	56.56
Main	11031	50-yr FIS	2847.46	2847.20	0.25	0.01	0.07	1000.00	48.81

Main	11031	10-yr FIS	2843.77	2843.73	0.03	0.00	0.03	150.00	34.93
Main	11031	10-yr SBCFCD	2847.19	2846.95	0.24	0.01	0.07	920.00	47.80
Main	11031	5-yr SBCFCD	2846.10	2845.94	0.17	0.01	0.07	620.00	43.75
Main	11031	2-yr SBCFCD	2845.09	2844.99	0.10	0.01	0.05	380.00	39.96
Main	11027	100-yr SBCFCD	2850.09	2849.07	1.02	0.01	0.00	1960.00	48.28
Main	11027	100-yr FIS	2849.43	2848.43	1.01	0.01	0.00	1700.00	45.71
Main	11027	50-yr FIS	2847.38	2846.42	0.96	0.02	0.01	1000.00	37.67
Main	11027	10-yr FIS	2843.73	2843.37	0.36	0.03	0.02	150.00	25.48
Main	11027	10-yr SBCFCD	2847.10	2846.15	0.95	0.02	0.01	920.00	36.62
Main	11027	5-yr SBCFCD	2846.03	2845.17	0.86	0.03	0.02	620.00	32.67
Main	11027	2-yr SBCFCD	2845.03	2844.39	0.64	0.03	0.03	380.00	29.57
Main	11024	100-yr SBCFCD	2850.08	2849.01	1.06	0.03	0.29	1960.00	47.50
Main	11024	100-yr FIS	2849.42	2848.37	1.05	0.03	0.29	1700.00	44.97
Main	11024	50-yr FIS	2847.35	2846.34	1.01	0.03	0.29	1000.00	37.02
Main	11024	10-yr FIS	2843.68	2843.16	0.53	0.02	0.16	150.00	24.53
Main	11024	10-yr SBCFCD	2847.08	2846.07	1.01	0.03	0.29	920.00	35.96
Main	11024	5-yr SBCFCD	2845.97	2844.87	1.10	0.02	0.32	620.00	31.27
Main	11024	2-yr SBCFCD	2844.97	2844.07	0.90	0.02	0.26	380.00	28.13
Main	10720.4	100-yr SBCFCD	2849.75	2849.67	0.08			1960.00	98.00
Main	10720.4	100-yr FIS	2849.09	2849.02	0.07			1700.00	98.00
Main	10720.4	50-yr FIS	2847.04	2846.99	0.05			1000.00	98.00
Main	10720.4	10-yr FIS	2843.04	2843.03	0.01			150.00	98.00
Main	10720.4	10-yr SBCFCD	2846.77	2846.72	0.04			920.00	98.00
Main	10720.4	5-yr SBCFCD	2845.62	2845.59	0.03			620.00	98.00
Main	10720.4	2-yr SBCFCD	2844.50	2844.48	0.02			380.00	98.00
Main	10694.4		Culvert						
Main	10659.4	100-yr SBCFCD	2848.98	2848.81	0.18	0.05	0.51	1960.00	88.25
Main	10659.4	100-yr FIS	2848.43	2848.27	0.16	0.05	0.48	1700.00	86.31
Main	10659.4	50-yr FIS	2846.65	2846.54	0.10	0.04	0.38	1000.00	80.06
Main	10659.4	10-yr FIS	2842.96	2842.94	0.02	0.04	0.15	150.00	67.01
Main	10659.4	10-yr SBCFCD	2846.41	2846.31	0.10	0.04	0.37	920.00	79.21
Main	10659.4	5-yr SBCFCD	2845.38	2845.31	0.07	0.04	0.31	620.00	75.58
Main	10659.4	2-yr SBCFCD	2844.34	2844.30	0.05	0.04	0.25	380.00	71.93
Main	10614.1	100-yr SBCFCD	2848.42	2846.53	1.89	0.00	0.05	1960.00	46.85
Main	10614.1	100-yr FIS	2847.90	2846.13	1.77	0.00	0.06	1700.00	44.73
Main	10614.1	50-yr FIS	2846.22	2844.85	1.37	0.00	0.05	1000.00	37.88
Main	10614.1	10-yr FIS	2842.77	2842.25	0.53	0.00	0.00	150.00	24.03
Main	10614.1	10-yr SBCFCD	2845.99	2844.66	1.33	0.00	0.03	920.00	36.90
Main	10614.1	5-yr SBCFCD	2845.03	2843.93	1.10	0.00	0.03	620.00	32.98
Main	10614.1	2-yr SBCFCD	2844.06	2843.19	0.87	0.00	0.02	380.00	29.04
Main	10613.9	100-yr SBCFCD	2847.99	2841.80	6.19	0.00	0.43	2590.00	36.65
Main	10613.9	100-yr FIS	2847.54	2842.24	5.30	0.00	0.35	2700.00	38.40
Main	10613.9	50-yr FIS	2845.81	2840.32	5.49	0.00	0.41	1500.00	30.70
Main	10613.9	10-yr FIS	2842.34	2837.62	4.73	0.01	0.42	200.00	19.87
Main	10613.9	10-yr SBCFCD	2845.54	2839.76	5.79	0.00	0.45	1220.00	28.45
Main	10613.9	5-yr SBCFCD	2844.57	2839.02	5.55	0.01	0.44	820.00	25.51

Main	10613.9	2-yr SBCFCD	2843.61	2838.35	5.26	0.01	0.44	500.00	22.82
Main	10213.9	100-yr SBCFCD	2841.61	2841.19	0.42	1.17	0.11	2590.00	120.38
Main	10213.9	100-yr FIS	2841.73	2841.30	0.43	1.16	0.11	2700.00	120.85
Main	10213.9	50-yr FIS	2840.23	2839.95	0.28	1.21	0.08	1500.00	115.29
Main	10213.9	10-yr FIS	2837.77	2837.71	0.06	1.24	0.02	200.00	106.13
Main	10213.9	10-yr SBCFCD	2839.81	2839.57	0.24	1.22	0.07	1220.00	113.77
Main	10213.9	5-yr SBCFCD	2839.15	2838.98	0.18	1.23	0.06	820.00	111.33
Main	10213.9	2-yr SBCFCD	2838.52	2838.40	0.12	1.25	0.04	500.00	108.98
Main	9863.9	100-yr SBCFCD	2840.33	2838.83	1.51	0.00	0.42	2590.00	88.10
Main	9863.9	100-yr FIS	2840.46	2838.91	1.55	0.00	0.43	2700.00	88.45
Main	9863.9	50-yr FIS	2838.94	2837.86	1.08	0.00	0.29	1500.00	84.17
Main	9863.9	10-yr FIS	2836.50	2836.20	0.30	0.04	0.05	200.00	77.43
Main	9863.9	10-yr SBCFCD	2838.52	2837.57	0.95	0.00	0.26	1220.00	83.02
Main	9863.9	5-yr SBCFCD	2837.86	2837.12	0.74	0.01	0.19	820.00	81.18
Main	9863.9	2-yr SBCFCD	2837.24	2836.70	0.54	0.01	0.13	500.00	79.47
Main	9850	100-yr SBCFCD	2838.55	2838.43	0.12	0.01	0.02	2590.00	139.71
Main	9850	100-yr FIS	2838.79	2838.67	0.12	0.01	0.02	2700.00	140.67
Main	9850	50-yr FIS	2835.96	2835.85	0.10	0.01	0.01	1500.00	129.40
Main	9850	10-yr FIS	2835.46	2831.11	4.35	0.62	0.41	200.00	110.43
Main	9850	10-yr SBCFCD	2835.20	2835.10	0.10	0.01	0.01	1220.00	126.39
Main	9850	5-yr SBCFCD	2834.01	2833.92	0.09	0.02	0.01	820.00	121.66
Main	9850	2-yr SBCFCD	2836.35	2831.25	5.10	0.44	0.46	500.00	111.00
Main	9747	100-yr SBCFCD	2838.53	2838.24	0.29	0.02	0.06	2590.00	80.00
Main	9747	100-yr FIS	2838.76	2838.47	0.29	0.02	0.07	2700.00	80.00
Main	9747	50-yr FIS	2835.93	2835.72	0.22	0.02	0.05	1500.00	80.00
Main	9747	10-yr FIS	2831.64	2831.48	0.16	0.04	0.07	200.00	80.00
Main	9747	10-yr SBCFCD	2835.18	2834.98	0.20	0.02	0.05	1220.00	80.00
Main	9747	5-yr SBCFCD	2833.98	2833.82	0.17	0.02	0.05	820.00	80.00
Main	9747	2-yr SBCFCD	2832.89	2832.74	0.15	0.03	0.05	500.00	80.00
Main	9536.1	100-yr SBCFCD	2838.44	2838.29	0.16			2590.00	98.00
Main	9536.1	100-yr FIS	2838.68	2838.52	0.16			2700.00	98.00
Main	9536.1	50-yr FIS	2835.86	2835.75	0.11			1500.00	98.00
Main	9536.1	10-yr FIS	2831.53	2831.50	0.03			200.00	98.00
Main	9536.1	10-yr SBCFCD	2835.10	2835.01	0.10			1220.00	98.00
Main	9536.1	5-yr SBCFCD	2833.91	2833.84	0.07			820.00	98.00
Main	9536.1	2-yr SBCFCD	2832.81	2832.76	0.05			500.00	98.00
Main	9525.6		Culvert						
Main	9515.2	100-yr SBCFCD	2835.09	2833.99	1.10	0.46	0.14	2620.00	85.94
Main	9515.2	100-yr FIS	2835.19	2834.07	1.12	0.45	0.15	2700.00	86.29
Main	9515.2	50-yr FIS	2833.59	2832.83	0.76	0.48	0.10	1500.00	81.32
Main	9515.2	10-yr FIS	2831.02	2830.85	0.17	0.54	0.04	200.00	73.39
Main	9515.2	10-yr SBCFCD	2833.18	2832.52	0.66	0.49	0.10	1230.00	80.07
Main	9515.2	5-yr SBCFCD	2832.48	2831.98	0.50	0.51	0.08	830.00	77.92
Main	9515.2	2-yr SBCFCD	2831.83	2831.48	0.35	0.52	0.06	510.00	75.92
Main	9313.9	100-yr SBCFCD	2834.50	2832.94	1.56	0.01	0.45	2620.00	82.62

Main	9313.9	100-yr FIS	2834.59	2832.99	1.60	0.01	0.46	2700.00	82.82
Main	9313.9	50-yr FIS	2833.01	2831.90	1.11	0.01	0.32	1500.00	78.66
Main	9313.9	10-yr FIS	2830.44	2830.14	0.31	0.02	0.08	200.00	71.93
Main	9313.9	10-yr SBCFCD	2832.59	2831.59	0.99	0.01	0.28	1230.00	77.49
Main	9313.9	5-yr SBCFCD	2831.89	2831.13	0.76	0.01	0.22	830.00	75.72
Main	9313.9	2-yr SBCFCD	2831.24	2830.68	0.56	0.01	0.16	510.00	74.02
Main	9300	100-yr SBCFCD	2833.79	2833.72	0.07	0.03	0.02	2620.00	162.87
Main	9300	100-yr FIS	2833.95	2833.88	0.07	0.03	0.02	2700.00	163.52
Main	9300	50-yr FIS	2831.26	2831.21	0.05	0.03	0.01	1500.00	152.83
Main	9300	10-yr FIS	2826.78	2826.76	0.02	0.05	0.00	200.00	135.04
Main	9300	10-yr SBCFCD	2830.54	2830.49	0.05	0.03	0.01	1230.00	149.97
Main	9300	5-yr SBCFCD	2829.34	2829.30	0.04	0.04	0.01	830.00	145.21
Main	9300	2-yr SBCFCD	2828.20	2828.17	0.03	0.04	0.01	510.00	140.68
Main	9035.8	100-yr SBCFCD	2833.74	2833.43	0.31			2620.00	70.00
Main	9035.8	100-yr FIS	2833.90	2833.58	0.31			2700.00	70.00
Main	9035.8	50-yr FIS	2831.21	2831.01	0.20			1500.00	70.00
Main	9035.8	10-yr FIS	2826.73	2826.68	0.04			200.00	70.00
Main	9035.8	10-yr SBCFCD	2830.49	2830.32	0.17			1230.00	70.00
Main	9035.8	5-yr SBCFCD	2829.30	2829.17	0.13			830.00	70.00
Main	9035.8	2-yr SBCFCD	2828.16	2828.07	0.09			510.00	70.00
Main	9020.4		Culvert						
Main	9005	100-yr SBCFCD	2832.78	2832.38	0.40	0.04	0.07	2620.00	70.00
Main	9005	100-yr FIS	2832.92	2832.51	0.41	0.04	0.07	2700.00	70.00
Main	9005	50-yr FIS	2830.62	2830.37	0.25	0.04	0.04	1500.00	70.00
Main	9005	10-yr FIS	2826.59	2826.53	0.05	0.04	0.01	200.00	70.00
Main	9005	10-yr SBCFCD	2829.99	2829.78	0.21	0.04	0.03	1230.00	70.00
Main	9005	5-yr SBCFCD	2828.92	2828.77	0.15	0.03	0.02	830.00	70.00
Main	9005	2-yr SBCFCD	2827.89	2827.79	0.11	0.04	0.02	510.00	70.00
Main	8713.9	100-yr SBCFCD	2832.68	2832.41	0.27	0.09	0.19	2620.00	85.00
Main	8713.9	100-yr FIS	2832.81	2832.54	0.28	0.09	0.19	2700.00	85.00
Main	8713.9	50-yr FIS	2830.54	2830.37	0.17	0.08	0.15	1500.00	85.00
Main	8713.9	10-yr FIS	2826.54	2826.50	0.04	0.10	0.05	200.00	85.00
Main	8713.9	10-yr SBCFCD	2829.92	2829.77	0.14	0.08	0.13	1230.00	85.00
Main	8713.9	5-yr SBCFCD	2828.86	2828.76	0.10	0.08	0.11	830.00	85.00
Main	8713.9	2-yr SBCFCD	2827.84	2827.77	0.07	0.08	0.08	510.00	85.00
Main	8470	100-yr SBCFCD	2832.40	2830.24	2.15	0.63	0.00	2620.00	51.77
Main	8470	100-yr FIS	2832.53	2830.33	2.20	0.64	0.00	2700.00	52.10
Main	8470	50-yr FIS	2830.31	2828.68	1.63	0.70	0.00	1500.00	45.52
Main	8470	10-yr FIS	2826.40	2825.88	0.51	1.00	0.00	200.00	34.32
Main	8470	10-yr SBCFCD	2829.70	2828.24	1.46	0.72	0.00	1230.00	43.74
Main	8470	5-yr SBCFCD	2828.67	2827.49	1.18	0.77	0.00	830.00	40.75
Main	8470	2-yr SBCFCD	2827.67	2826.78	0.90	0.83	0.00	510.00	37.91
Main	8416	100-yr SBCFCD	2831.28	2827.39	3.89	0.93	0.17	2620.00	47.17
Main	8416	100-yr FIS	2831.41	2827.48	3.94	0.93	0.17	2700.00	47.50
Main	8416	50-yr FIS	2829.12	2826.08	3.04	1.04	0.14	1500.00	41.92
Main	8416	10-yr FIS	2824.85	2823.92	0.93	1.51	0.04	200.00	33.27

Main	8416	10-yr SBCFCD	2828.48	2825.72	2.76	1.09	0.13	1230.00	40.47
Main	8416	5-yr SBCFCD	2827.38	2825.12	2.26	1.18	0.11	830.00	38.08
Main	8416	2-yr SBCFCD	2826.30	2824.57	1.73	1.29	0.08	510.00	35.88
Main	8382	100-yr SBCFCD	2828.57	2816.13	12.44	1.85	0.86	2620.00	40.50
Main	8382	100-yr FIS	2828.73	2816.19	12.54	1.83	0.86	2700.00	40.74
Main	8382	50-yr FIS	2821.23	2820.91	0.32	0.06	0.01	1500.00	59.63
Main	8382	10-yr FIS	2817.16	2817.13	0.03	0.01	0.00	200.00	44.51
Main	8382	10-yr SBCFCD	2820.60	2820.33	0.26	0.06	0.01	1230.00	57.33
Main	8382	5-yr SBCFCD	2819.53	2819.35	0.18	0.05	0.00	830.00	53.41
Main	8382	2-yr SBCFCD	2818.50	2818.39	0.11	0.03	0.00	510.00	49.55
Main	8330	100-yr SBCFCD	2823.28	2822.83	0.45	0.01	0.17	2620.00	74.79
Main	8330	100-yr FIS	2823.41	2822.96	0.46	0.01	0.17	2700.00	75.38
Main	8330	50-yr FIS	2821.15	2820.87	0.28	0.01	0.13	1500.00	65.37
Main	8330	10-yr FIS	2817.15	2817.12	0.03	0.00	0.05	200.00	47.35
Main	8330	10-yr SBCFCD	2820.53	2820.30	0.24	0.01	0.12	1230.00	62.62
Main	8330	5-yr SBCFCD	2819.48	2819.32	0.16	0.01	0.10	830.00	57.93
Main	8330	2-yr SBCFCD	2818.46	2818.36	0.10	0.01	0.08	510.00	53.33
Main	8326	100-yr SBCFCD	2823.10	2820.94	2.16	0.01	0.54	2620.00	51.76
Main	8326	100-yr FIS	2823.23	2821.03	2.20	0.01	0.55	2700.00	52.11
Main	8326	50-yr FIS	2821.01	2819.38	1.63	0.01	0.41	1500.00	45.52
Main	8326	10-yr FIS	2817.10	2816.58	0.51	0.01	0.14	200.00	34.32
Main	8326	10-yr SBCFCD	2820.40	2818.94	1.46	0.01	0.38	1230.00	43.74
Main	8326	5-yr SBCFCD	2819.37	2818.19	1.18	0.01	0.31	830.00	40.76
Main	8326	2-yr SBCFCD	2818.37	2817.48	0.89	0.01	0.23	510.00	37.92
Main	8323	100-yr SBCFCD	2822.14	2821.78	0.36	0.48	0.15	2620.00	99.22
Main	8323	100-yr FIS	2822.25	2821.89	0.37	0.48	0.16	2700.00	99.65
Main	8323	50-yr FIS	2820.28	2820.04	0.25	0.48	0.12	1500.00	92.24
Main	8323	10-yr FIS	2816.89	2816.84	0.06	0.52	0.03	200.00	79.36
Main	8323	10-yr SBCFCD	2819.75	2819.54	0.21	0.49	0.10	1230.00	90.22
Main	8323	5-yr SBCFCD	2818.86	2818.69	0.16	0.50	0.09	830.00	86.83
Main	8323	2-yr SBCFCD	2818.00	2817.88	0.11	0.52	0.06	510.00	83.57
Main	8113.9	100-yr SBCFCD	2821.51	2819.61	1.90	0.13	0.51	2620.00	62.81
Main	8113.9	100-yr FIS	2821.62	2819.69	1.93	0.12	0.52	2700.00	63.23
Main	8113.9	50-yr FIS	2819.68	2818.27	1.41	0.39	0.33	1500.00	56.20
Main	8113.9	10-yr FIS	2816.35	2816.00	0.34	1.66	0.04	200.00	44.97
Main	8113.9	10-yr SBCFCD	2819.16	2817.89	1.26	0.78	0.24	1230.00	54.32
Main	8113.9	5-yr SBCFCD	2818.27	2817.25	1.02	1.40	0.14	830.00	51.14
Main	8113.9	2-yr SBCFCD	2817.41	2816.65	0.76	1.55	0.11	510.00	48.18
Main	7800	100-yr SBCFCD	2819.50	2819.29	0.21	0.00	0.00	2620.00	145.17
Main	7800	100-yr FIS	2819.68	2819.47	0.21	0.00	0.00	2700.00	145.90
Main	7800	50-yr FIS	2816.91	2816.60	0.31	0.01	0.04	1500.00	134.39
Main	7800	10-yr FIS	2814.65	2814.43	0.22	0.02	0.05	200.00	125.72
Main	7800	10-yr SBCFCD	2816.47	2815.01	1.46	2.67	0.02	1230.00	128.03
Main	7800	5-yr SBCFCD	2815.79	2814.85	0.94	2.46	0.02	830.00	127.39
Main	7800	2-yr SBCFCD	2815.23	2814.69	0.53	2.12	0.07	510.00	126.77
Main	7761.1	100-yr SBCFCD	2819.50	2819.29	0.21			2620.00	103.16

Main	7761.1	100-yr FIS	2819.68	2819.47	0.21			2700.00	103.87
Main	7761.1	50-yr FIS	2816.86	2816.69	0.16			1500.00	92.78
Main	7761.1	10-yr FIS	2812.53	2812.48	0.05			200.00	75.91
Main	7761.1	10-yr SBCFCD	2816.13	2815.98	0.15			1230.00	89.92
Main	7761.1	5-yr SBCFCD	2814.94	2814.82	0.12			830.00	85.29
Main	7761.1	2-yr SBCFCD	2813.85	2813.76	0.09			510.00	81.03
Main	7749.9		Culvert						
Main	7738.6	100-yr SBCFCD	2817.14	2816.76	0.38	0.10	0.04	2970.00	116.02
Main	7738.6	100-yr FIS	2816.46	2816.04	0.42	0.12	0.05	2700.00	113.15
Main	7738.6	50-yr FIS	2814.04	2813.42	0.63	0.33	0.16	1500.00	102.67
Main	7738.6	10-yr FIS	2811.78	2811.51	0.27	1.79	0.01	200.00	95.03
Main	7738.6	10-yr SBCFCD	2813.86	2813.20	0.66	0.37	0.18	1400.00	101.80
Main	7738.6	5-yr SBCFCD	2813.15	2812.45	0.69	0.62	0.20	930.00	98.80
Main	7738.6	2-yr SBCFCD	2812.56	2812.04	0.52	0.93	0.10	570.00	97.15
Main	7456.8	100-yr SBCFCD	2817.00	2816.69	0.31	0.02	0.06	2970.00	102.62
Main	7456.8	100-yr FIS	2816.28	2815.96	0.32	0.02	0.07	2700.00	99.67
Main	7456.8	50-yr FIS	2813.55	2813.25	0.30	0.02	0.07	1500.00	88.68
Main	7456.8	10-yr FIS	2809.93	2809.60	0.32	1.84	0.02	200.00	73.93
Main	7456.8	10-yr SBCFCD	2813.31	2813.01	0.30	0.02	0.07	1400.00	87.71
Main	7456.8	5-yr SBCFCD	2812.08	2811.78	0.29	0.03	0.07	930.00	82.76
Main	7456.8	2-yr SBCFCD	2811.00	2810.68	0.32	0.03	0.08	570.00	78.29
Main	7267	100-yr SBCFCD	2816.92	2816.83	0.09			2970.00	158.32
Main	7267	100-yr FIS	2816.20	2816.11	0.09			2700.00	155.43
Main	7267	50-yr FIS	2813.46	2813.39	0.07			1500.00	144.55
Main	7267	10-yr FIS	2809.46	2809.44	0.02			200.00	128.75
Main	7267	10-yr SBCFCD	2813.21	2813.15	0.06			1400.00	143.60
Main	7267	5-yr SBCFCD	2811.98	2811.93	0.05			930.00	138.70
Main	7267	2-yr SBCFCD	2810.88	2810.84	0.04			570.00	134.37
Main	7249.1		Culvert						
Main	7231.3	100-yr SBCFCD	2815.11	2814.94	0.17	0.02	0.06	3150.00	150.76
Main	7231.3	100-yr FIS	2814.21	2814.04	0.17	0.02	0.06	2700.00	147.14
Main	7231.3	50-yr FIS	2811.58	2811.40	0.18	0.04	0.07	1500.00	136.58
Main	7231.3	10-yr FIS	2808.65	2808.43	0.22	0.96	0.07	200.00	124.72
Main	7231.3	10-yr SBCFCD	2811.53	2811.35	0.18	0.04	0.07	1480.00	136.39
Main	7231.3	5-yr SBCFCD	2810.31	2810.09	0.21	0.06	0.09	990.00	131.38
Main	7231.3	2-yr SBCFCD	2809.36	2808.97	0.40	0.15	0.18	610.00	126.87
Main	7010.2	100-yr SBCFCD	2815.03	2814.99	0.05	0.01	0.00	3150.00	244.94
Main	7010.2	100-yr FIS	2814.12	2814.08	0.04	0.01	0.00	2700.00	241.31
Main	7010.2	50-yr FIS	2811.47	2811.43	0.04	0.01	0.00	1500.00	230.72
Main	7010.2	10-yr FIS	2807.51	2807.43	0.07	0.04	0.02	200.00	214.73
Main	7010.2	10-yr SBCFCD	2811.42	2811.38	0.04	0.01	0.00	1480.00	230.53
Main	7010.2	5-yr SBCFCD	2810.16	2810.13	0.03	0.02	0.00	990.00	225.50
Main	7010.2	2-yr SBCFCD	2809.03	2809.00	0.03	0.02	0.00	610.00	220.99
Main	6801.5	100-yr SBCFCD	2815.02	2814.93	0.09			3150.00	154.00
Main	6801.5	100-yr FIS	2814.11	2814.03	0.08			2700.00	154.00

Main	6801.5	50-yr FIS	2811.45	2811.39	0.06			1500.00	151.56
Main	6801.5	10-yr FIS	2807.45	2807.43	0.02			200.00	135.74
Main	6801.5	10-yr SBCFCD	2811.40	2811.34	0.06			1480.00	151.37
Main	6801.5	5-yr SBCFCD	2810.14	2810.09	0.05			990.00	146.37
Main	6801.5	2-yr SBCFCD	2809.01	2808.97	0.04			610.00	141.89
Main	6785.6		Culvert						
Main	6769.7	100-yr SBCFCD	2810.93	2809.33	1.60	0.00	0.36	3150.00	96.65
Main	6769.7	100-yr FIS	2810.45	2809.02	1.44	0.00	0.32	2700.00	96.04
Main	6769.7	50-yr FIS	2809.03	2808.05	0.98	0.00	0.04	1500.00	94.10
Main	6769.7	10-yr FIS	2806.80	2806.53	0.27	0.00	0.01	200.00	91.07
Main	6769.7	10-yr SBCFCD	2809.00	2808.03	0.98	0.00	0.04	1480.00	94.06
Main	6769.7	5-yr SBCFCD	2808.31	2807.56	0.75	0.00	0.03	990.00	93.12
Main	6769.7	2-yr SBCFCD	2807.68	2807.13	0.55	0.00	0.02	610.00	92.25
Main	6769.1	100-yr SBCFCD	2810.43	2807.21	3.22	0.00	0.49	3150.00	81.25
Main	6769.1	100-yr FIS	2809.96	2806.88	3.08	0.00	0.49	2700.00	79.84
Main	6769.1	50-yr FIS	2808.53	2805.89	2.64	0.00	0.50	1500.00	75.70
Main	6769.1	10-yr FIS	2806.34	2804.57	1.77	0.01	0.45	200.00	70.13
Main	6769.1	10-yr SBCFCD	2808.50	2805.87	2.63	0.00	0.50	1480.00	75.62
Main	6769.1	5-yr SBCFCD	2807.81	2805.42	2.39	0.00	0.49	990.00	73.71
Main	6769.1	2-yr SBCFCD	2807.19	2805.03	2.15	0.00	0.48	610.00	72.09
Main	6555.8	100-yr SBCFCD	2808.13	2807.83	0.30	0.02	0.01	3150.00	153.13
Main	6555.8	100-yr FIS	2807.28	2806.95	0.33	0.03	0.01	2700.00	149.59
Main	6555.8	50-yr FIS	2805.44	2805.09	0.35	0.09	0.05	1500.00	142.16
Main	6555.8	10-yr FIS	2803.52	2803.44	0.08	0.12	0.01	200.00	135.56
Main	6555.8	10-yr SBCFCD	2805.42	2805.07	0.35	0.09	0.05	1480.00	142.08
Main	6555.8	5-yr SBCFCD	2804.82	2804.55	0.27	0.09	0.04	990.00	140.02
Main	6555.8	2-yr SBCFCD	2804.27	2804.08	0.19	0.10	0.03	610.00	138.13
Main	6540	100-yr SBCFCD	2808.10	2807.69	0.41	0.01	0.08	3150.00	135.49
Main	6540	100-yr FIS	2807.24	2806.77	0.47	0.01	0.10	2700.00	130.96
Main	6540	50-yr FIS	2805.31	2804.46	0.85	0.02	0.22	1500.00	119.61
Main	6540	10-yr FIS	2803.39	2803.17	0.23	0.17	0.03	200.00	113.29
Main	6540	10-yr SBCFCD	2805.29	2804.44	0.84	0.02	0.22	1480.00	119.55
Main	6540	5-yr SBCFCD	2804.69	2804.03	0.66	0.02	0.17	990.00	117.54
Main	6540	2-yr SBCFCD	2804.15	2803.68	0.47	0.04	0.11	610.00	115.81
Main	6535	100-yr SBCFCD	2808.01	2807.87	0.14	0.01	0.00	3150.00	148.47
Main	6535	100-yr FIS	2807.13	2806.99	0.14	0.02	0.00	2700.00	144.96
Main	6535	50-yr FIS	2804.58	2804.46	0.11	0.02	0.00	1500.00	134.85
Main	6535	10-yr FIS	2802.42	2800.15	2.27	0.76	0.20	200.00	112.04
Main	6535	10-yr SBCFCD	2804.53	2804.42	0.11	0.02	0.00	1480.00	134.66
Main	6535	5-yr SBCFCD	2803.29	2803.19	0.10	0.03	0.01	990.00	129.76
Main	6535	2-yr SBCFCD	2802.19	2802.09	0.09	0.03	0.01	610.00	125.37
Main	6385	100-yr SBCFCD	2808.00	2807.86	0.14	0.00	0.02	3150.00	144.44
Main	6385	100-yr FIS	2807.11	2806.98	0.13	0.00	0.02	2700.00	140.92
Main	6385	50-yr FIS	2804.55	2804.45	0.10	0.00	0.02	1500.00	130.81
Main	6385	10-yr FIS	2800.61	2800.57	0.04	0.00	0.01	200.00	115.26
Main	6385	10-yr SBCFCD	2804.50	2804.41	0.10	0.00	0.02	1480.00	130.62

Main	6385	5-yr SBCFCD	2803.26	2803.18	0.08	0.00	0.02	990.00	125.72
Main	6385	2-yr SBCFCD	2802.14	2802.08	0.06	0.00	0.02	610.00	121.31
Main	6344.7	100-yr SBCFCD	2807.97	2807.88	0.09			3150.00	148.00
Main	6344.7	100-yr FIS	2807.09	2807.00	0.08			2700.00	148.00
Main	6344.7	50-yr FIS	2804.53	2804.47	0.06			1500.00	148.00
Main	6344.7	10-yr FIS	2800.59	2800.58	0.01			200.00	148.00
Main	6344.7	10-yr SBCFCD	2804.48	2804.42	0.06			1480.00	148.00
Main	6344.7	5-yr SBCFCD	2803.24	2803.20	0.04			990.00	148.00
Main	6344.7	2-yr SBCFCD	2802.12	2802.09	0.03			610.00	148.00
Main	6328.7		Culvert						
Main	6312.5	100-yr SBCFCD	2805.13	2804.75	0.38	0.01	0.07	3150.00	111.00
Main	6312.5	100-yr FIS	2804.45	2804.10	0.35	0.01	0.07	2700.00	111.00
Main	6312.5	50-yr FIS	2802.34	2802.03	0.31	0.02	0.07	1500.00	111.00
Main	6312.5	10-yr FIS	2799.70	2799.46	0.24	0.12	0.08	200.00	111.00
Main	6312.5	10-yr SBCFCD	2802.30	2801.99	0.31	0.02	0.07	1480.00	111.00
Main	6312.5	5-yr SBCFCD	2801.25	2800.92	0.34	0.03	0.10	990.00	111.00
Main	6312.5	2-yr SBCFCD	2800.47	2799.99	0.48	0.06	0.18	610.00	111.00
Main	6275	100-yr SBCFCD	2805.05	2804.81	0.24	0.16	0.20	3150.00	132.24
Main	6275	100-yr FIS	2804.37	2804.15	0.22	0.17	0.19	2700.00	129.60
Main	6275	50-yr FIS	2802.24	2802.08	0.16	0.20	0.14	1500.00	121.32
Main	6275	10-yr FIS	2798.90	2798.82	0.08	0.62	0.04	200.00	108.29
Main	6275	10-yr SBCFCD	2802.20	2802.04	0.16	0.20	0.14	1480.00	121.16
Main	6275	5-yr SBCFCD	2801.12	2800.99	0.14	0.25	0.11	990.00	116.94
Main	6275	2-yr SBCFCD	2800.15	2800.03	0.12	0.32	0.08	610.00	113.13
Main	6170	100-yr SBCFCD	2804.68	2802.40	2.28	0.65	0.00	3150.00	57.83
Main	6170	100-yr FIS	2804.01	2801.91	2.10	0.66	0.00	2700.00	55.82
Main	6170	50-yr FIS	2801.90	2800.37	1.54	0.73	0.00	1500.00	49.54
Main	6170	10-yr FIS	2798.25	2797.78	0.47	1.05	0.00	200.00	39.00
Main	6170	10-yr SBCFCD	2801.86	2800.34	1.53	0.73	0.00	1480.00	49.41
Main	6170	5-yr SBCFCD	2800.77	2799.55	1.22	0.78	0.00	990.00	46.19
Main	6170	2-yr SBCFCD	2799.75	2798.82	0.92	0.85	0.00	610.00	43.23
Main	6114	100-yr SBCFCD	2803.54	2799.39	4.15	0.95	0.19	3150.00	52.86
Main	6114	100-yr FIS	2802.84	2798.97	3.88	0.99	0.18	2700.00	51.15
Main	6114	50-yr FIS	2800.64	2797.69	2.95	1.12	0.14	1500.00	45.94
Main	6114	10-yr FIS	2796.60	2795.73	0.87	1.62	0.04	200.00	37.99
Main	6114	10-yr SBCFCD	2800.60	2797.66	2.93	1.12	0.14	1480.00	45.85
Main	6114	5-yr SBCFCD	2799.43	2797.04	2.39	1.22	0.12	990.00	43.30
Main	6114	2-yr SBCFCD	2798.31	2796.48	1.83	1.35	0.09	610.00	41.03
Main	6084	100-yr SBCFCD	2798.92	2798.59	0.33	0.04	0.00	3150.00	82.38
Main	6084	100-yr FIS	2798.15	2797.86	0.29	0.04	0.00	2700.00	79.47
Main	6084	50-yr FIS	2795.65	2795.48	0.17	0.03	0.00	1500.00	69.94
Main	6084	10-yr FIS	2790.99	2790.97	0.02	0.01	0.00	200.00	51.59
Main	6084	10-yr SBCFCD	2795.60	2795.43	0.17	0.03	0.00	1480.00	69.75
Main	6084	5-yr SBCFCD	2794.27	2794.15	0.12	0.02	0.00	990.00	64.52
Main	6084	2-yr SBCFCD	2792.97	2792.90	0.07	0.02	0.00	610.00	59.43

Main	6031	100-yr SBCFCD	2798.88	2798.55	0.33	0.00	0.03	3150.00	82.21
Main	6031	100-yr FIS	2798.11	2797.82	0.29	0.00	0.03	2700.00	79.31
Main	6031	50-yr FIS	2795.62	2795.45	0.17	0.00	0.02	1500.00	69.81
Main	6031	10-yr FIS	2790.99	2790.97	0.02	0.00	0.01	200.00	51.55
Main	6031	10-yr SBCFCD	2795.57	2795.40	0.17	0.00	0.02	1480.00	69.62
Main	6031	5-yr SBCFCD	2794.24	2794.12	0.12	0.00	0.02	990.00	64.42
Main	6031	2-yr SBCFCD	2792.95	2792.88	0.07	0.00	0.01	610.00	59.36
Main	6027	100-yr SBCFCD	2798.85	2798.24	0.61	0.01	0.19	3150.00	73.04
Main	6027	100-yr FIS	2798.08	2797.53	0.55	0.01	0.18	2700.00	70.13
Main	6027	50-yr FIS	2795.60	2795.21	0.38	0.01	0.14	1500.00	60.71
Main	6027	10-yr FIS	2790.98	2790.87	0.11	0.01	0.05	200.00	43.02
Main	6027	10-yr SBCFCD	2795.55	2795.17	0.38	0.01	0.14	1480.00	60.53
Main	6027	5-yr SBCFCD	2794.22	2793.93	0.29	0.01	0.12	990.00	55.47
Main	6027	2-yr SBCFCD	2792.94	2792.72	0.22	0.01	0.09	610.00	50.55
Main	6024	100-yr SBCFCD	2798.64	2796.12	2.52	0.19	0.57	3150.00	48.45
Main	6024	100-yr FIS	2797.89	2795.54	2.35	0.21	0.52	2700.00	46.14
Main	6024	50-yr FIS	2795.45	2793.66	1.78	0.26	0.39	1500.00	38.76
Main	6024	10-yr FIS	2790.91	2790.29	0.63	0.51	0.13	200.00	25.46
Main	6024	10-yr SBCFCD	2795.40	2793.62	1.78	0.26	0.39	1480.00	38.57
Main	6024	5-yr SBCFCD	2794.09	2792.61	1.49	0.35	0.31	990.00	34.60
Main	6024	2-yr SBCFCD	2792.83	2791.68	1.15	0.41	0.24	610.00	30.94
Main	5742.1	100-yr SBCFCD	2795.25	2794.62	0.63	0.00	0.01	3150.00	55.89
Main	5742.1	100-yr FIS	2794.00	2793.38	0.62	0.00	0.02	2700.00	54.74
Main	5742.1	50-yr FIS	2790.88	2790.39	0.49	0.00	0.02	1500.00	51.98
Main	5742.1	10-yr FIS	2786.71	2785.47	1.24	4.13	0.06	200.00	47.44
Main	5742.1	10-yr SBCFCD	2790.82	2790.34	0.49	0.00	0.02	1480.00	51.93
Main	5742.1	5-yr SBCFCD	2790.37	2786.28	4.09	3.46	0.26	990.00	48.18
Main	5742.1	2-yr SBCFCD	2788.91	2785.93	2.98	3.74	0.18	610.00	47.86
Main	5742	100-yr SBCFCD	2795.24	2794.57	0.67			3150.00	59.29
Main	5742	100-yr FIS	2793.98	2793.29	0.69			2700.00	56.25
Main	5742	50-yr FIS	2790.86	2790.30	0.56			1500.00	47.83
Main	5742	10-yr FIS	2786.71	2785.48	1.24	0.00	0.00	200.00	47.00
Main	5742	10-yr SBCFCD	2790.80	2790.24	0.56			1480.00	47.68
Main	5742	5-yr SBCFCD	2790.37	2786.30	4.07	0.00	0.01	990.00	47.00
Main	5742	2-yr SBCFCD	2788.90	2785.94	2.96	0.00	0.01	610.00	47.00
Main	5679.8		Culvert						
Main	5609.6	100-yr SBCFCD	2794.39	2793.73	0.66	0.02	0.67	3150.00	74.93
Main	5609.6	100-yr FIS	2793.46	2792.80	0.66	0.02	0.62	2700.00	69.27
Main	5609.6	50-yr FIS	2790.48	2790.03	0.45	0.02	0.48	1500.00	46.00
Main	5609.6	10-yr FIS	2785.26	2784.84	0.41			200.00	46.00
Main	5609.6	10-yr SBCFCD	2790.43	2789.98	0.45	0.02	0.48	1480.00	46.00
Main	5609.6	5-yr SBCFCD	2787.65	2786.44	1.21			990.00	46.00
Main	5609.6	2-yr SBCFCD	2786.64	2785.78	0.87			610.00	46.00
Main	5581.3	100-yr SBCFCD	2793.70	2790.79	2.91	0.09	0.31	3150.00	39.35
Main	5581.3	100-yr FIS	2792.82	2790.10	2.73	0.11	0.16	2700.00	36.97
Main	5581.3	50-yr FIS	2789.98	2787.92	2.06	0.13	0.13	1500.00	31.06

Main	5581.3	10-yr FIS	2785.27	2784.72	0.55	0.17	0.02		200.00		30.02
Main	5581.3	10-yr SBCFCD	2789.93	2787.87	2.06	0.13	0.13		1480.00		31.00
Main	5581.3	5-yr SBCFCD	2788.45	2786.85	1.60	0.13	0.09		990.00		30.03
Main	5581.3	2-yr SBCFCD	2787.11	2785.95	1.16	0.14	0.05		610.00		30.02
Main	5515.3	100-yr SBCFCD	2793.17	2787.05	6.13	0.20	0.32		3150.00		46.68
Main	5515.3	100-yr FIS	2792.32	2786.68	5.64	0.21	0.29		2700.00		45.36
Main	5515.3	50-yr FIS	2789.56	2785.57	3.99	0.23	0.19		1500.00		41.31
Main	5515.3	10-yr FIS	2784.90	2783.69	1.21	0.30	0.07		200.00		34.13
Main	5515.3	10-yr SBCFCD	2789.51	2785.55	3.96	0.23	0.19		1480.00		41.23
Main	5515.3	5-yr SBCFCD	2788.07	2784.99	3.07	0.24	0.15		990.00		39.16
Main	5515.3	2-yr SBCFCD	2786.74	2784.47	2.27	0.25	0.11		610.00		37.17
Main	5135	100-yr SBCFCD	2792.90	2786.70	6.21	0.26	0.01	175.01	2799.98	175.01	43.46
Main	5135	100-yr FIS	2792.03	2786.26	5.78	0.28	0.01	136.74	2426.52	136.74	42.13
Main	5135	50-yr FIS	2789.22	2784.94	4.28	0.32	0.03	53.01	1393.98	53.01	38.19
Main	5135	10-yr FIS	2784.32	2782.89	1.43	0.56	0.02	1.85	196.29	1.85	32.03
Main	5135	10-yr SBCFCD	2789.17	2784.91	4.25	0.32	0.03	51.85	1376.31	51.85	38.11
Main	5135	5-yr SBCFCD	2787.69	2784.28	3.41	0.35	0.03	26.94	936.12	26.94	36.20
Main	5135	2-yr SBCFCD	2786.31	2783.69	2.62	0.39	0.04	12.09	585.81	12.09	34.45
Main	4875	100-yr SBCFCD	2791.42	2783.87	7.55	1.35	0.13	162.08	2825.85	162.08	42.35
Main	4875	100-yr FIS	2790.48	2783.46	7.03	1.43	0.12	126.45	2447.10	126.45	41.13
Main	4875	50-yr FIS	2787.40	2782.26	5.14	1.74	0.09	49.04	1401.91	49.04	37.53
Main	4875	10-yr FIS	2781.65	2780.50	1.15	2.59	0.08	2.06	195.89	2.06	32.26
Main	4875	10-yr SBCFCD	2787.34	2782.24	5.10	1.75	0.08	47.99	1384.03	47.99	37.47
Main	4875	5-yr SBCFCD	2785.67	2781.67	4.00	1.96	0.06	25.09	939.82	25.09	35.75
Main	4875	2-yr SBCFCD	2784.06	2781.16	2.90	2.22	0.03	11.55	586.90	11.55	34.24
Main	4635	100-yr SBCFCD	2789.76	2781.38	8.38	1.58	0.08	155.56	2838.88	155.56	41.80
Main	4635	100-yr FIS	2788.75	2781.00	7.75	1.67	0.07	121.52	2456.96	121.52	40.65
Main	4635	50-yr FIS	2785.39	2779.88	5.51	1.97	0.04	47.57	1404.87	47.57	37.29
Main	4635	10-yr FIS	2779.45	2778.17	1.28	2.19	0.01	1.95	196.09	1.95	32.15
Main	4635	10-yr SBCFCD	2785.33	2779.86	5.47	1.98	0.04	46.55	1386.90	46.55	37.23
Main	4635	5-yr SBCFCD	2783.51	2779.33	4.18	2.14	0.02	24.61	940.78	24.61	35.63
Main	4635	2-yr SBCFCD	2781.80	2778.85	2.95	2.25	0.01	11.46	587.08	11.46	34.20
Main	4385	100-yr SBCFCD	2787.82	2778.87	8.95	1.88	0.06	151.49	2847.03	151.49	41.46
Main	4385	100-yr FIS	2786.74	2778.51	8.23	1.97	0.05	118.58	2462.84	118.58	40.37
Main	4385	50-yr FIS	2783.14	2777.45	5.69	2.23	0.02	46.91	1406.18	46.91	37.18
Main	4385	10-yr FIS	2777.01	2775.78	1.23	2.42	0.01	1.99	196.02	1.99	32.19
Main	4385	10-yr SBCFCD	2783.07	2777.43	5.64	2.24	0.02	45.92	1388.15	45.92	37.12
Main	4385	5-yr SBCFCD	2781.17	2776.91	4.25	2.34	0.01	24.43	941.14	24.43	35.59
Main	4385	2-yr SBCFCD	2779.41	2776.45	2.96	2.39	0.00	11.44	587.13	11.44	34.19
Main	4135	100-yr SBCFCD	2785.74	2776.40	9.34	2.05	0.04	148.93	2852.13	148.93	41.24
Main	4135	100-yr FIS	2784.58	2776.05	8.53	2.12	0.03	116.87	2466.26	116.87	40.20
Main	4135	50-yr FIS	2780.81	2775.03	5.78	2.32	0.01	46.59	1406.81	46.59	37.13
Main	4135	10-yr FIS	2774.63	2773.37	1.26	2.39	0.00	1.97	196.06	1.97	32.16
Main	4135	10-yr SBCFCD	2780.74	2775.01	5.73	2.32	0.01	45.62	1388.76	45.62	37.07
Main	4135	5-yr SBCFCD	2778.79	2774.51	4.28	2.38	0.00	24.36	941.29	24.36	35.57
Main	4135	2-yr SBCFCD	2777.01	2774.05	2.97	2.40	0.00	11.43	587.13	11.43	34.19

Main	3969.6	100-yr SBCFCD	2784.20	2774.83	9.37	1.53	0.00		3380.00		41.83
Main	3969.6	100-yr FIS	2782.93	2774.26	8.67	1.63	0.01		2700.00		40.08
Main	3969.6	50-yr FIS	2779.11	2773.31	5.80	1.69	0.00		1500.00		37.17
Main	3969.6	10-yr FIS	2772.97	2771.71	1.26	1.66	0.00		200.00		32.24
Main	3969.6	10-yr SBCFCD	2779.10	2773.49	5.61	1.60	0.04		1600.00		37.70
Main	3969.6	5-yr SBCFCD	2777.16	2772.97	4.19	1.60	0.03		1070.00		36.12
Main	3969.6	2-yr SBCFCD	2775.39	2772.47	2.93	1.61	0.01		650.00		34.57
Main	3835	100-yr SBCFCD	2782.96	2773.79	9.16	1.17	0.06	170.36	3039.28	170.36	42.07
Main	3835	100-yr FIS	2781.51	2773.21	8.30	1.30	0.11	118.17	2463.65	118.17	40.33
Main	3835	50-yr FIS	2777.69	2772.21	5.49	1.32	0.09	47.66	1404.68	47.66	37.31
Main	3835	10-yr FIS	2771.68	2770.52	1.16	1.26	0.03	2.05	195.91	2.05	32.25
Main	3835	10-yr SBCFCD	2777.86	2772.35	5.51	1.20	0.03	53.63	1492.74	53.63	37.74
Main	3835	5-yr SBCFCD	2775.94	2771.80	4.15	1.21	0.01	28.61	1012.79	28.61	36.08
Main	3835	2-yr SBCFCD	2774.16	2771.28	2.88	1.22	0.01	13.08	623.83	13.08	34.52
Main	3695.2	100-yr SBCFCD	2780.07	2771.54	8.54	2.69	0.19		3380.00		68.99
Main	3695.2	100-yr FIS	2778.23	2771.30	6.94	2.87	0.41		2700.00		68.02
Main	3695.2	50-yr FIS	2774.42	2770.87	3.55	2.69	0.58		1500.00		66.32
Main	3695.2	10-yr FIS	2770.34	2770.00	0.34	0.03	0.09		200.00		62.80
Main	3695.2	10-yr SBCFCD	2774.77	2770.90	3.87	2.60	0.49		1600.00		66.44
Main	3695.2	5-yr SBCFCD	2772.98	2770.71	2.27	2.40	0.56		1070.00		65.67
Main	3695.2	2-yr SBCFCD	2771.61	2770.57	1.04	1.99	0.55		650.00		65.10
Main	3680.9	100-yr SBCFCD	2777.74	2766.46	11.28	2.05	0.27		3380.00		68.02
Main	3680.9	100-yr FIS	2775.95	2766.20	9.75	2.01	0.28		2700.00		66.95
Main	3680.9	50-yr FIS	2772.41	2765.65	6.76	1.69	0.32		1500.00		64.72
Main	3680.9	10-yr FIS	2766.39	2766.35	0.04	0.42	0.03		200.00		67.55
Main	3680.9	10-yr SBCFCD	2772.72	2765.71	7.01	1.74	0.31		1600.00		64.93
Main	3680.9	5-yr SBCFCD	2771.17	2765.40	5.77	1.46	0.35		1070.00		63.67
Main	3680.9	2-yr SBCFCD	2767.81	2767.66	0.15	0.62	0.06		650.00		72.94
Main	3488.2	100-yr SBCFCD	2771.23	2769.27	1.96				3380.00		77.74
Main	3488.2	100-yr FIS	2770.41	2768.69	1.72	0.06	0.36		2700.00		75.38
Main	3488.2	50-yr FIS	2768.71	2767.50	1.21	0.06	0.27		1500.00		70.55
Main	3488.2	10-yr FIS	2765.94	2765.59	0.35	0.03	0.09		200.00		62.80
Main	3488.2	10-yr SBCFCD	2768.87	2767.61	1.26	0.06	0.28		1600.00		70.99
Main	3488.2	5-yr SBCFCD	2767.98	2766.99	0.99	7.36	1.43		1070.00		68.46
Main	3488.2	2-yr SBCFCD	2767.13	2766.41	0.72	0.05	0.17		650.00		66.13
Main	3473.9	100-yr SBCFCD	2770.26	2762.42	7.84	0.38	0.59		3380.00		69.51
Main	3473.9	100-yr FIS	2769.44	2762.03	7.40	0.41	0.57		2700.00		67.91
Main	3473.9	50-yr FIS	2767.70	2761.28	6.42	0.49	0.52		1500.00		64.84
Main	3473.9	10-yr FIS	2761.99	2761.94	0.04	0.42	0.03		200.00		67.54
Main	3473.9	10-yr SBCFCD	2767.87	2761.35	6.52	0.48	0.53		1600.00		65.11
Main	3473.9	5-yr SBCFCD	2766.93	2760.99	5.94	0.55	0.49		1070.00		63.62
Main	3473.9	2-yr SBCFCD	2766.04	2760.67	5.36	0.64	0.46		650.00		62.34
Main	3281.2	100-yr SBCFCD	2766.83	2764.87	1.96	0.06	0.44		3380.00		77.58
Main	3281.2	100-yr FIS	2766.01	2764.29	1.72				2700.00		75.24
Main	3281.2	50-yr FIS	2764.32	2763.10	1.22	0.05	0.29		1500.00		70.44
Main	3281.2	10-yr FIS	2761.54	2761.20	0.34	0.03	0.09		200.00		62.79
Main	3281.2	10-yr SBCFCD	2764.47	2763.21	1.26	0.05	0.30		1600.00		70.89

Main	3281.2	5-yr SBCFCD	2763.58	2762.59	0.99	7.40	1.49	1070.00	68.39
Main	3281.2	2-yr SBCFCD	2762.73	2762.01	0.73	8.70	1.39	650.00	66.06
Main	3261.9	100-yr SBCFCD	2762.47	2761.97	0.50	1.19	0.15	3380.00	91.63
Main	3261.9	100-yr FIS	2761.58	2761.17	0.41	1.14	0.13	2700.00	88.42
Main	3261.9	50-yr FIS	2759.70	2759.46	0.24	0.99	0.10	1500.00	81.55
Main	3261.9	10-yr FIS	2756.34	2756.31	0.03	0.46	0.03	200.00	68.86
Main	3261.9	10-yr SBCFCD	2759.88	2759.63	0.26	1.01	0.10	1600.00	82.21
Main	3261.9	5-yr SBCFCD	2758.86	2758.69	0.18	0.90	0.08	1070.00	78.44
Main	3261.9	2-yr SBCFCD	2757.87	2757.76	0.11	0.77	0.06	650.00	74.71
Main	2906.2	100-yr SBCFCD	2761.13	2759.17	1.96	0.05	0.39	3380.00	77.65
Main	2906.2	100-yr FIS	2760.31	2758.59	1.72	0.05	0.35	2700.00	75.29
Main	2906.2	50-yr FIS	2758.61	2757.40	1.21	0.05	0.26	1500.00	70.49
Main	2906.2	10-yr FIS	2755.84	2755.50	0.34	0.03	0.09	200.00	62.81
Main	2906.2	10-yr SBCFCD	2758.77	2757.51	1.26	0.05	0.27	1600.00	70.93
Main	2906.2	5-yr SBCFCD	2757.88	2756.89	0.99	0.04	0.22	1070.00	68.42
Main	2906.2	2-yr SBCFCD	2757.03	2756.31	0.72	0.04	0.17	650.00	66.09
Main	2894.8	100-yr SBCFCD	2760.36	2753.59	6.78	0.28	0.48	3380.00	70.04
Main	2894.8	100-yr FIS	2759.54	2753.18	6.36	0.31	0.46	2700.00	68.39
Main	2894.8	50-yr FIS	2756.10	2755.76	0.33	0.79	0.09	1500.00	78.81
Main	2894.8	10-yr FIS	2752.94	2752.89	0.05	0.47	0.03	200.00	67.22
Main	2894.8	10-yr SBCFCD	2756.27	2755.91	0.35	0.80	0.09	1600.00	79.42
Main	2894.8	5-yr SBCFCD	2755.30	2755.05	0.25	0.74	0.07	1070.00	75.95
Main	2894.8	2-yr SBCFCD	2754.36	2754.20	0.16	0.67	0.06	650.00	72.52
Main	2697.2	100-yr SBCFCD	2757.73	2755.77	1.96	0.07	0.41	3380.00	77.74
Main	2697.2	100-yr FIS	2756.91	2755.19	1.72	5.28	1.39	2700.00	75.39
Main	2697.2	50-yr FIS	2755.21	2754.00	1.21	0.06	0.28	1500.00	70.55
Main	2697.2	10-yr FIS	2752.44	2752.10	0.34	0.03	0.09	200.00	62.83
Main	2697.2	10-yr SBCFCD	2755.37	2754.11	1.26	0.06	0.29	1600.00	70.99
Main	2697.2	5-yr SBCFCD	2754.48	2753.49	0.99	0.05	0.24	1070.00	68.47
Main	2697.2	2-yr SBCFCD	2753.63	2752.91	0.73	0.05	0.18	650.00	66.13
Main	2679	100-yr SBCFCD	2756.52	2747.49	9.03	0.51	0.71	3380.00	68.00
Main	2679	100-yr FIS	2755.68	2747.12	8.57	0.54	0.68	2700.00	66.63
Main	2679	50-yr FIS	2753.92	2746.40	7.52	0.66	0.63	1500.00	64.02
Main	2679	10-yr FIS	2747.40	2747.36	0.04	0.43	0.03	200.00	67.53
Main	2679	10-yr SBCFCD	2754.09	2746.46	7.62	0.65	0.64	1600.00	64.25
Main	2679	5-yr SBCFCD	2749.85	2749.65	0.20	0.80	0.08	1070.00	75.89
Main	2679	2-yr SBCFCD	2748.88	2748.76	0.12	0.69	0.06	650.00	72.62
Main	2410.8	100-yr SBCFCD	2752.23	2750.27	1.96	0.07	0.39	3380.00	77.57
Main	2410.8	100-yr FIS	2751.41	2749.69	1.72	0.07	0.35	2700.00	75.23
Main	2410.8	50-yr FIS	2749.72	2748.50	1.22	0.06	0.27	1500.00	70.44
Main	2410.8	10-yr FIS	2746.94	2746.60	0.34	0.04	0.09	200.00	62.79
Main	2410.8	10-yr SBCFCD	2749.87	2748.61	1.27	9.52	1.91	1600.00	70.88
Main	2410.8	5-yr SBCFCD	2748.98	2747.99	0.99	0.06	0.23	1070.00	68.38
Main	2410.8	2-yr SBCFCD	2748.13	2747.41	0.73	0.05	0.17	650.00	66.06
Main	2395.1	100-yr SBCFCD	2751.17	2742.86	8.31	0.42	0.64	3380.00	69.14
Main	2395.1	100-yr FIS	2750.35	2742.48	7.87	0.46	0.61	2700.00	67.59

Main	2395.1	50-yr FIS	2748.60	2741.75	6.85	0.55	0.56		1500.00		64.63
Main	2395.1	10-yr FIS	2742.48	2742.43	0.05	0.41	0.03		200.00		67.39
Main	2395.1	10-yr SBCFCD	2748.76	2741.81	6.95	0.54	0.57		1600.00		64.89
Main	2395.1	5-yr SBCFCD	2747.82	2741.46	6.36	0.62	0.54		1070.00		63.46
Main	2395.1	2-yr SBCFCD	2746.91	2741.15	5.75	0.72	0.50		650.00		62.23
Main	2210.8	100-yr SBCFCD	2747.33	2745.37	1.96				3380.00		77.75
Main	2210.8	100-yr FIS	2746.51	2744.79	1.72				2700.00		75.38
Main	2210.8	50-yr FIS	2744.81	2743.60	1.22	0.04	0.28		1500.00		70.54
Main	2210.8	10-yr FIS	2742.04	2741.70	0.34	0.02	0.09		200.00		62.83
Main	2210.8	10-yr SBCFCD	2744.97	2743.71	1.26	6.34	1.71		1600.00		71.00
Main	2210.8	5-yr SBCFCD	2744.08	2743.09	0.99	7.25	1.61		1070.00		68.47
Main	2210.8	2-yr SBCFCD	2743.23	2742.51	0.73	0.03	0.18		650.00		66.13
Main	2198.3	100-yr SBCFCD	2745.02	2744.49	0.53	1.04	0.15		3380.00		90.22
Main	2198.3	100-yr FIS	2744.06	2743.60	0.45	1.02	0.13		2700.00		86.73
Main	2198.3	50-yr FIS	2742.21	2741.94	0.27	0.90	0.09		1500.00		80.19
Main	2198.3	10-yr FIS	2738.92	2738.88	0.03	0.45	0.03		200.00		68.18
Main	2198.3	10-yr SBCFCD	2742.45	2742.17	0.28	0.90	0.10		1600.00		81.10
Main	2198.3	5-yr SBCFCD	2741.46	2741.27	0.19	0.81	0.08		1070.00		77.55
Main	2198.3	2-yr SBCFCD	2740.46	2740.35	0.12	0.70	0.06		650.00		73.93
Main	1910.8	100-yr SBCFCD	2743.84	2741.85	1.99	0.04	0.39		3480.00		78.08
Main	1910.8	100-yr FIS	2742.91	2741.19	1.72	0.04	0.35		2700.00		75.38
Main	1910.8	50-yr FIS	2741.21	2740.00	1.21	0.03	0.27		1500.00		70.55
Main	1910.8	10-yr FIS	2738.44	2738.09	0.34	0.02	0.09		200.00		62.81
Main	1910.8	10-yr SBCFCD	2741.45	2740.16	1.29	0.03	0.28		1650.00		71.21
Main	1910.8	5-yr SBCFCD	2740.57	2739.55	1.02	0.03	0.23		1120.00		68.73
Main	1910.8	2-yr SBCFCD	2739.70	2738.95	0.75	0.03	0.18		680.00		66.30
Main	1901.8	100-yr SBCFCD	2743.18	2736.71	6.47	0.22	0.45		3480.00		70.60
Main	1901.8	100-yr FIS	2740.88	2740.33	0.55	1.79	0.09		2700.00		85.28
Main	1901.8	50-yr FIS	2739.20	2738.88	0.31	1.61	0.08		1500.00		79.40
Main	1901.8	10-yr FIS	2736.00	2735.95	0.04	0.95	0.03		200.00		67.51
Main	1901.8	10-yr SBCFCD	2739.44	2739.10	0.34	1.65	0.08		1650.00		80.29
Main	1901.8	5-yr SBCFCD	2738.51	2738.27	0.24	1.51	0.07		1120.00		76.92
Main	1901.8	2-yr SBCFCD	2737.55	2737.40	0.15	1.34	0.05		680.00		73.38
Main	1439.8	100-yr SBCFCD	2739.79	2738.11	1.68	3.68	0.15	76.05	3396.41	7.53	118.01
Main	1439.8	100-yr FIS	2739.00	2737.55	1.46	4.04	0.11	23.36	2675.44	1.20	108.57
Main	1439.8	50-yr FIS	2737.51	2736.42	1.09	5.21	0.07		1500.00		83.28
Main	1439.8	10-yr FIS	2735.02	2734.71	0.31	7.21	0.02		200.00		70.14
Main	1439.8	10-yr SBCFCD	2737.72	2736.57	1.16	5.11	0.07		1650.00		83.88
Main	1439.8	5-yr SBCFCD	2736.93	2736.02	0.91	5.54	0.05		1120.00		81.65
Main	1439.8	2-yr SBCFCD	2736.16	2735.49	0.67	6.09	0.04		680.00		78.75
Main	957.5	100-yr SBCFCD	2732.61	2729.24	3.37	7.01	0.17	3.55	3476.45		134.19
Main	957.5	100-yr FIS	2731.68	2728.98	2.71	7.19	0.13		2700.00		117.61
Main	957.5	50-yr FIS	2730.01	2728.54	1.47	7.46	0.04		1500.00		111.30
Main	957.5	10-yr FIS	2727.79	2727.55	0.24				200.00		97.13
Main	957.5	10-yr SBCFCD	2730.21	2728.61	1.60	7.46	0.05		1650.00		112.36
Main	957.5	5-yr SBCFCD	2729.46	2728.33	1.13	7.45	0.02		1120.00		108.37
Main	957.5	2-yr SBCFCD	2728.75	2728.04	0.71	7.40	0.00		680.00		104.19

Profile Output Table - Standard Table 3

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Froude # XS	Shear Chan (lb/sq ft)
Main	12028.1	100-yr SBCFCD	1730.00	2859.00	2865.92	0.000038	1.07	1.07	1623.65	240.86	0.07	0.07	0.02
Main	12028.1	100-yr FIS	700.00	2859.00	2862.92	0.000041	0.77	0.77	909.23	235.42	0.07	0.07	0.01
Main	12028.1	50-yr FIS	500.00	2859.00	2862.11	0.000045	0.70	0.70	718.84	233.95	0.07	0.07	0.01
Main	12028.1	10-yr FIS	100.00	2859.00	2859.79	0.000175	0.56	0.56	180.10	229.74	0.11	0.11	0.01
Main	12028.1	10-yr SBCFCD	810.00	2859.00	2863.32	0.000040	0.81	0.81	1003.46	236.14	0.07	0.07	0.01
Main	12028.1	5-yr SBCFCD	550.00	2859.00	2862.33	0.000044	0.72	0.72	769.14	234.34	0.07	0.07	0.01
Main	12028.1	2-yr SBCFCD	340.00	2859.00	2861.34	0.000054	0.63	0.63	539.40	232.55	0.07	0.07	0.01
Main	11915	100-yr SBCFCD	1730.00	2858.30	2863.42	0.012483	11.15	11.15	155.11	40.62	1.01	1.01	2.81
Main	11915	100-yr FIS	700.00	2858.30	2861.31	0.014197	8.92	8.92	78.50	32.13	1.01	1.01	2.07
Main	11915	50-yr FIS	500.00	2858.30	2860.75	0.015009	8.18	8.18	61.15	29.88	1.01	1.01	1.85
Main	11915	10-yr FIS	100.00	2858.30	2859.19	0.019750	5.17	5.17	19.35	23.58	1.01	1.01	0.99
Main	11915	10-yr SBCFCD	810.00	2858.30	2861.58	0.013942	9.27	9.27	87.40	33.23	1.01	1.01	2.19
Main	11915	5-yr SBCFCD	550.00	2858.30	2860.90	0.014737	8.38	8.38	65.67	30.48	1.01	1.01	1.91
Main	11915	2-yr SBCFCD	340.00	2858.30	2860.23	0.015950	7.36	7.36	46.18	27.79	1.01	1.01	1.60
Main	11864	100-yr SBCFCD	1730.00	2856.70	2860.79	0.028566	14.96	14.96	115.64	36.49	1.48	1.48	5.37
Main	11864	100-yr FIS	700.00	2856.70	2859.02	0.035787	12.23	12.23	57.21	29.34	1.54	1.54	4.20
Main	11864	50-yr FIS	500.00	2856.70	2858.57	0.038748	11.26	11.26	44.41	27.53	1.56	1.56	3.78
Main	11864	10-yr FIS	100.00	2856.70	2857.39	0.045705	6.75	6.75	14.82	22.79	1.47	1.47	1.83
Main	11864	10-yr SBCFCD	810.00	2856.70	2859.25	0.034487	12.66	12.66	63.99	30.26	1.53	1.53	4.38
Main	11864	5-yr SBCFCD	550.00	2856.70	2858.69	0.037831	11.53	11.53	47.72	28.01	1.56	1.56	3.89
Main	11864	2-yr SBCFCD	340.00	2856.70	2858.16	0.041765	10.13	10.13	33.55	25.89	1.57	1.57	3.29
Main	11841	100-yr SBCFCD	1730.00	2850.50	2859.66	0.001304	4.93	4.93	351.17	56.65	0.35	0.35	0.47
Main	11841	100-yr FIS	700.00	2850.50	2858.29	0.000409	2.53	2.53	276.91	51.14	0.19	0.19	0.13
Main	11841	50-yr FIS	500.00	2850.50	2856.66	0.000520	2.51	2.51	198.89	44.62	0.21	0.21	0.14
Main	11841	10-yr FIS	100.00	2850.50	2854.12	0.000150	1.01	1.01	98.63	34.48	0.11	0.11	0.03
Main	11841	10-yr SBCFCD	810.00	2850.50	2857.44	0.000861	3.45	3.45	234.93	47.74	0.27	0.27	0.25
Main	11841	5-yr SBCFCD	550.00	2850.50	2856.54	0.000677	2.84	2.84	193.70	44.15	0.24	0.24	0.17
Main	11841	2-yr SBCFCD	340.00	2850.50	2855.64	0.000478	2.19	2.19	155.44	40.54	0.20	0.20	0.11
Main	11792	100-yr SBCFCD	1730.00	2850.50	2859.56	0.001426	5.13	5.13	337.23	54.44	0.36	0.36	0.51
Main	11792	100-yr FIS	700.00	2850.50	2858.26	0.000431	2.60	2.60	269.57	49.49	0.20	0.20	0.14
Main	11792	50-yr FIS	500.00	2850.50	2856.62	0.000548	2.58	2.58	193.74	43.28	0.21	0.21	0.14
Main	11792	10-yr FIS	100.00	2850.50	2854.11	0.000154	1.03	1.03	97.05	33.73	0.11	0.11	0.03
Main	11792	10-yr SBCFCD	810.00	2850.50	2857.38	0.000922	3.56	3.56	227.47	46.15	0.28	0.28	0.26
Main	11792	5-yr SBCFCD	550.00	2850.50	2856.50	0.000718	2.92	2.92	188.25	42.79	0.25	0.25	0.18
Main	11792	2-yr SBCFCD	340.00	2850.50	2855.61	0.000502	2.24	2.24	151.70	39.41	0.20	0.20	0.11
Main	11788	100-yr SBCFCD	1730.00	2852.50	2858.78	0.005723	8.43	8.43	205.23	45.32	0.70	0.70	1.52
Main	11788	100-yr FIS	700.00	2852.50	2858.10	0.001458	4.00	4.00	175.05	42.55	0.35	0.35	0.35
Main	11788	50-yr FIS	500.00	2852.50	2856.36	0.002953	4.66	4.66	107.28	35.56	0.47	0.47	0.53
Main	11788	10-yr FIS	100.00	2852.50	2853.98	0.003454	2.94	2.94	34.05	25.97	0.45	0.45	0.28
Main	11788	10-yr SBCFCD	810.00	2852.50	2856.89	0.004859	6.40	6.40	126.48	37.67	0.62	0.62	0.97
Main	11788	5-yr SBCFCD	550.00	2852.50	2856.10	0.004621	5.61	5.61	98.05	34.50	0.59	0.59	0.78
Main	11788	2-yr SBCFCD	340.00	2852.50	2855.31	0.004303	4.72	4.72	72.01	31.31	0.55	0.55	0.59
Main	11785	100-yr SBCFCD	1730.00	2852.50	2858.76	0.005818	8.48	8.48	204.01	45.21	0.70	0.70	1.54
Main	11785	100-yr FIS	700.00	2852.50	2858.09	0.001463	4.00	4.00	174.84	42.53	0.35	0.35	0.35
Main	11785	50-yr FIS	500.00	2852.50	2856.35	0.002983	4.68	4.68	106.91	35.52	0.48	0.48	0.53
Main	11785	10-yr FIS	100.00	2852.50	2853.97	0.003576	2.97	2.97	33.66	25.91	0.46	0.46	0.28
Main	11785	10-yr SBCFCD	810.00	2852.50	2856.86	0.004957	6.45	6.45	125.59	37.57	0.62	0.62	0.98
Main	11785	5-yr SBCFCD	550.00	2852.50	2856.08	0.004725	5.65	5.65	97.29	34.41	0.59	0.59	0.80
Main	11785	2-yr SBCFCD	340.00	2852.50	2855.29	0.004414	4.76	4.76	71.39	31.23	0.56	0.56	0.60
Main	11663.9	100-yr SBCFCD	1730.00	2852.00	2857.79	0.005701	9.38	9.38	184.41	43.75	0.81	0.81	1.41
Main	11663.9	100-yr FIS	700.00	2852.00	2858.00	0.000815	3.61	3.61	193.68	44.61	0.31	0.31	0.21

Main	11663.9	50-yr FIS	500.00	2852.00	2856.13	0.001689	4.26	4.26	117.46	36.94	0.42	0.42	0.32
Main	11663.9	10-yr FIS	100.00	2852.00	2852.89	0.014390	5.15	5.15	19.42	23.65	1.00	1.00	0.72
Main	11663.9	10-yr SBCFCD	810.00	2852.00	2855.28	0.010245	9.25	9.25	87.59	33.45	1.01	1.01	1.60
Main	11663.9	5-yr SBCFCD	550.00	2852.00	2854.60	0.010859	8.37	8.37	65.74	30.66	1.01	1.01	1.40
Main	11663.9	2-yr SBCFCD	340.00	2852.00	2853.93	0.011731	7.35	7.35	46.24	27.92	1.01	1.01	1.18
Main	11313.9	100-yr SBCFCD	1960.00	2851.30	2858.66	0.000063	1.39	1.39	1406.50	206.44	0.09	0.09	0.03
Main	11313.9	100-yr FIS	1700.00	2851.30	2858.08	0.000062	1.32	1.32	1289.04	204.07	0.09	0.09	0.02
Main	11313.9	50-yr FIS	1000.00	2851.30	2856.27	0.000061	1.08	1.08	925.63	196.56	0.09	0.09	0.02
Main	11313.9	10-yr FIS	150.00	2851.30	2852.68	0.000101	0.61	0.61	246.53	181.70	0.09	0.09	0.01
Main	11313.9	10-yr SBCFCD	920.00	2851.30	2856.02	0.000061	1.05	1.05	877.62	195.55	0.09	0.09	0.02
Main	11313.9	5-yr SBCFCD	620.00	2851.30	2855.00	0.000064	0.91	0.91	678.67	191.29	0.09	0.09	0.01
Main	11313.9	2-yr SBCFCD	380.00	2851.30	2853.98	0.000070	0.78	0.78	486.94	187.10	0.09	0.09	0.01
Main	11170	100-yr SBCFCD	1960.00	2850.90	2856.40	0.012291	11.50	11.50	170.37	41.99	1.01	1.01	2.93
Main	11170	100-yr FIS	1700.00	2850.90	2855.99	0.012358	11.07	11.07	153.58	40.36	1.00	1.00	2.77
Main	11170	50-yr FIS	1000.00	2850.90	2854.63	0.013434	9.76	9.76	102.47	34.92	1.00	1.00	2.34
Main	11170	10-yr FIS	150.00	2850.90	2852.05	0.018333	5.83	5.83	25.71	24.61	1.01	1.01	1.17
Main	11170	10-yr SBCFCD	920.00	2850.90	2854.45	0.013618	9.56	9.56	96.21	34.20	1.00	1.00	2.28
Main	11170	5-yr SBCFCD	620.00	2850.90	2853.70	0.014457	8.65	8.65	71.70	31.20	1.01	1.01	1.99
Main	11170	2-yr SBCFCD	380.00	2850.90	2852.98	0.015579	7.58	7.58	50.12	28.30	1.00	1.00	1.66
Main	11116	100-yr SBCFCD	1960.00	2849.20	2853.60	0.028286	15.48	15.48	126.62	37.59	1.49	1.49	5.64
Main	11116	100-yr FIS	1700.00	2849.20	2853.23	0.029291	15.03	15.03	113.12	36.12	1.50	1.50	5.44
Main	11116	50-yr FIS	1000.00	2849.20	2852.09	0.033487	13.40	13.40	74.62	31.58	1.54	1.54	4.74
Main	11116	10-yr FIS	150.00	2849.20	2850.07	0.046865	7.89	7.89	19.01	23.50	1.55	1.55	2.33
Main	11116	10-yr SBCFCD	920.00	2849.20	2851.95	0.034203	13.15	13.15	69.96	30.98	1.54	1.54	4.63
Main	11116	5-yr SBCFCD	620.00	2849.20	2851.33	0.037591	11.97	11.97	51.80	28.54	1.57	1.57	4.11
Main	11116	2-yr SBCFCD	380.00	2849.20	2850.76	0.041808	10.54	10.54	36.07	26.24	1.58	1.58	3.49
Main	11083	100-yr SBCFCD	1960.00	2840.00	2849.84	0.001253	5.02	5.02	390.60	59.37	0.34	0.34	0.48
Main	11083	100-yr FIS	1700.00	2840.00	2849.22	0.001231	4.80	4.80	354.18	56.86	0.34	0.34	0.44
Main	11083	50-yr FIS	1000.00	2840.00	2847.27	0.001094	3.98	3.98	250.98	49.07	0.31	0.31	0.33
Main	11083	10-yr FIS	150.00	2840.00	2843.75	0.000297	1.46	1.46	103.08	35.00	0.15	0.15	0.05
Main	11083	10-yr SBCFCD	920.00	2840.00	2847.01	0.001064	3.86	3.86	238.57	48.05	0.30	0.30	0.31
Main	11083	5-yr SBCFCD	620.00	2840.00	2845.99	0.000888	3.24	3.24	191.48	43.95	0.27	0.27	0.23
Main	11083	2-yr SBCFCD	380.00	2840.00	2845.03	0.000647	2.52	2.52	151.08	40.11	0.23	0.23	0.14
Main	11031	100-yr SBCFCD	1960.00	2840.00	2849.77	0.001293	5.08	5.08	386.08	59.06	0.35	0.35	0.49
Main	11031	100-yr FIS	1700.00	2840.00	2849.14	0.001272	4.86	4.86	349.94	56.56	0.34	0.34	0.46
Main	11031	50-yr FIS	1000.00	2840.00	2847.20	0.001133	4.04	4.04	247.80	48.81	0.32	0.32	0.34
Main	11031	10-yr FIS	150.00	2840.00	2843.73	0.000302	1.46	1.46	102.52	34.93	0.15	0.15	0.05
Main	11031	10-yr SBCFCD	920.00	2840.00	2846.95	0.001102	3.91	3.91	235.57	47.80	0.31	0.31	0.32
Main	11031	5-yr SBCFCD	620.00	2840.00	2845.94	0.000918	3.28	3.28	189.24	43.75	0.28	0.28	0.23
Main	11031	2-yr SBCFCD	380.00	2840.00	2844.99	0.000664	2.54	2.54	149.63	39.96	0.23	0.23	0.15
Main	11027	100-yr SBCFCD	1960.00	2842.00	2849.07	0.004677	8.12	8.12	241.40	48.28	0.64	0.64	1.37
Main	11027	100-yr FIS	1700.00	2842.00	2848.43	0.005090	8.05	8.05	211.19	45.71	0.66	0.66	1.38
Main	11027	50-yr FIS	1000.00	2842.00	2846.42	0.007236	7.85	7.85	127.40	37.67	0.75	0.75	1.45
Main	11027	10-yr FIS	150.00	2842.00	2843.37	0.010188	4.82	4.82	31.14	25.48	0.77	0.77	0.76
Main	11027	10-yr SBCFCD	920.00	2842.00	2846.15	0.007685	7.82	7.82	117.58	36.62	0.77	0.77	1.46
Main	11027	5-yr SBCFCD	620.00	2842.00	2845.17	0.009313	7.43	7.43	83.45	32.67	0.82	0.82	1.42
Main	11027	2-yr SBCFCD	380.00	2842.00	2844.39	0.009460	6.41	6.41	59.32	29.57	0.80	0.80	1.14
Main	11024	100-yr SBCFCD	1960.00	2842.00	2849.01	0.003598	8.28	8.28	236.70	47.50	0.65	0.65	1.05
Main	11024	100-yr FIS	1700.00	2842.00	2848.37	0.003931	8.22	8.22	206.83	44.97	0.68	0.68	1.06
Main	11024	50-yr FIS	1000.00	2842.00	2846.34	0.005732	8.08	8.08	123.73	37.02	0.78	0.78	1.13
Main	11024	10-yr FIS	150.00	2842.00	2843.16	0.013406	5.83	5.83	25.72	24.53	1.00	1.00	0.86
Main	11024	10-yr SBCFCD	920.00	2842.00	2846.07	0.006143	8.08	8.08	113.86	35.96	0.80	0.80	1.15
Main	11024	5-yr SBCFCD	620.00	2842.00	2844.87	0.009759	8.42	8.42	73.66	31.27	0.97	0.97	1.37
Main	11024	2-yr SBCFCD	380.00	2842.00	2844.07	0.011518	7.61	7.61	49.92	28.13	1.01	1.01	1.23
Main	10720.4	100-yr SBCFCD	1960.00	2841.00	2849.67	0.000028	2.31	2.31	849.72	98.00	0.14	0.14	0.01
Main	10720.4	100-yr FIS	1700.00	2841.00	2849.02	0.000027	2.16	2.16	786.03	98.00	0.13	0.13	0.01
Main	10720.4	50-yr FIS	1000.00	2841.00	2846.99	0.000024	1.70	1.70	587.31	98.00	0.12	0.12	0.01
Main	10720.4	10-yr FIS	150.00	2841.00	2843.03	0.000018	0.76	0.76	198.54	98.00	0.09	0.09	0.00

Main	10720.4	10-yr SBCFCD	920.00	2841.00	2846.72	0.000023	1.64	1.64	560.99	98.00	0.12	0.12	0.01
Main	10720.4	5-yr SBCFCD	620.00	2841.00	2845.59	0.000021	1.38	1.38	450.26	98.00	0.11	0.11	0.01
Main	10720.4	2-yr SBCFCD	380.00	2841.00	2844.48	0.000020	1.11	1.11	341.42	98.00	0.11	0.11	0.00
Main	10694.4		Culvert										
Main	10659.4	100-yr SBCFCD	1960.00	2841.00	2848.81	0.000405	3.39	3.39	578.55	88.25	0.23	0.23	0.16
Main	10659.4	100-yr FIS	1700.00	2841.00	2848.27	0.000390	3.20	3.20	531.80	86.31	0.23	0.23	0.14
Main	10659.4	50-yr FIS	1000.00	2841.00	2846.54	0.000345	2.58	2.58	388.16	80.06	0.21	0.21	0.10
Main	10659.4	10-yr FIS	150.00	2841.00	2842.94	0.000276	1.22	1.22	122.93	67.01	0.16	0.16	0.03
Main	10659.4	10-yr SBCFCD	920.00	2841.00	2846.31	0.000339	2.49	2.49	369.53	79.21	0.20	0.20	0.10
Main	10659.4	5-yr SBCFCD	620.00	2841.00	2845.31	0.000316	2.12	2.12	291.83	75.58	0.19	0.19	0.07
Main	10659.4	2-yr SBCFCD	380.00	2841.00	2844.30	0.000294	1.75	1.75	217.38	71.93	0.18	0.18	0.05
Main	10614.1	100-yr SBCFCD	1960.00	2841.00	2846.53	0.008883	11.03	11.03	177.66	46.85	1.00	1.00	2.01
Main	10614.1	100-yr FIS	1700.00	2841.00	2846.13	0.008997	10.66	10.66	159.43	44.73	1.00	1.00	1.92
Main	10614.1	50-yr FIS	1000.00	2841.00	2844.85	0.009580	9.41	9.41	106.27	37.88	0.99	0.99	1.62
Main	10614.1	10-yr FIS	150.00	2841.00	2842.25	0.012867	5.82	5.82	25.79	24.03	0.99	0.99	0.85
Main	10614.1	10-yr SBCFCD	920.00	2841.00	2844.66	0.009764	9.25	9.25	99.44	36.90	0.99	0.99	1.58
Main	10614.1	5-yr SBCFCD	620.00	2841.00	2843.93	0.010309	8.41	8.41	73.70	32.98	0.99	0.99	1.39
Main	10614.1	2-yr SBCFCD	380.00	2841.00	2843.19	0.011268	7.49	7.49	50.74	29.04	1.00	1.00	1.20
Main	10613.9	100-yr SBCFCD	2590.00	2837.00	2841.80	0.032635	19.97	19.97	129.71	36.65	1.87	1.87	6.79
Main	10613.9	100-yr FIS	2700.00	2837.00	2842.24	0.025458	18.48	18.48	146.12	38.40	1.67	1.67	5.68
Main	10613.9	50-yr FIS	1500.00	2837.00	2840.32	0.043070	18.80	18.80	79.80	30.70	2.05	2.05	6.65
Main	10613.9	10-yr FIS	200.00	2837.00	2837.62	0.263283	17.45	17.45	11.46	19.87	4.05	4.05	9.35
Main	10613.9	10-yr SBCFCD	1220.00	2837.00	2839.76	0.055625	19.30	19.30	63.20	28.45	2.28	2.28	7.38
Main	10613.9	5-yr SBCFCD	820.00	2837.00	2839.02	0.075346	18.90	18.90	43.38	25.51	2.55	2.55	7.71
Main	10613.9	2-yr SBCFCD	500.00	2837.00	2838.35	0.113482	18.40	18.40	27.17	22.82	2.97	2.97	8.21
Main	10213.9	100-yr SBCFCD	2590.00	2836.70	2841.19	0.001688	5.19	5.19	498.95	120.38	0.45	0.45	0.43
Main	10213.9	100-yr FIS	2700.00	2836.70	2841.30	0.001686	5.27	5.27	512.61	120.85	0.45	0.45	0.44
Main	10213.9	50-yr FIS	1500.00	2836.70	2839.95	0.001691	4.25	4.25	352.60	115.29	0.43	0.43	0.32
Main	10213.9	10-yr FIS	200.00	2836.70	2837.71	0.001509	1.90	1.90	105.01	106.13	0.34	0.34	0.09
Main	10213.9	10-yr SBCFCD	1220.00	2836.70	2839.57	0.001686	3.94	3.94	309.90	113.77	0.42	0.42	0.28
Main	10213.9	5-yr SBCFCD	820.00	2836.70	2838.98	0.001662	3.38	3.38	242.91	111.33	0.40	0.40	0.22
Main	10213.9	2-yr SBCFCD	500.00	2836.70	2838.40	0.001634	2.78	2.78	179.77	108.98	0.38	0.38	0.17
Main	9863.9	100-yr SBCFCD	2590.00	2835.60	2838.83	0.009405	9.85	9.85	263.01	88.10	1.00	1.00	1.72
Main	9863.9	100-yr FIS	2700.00	2835.60	2838.91	0.009351	9.98	9.98	270.60	88.45	1.01	1.01	1.76
Main	9863.9	50-yr FIS	1500.00	2835.60	2837.86	0.010506	8.35	8.35	179.69	84.17	1.01	1.01	1.38
Main	9863.9	10-yr FIS	200.00	2835.60	2836.20	0.016019	4.39	4.39	45.55	77.43	1.01	1.01	0.59
Main	9863.9	10-yr SBCFCD	1220.00	2835.60	2837.57	0.010930	7.82	7.82	155.91	83.02	1.01	1.01	1.27
Main	9863.9	5-yr SBCFCD	820.00	2835.60	2837.12	0.011859	6.91	6.91	118.69	81.18	1.01	1.01	1.07
Main	9863.9	2-yr SBCFCD	500.00	2835.60	2836.70	0.013023	5.88	5.88	84.97	79.47	1.00	1.00	0.86
Main	9850	100-yr SBCFCD	2590.00	2831.00	2838.43	0.000049	2.79	2.79	927.43	139.71	0.19	0.19	0.02
Main	9850	100-yr FIS	2700.00	2831.00	2838.67	0.000048	2.81	2.81	960.83	140.67	0.19	0.19	0.02
Main	9850	50-yr FIS	1500.00	2831.00	2835.85	0.000071	2.58	2.58	580.68	129.40	0.21	0.21	0.02
Main	9850	10-yr FIS	200.00	2831.00	2831.11	0.416349	16.74	16.74	11.95	110.43	8.97	8.97	2.81
Main	9850	10-yr SBCFCD	1220.00	2831.00	2835.10	0.000083	2.52	2.52	484.35	126.39	0.23	0.23	0.02
Main	9850	5-yr SBCFCD	820.00	2831.00	2833.92	0.000117	2.43	2.43	337.71	121.66	0.26	0.26	0.02
Main	9850	2-yr SBCFCD	500.00	2831.00	2831.25	0.160925	18.12	18.12	27.60	111.00	6.40	6.40	2.50
Main	9747	100-yr SBCFCD	2590.00	2830.70	2838.24	0.000120	4.29	4.29	603.09	80.00	0.28	0.28	0.05
Main	9747	100-yr FIS	2700.00	2830.70	2838.47	0.000119	4.34	4.34	621.72	80.00	0.27	0.27	0.05
Main	9747	50-yr FIS	1500.00	2830.70	2835.72	0.000146	3.74	3.74	401.29	80.00	0.29	0.29	0.04
Main	9747	10-yr FIS	200.00	2830.70	2831.48	0.001114	3.20	3.20	62.56	80.00	0.64	0.64	0.05
Main	9747	10-yr SBCFCD	1220.00	2830.70	2834.98	0.000160	3.57	3.57	342.21	80.00	0.30	0.30	0.04
Main	9747	5-yr SBCFCD	820.00	2830.70	2833.82	0.000201	3.29	3.29	249.28	80.00	0.33	0.33	0.04
Main	9747	2-yr SBCFCD	500.00	2830.70	2832.74	0.000296	3.06	3.06	163.36	80.00	0.38	0.38	0.04
Main	9536.1	100-yr SBCFCD	2590.00	2830.00	2838.29	0.000057	3.19	3.19	812.02	98.00	0.20	0.20	0.03
Main	9536.1	100-yr FIS	2700.00	2830.00	2838.52	0.000057	3.23	3.23	834.94	98.00	0.20	0.20	0.03
Main	9536.1	50-yr FIS	1500.00	2830.00	2835.75	0.000061	2.66	2.66	563.52	98.00	0.20	0.20	0.02
Main	9536.1	10-yr FIS	200.00	2830.00	2831.50	0.000085	1.36	1.36	147.24	98.00	0.20	0.20	0.01

Main	9536.1	10-yr SBCFCD	1220.00	2830.00	2835.01	0.000063	2.49	2.49	490.81	98.00	0.20	0.20	0.02
Main	9536.1	5-yr SBCFCD	820.00	2830.00	2833.84	0.000067	2.18	2.18	376.35	98.00	0.20	0.20	0.01
Main	9536.1	2-yr SBCFCD	500.00	2830.00	2832.76	0.000073	1.85	1.85	270.53	98.00	0.20	0.20	0.01
Main	9525.6		Culvert										
Main	9515.2	100-yr SBCFCD	2620.00	2830.00	2833.99	0.001009	8.43	8.43	310.80	85.94	0.78	0.78	0.22
Main	9515.2	100-yr FIS	2700.00	2830.00	2834.07	0.000997	8.49	8.49	318.14	86.29	0.78	0.78	0.22
Main	9515.2	50-yr FIS	1500.00	2830.00	2832.83	0.001056	7.01	7.01	214.10	81.32	0.76	0.76	0.17
Main	9515.2	10-yr FIS	200.00	2830.00	2830.85	0.001079	3.30	3.30	60.68	73.39	0.64	0.64	0.06
Main	9515.2	10-yr SBCFCD	1230.00	2830.00	2832.52	0.001053	6.51	6.51	188.95	80.07	0.75	0.75	0.15
Main	9515.2	5-yr SBCFCD	830.00	2830.00	2831.98	0.001078	5.67	5.67	146.40	77.92	0.73	0.73	0.12
Main	9515.2	2-yr SBCFCD	510.00	2830.00	2831.48	0.001081	4.72	4.72	107.98	75.92	0.70	0.70	0.10
Main	9313.9	100-yr SBCFCD	2620.00	2829.50	2832.94	0.009071	10.03	10.03	261.28	82.62	0.99	0.99	1.76
Main	9313.9	100-yr FIS	2700.00	2829.50	2832.99	0.009147	10.16	10.16	265.67	82.82	1.00	1.00	1.79
Main	9313.9	50-yr FIS	1500.00	2829.50	2831.90	0.010000	8.44	8.44	177.67	78.66	0.99	0.99	1.39
Main	9313.9	10-yr FIS	200.00	2829.50	2830.14	0.015030	4.43	4.43	45.10	71.93	0.99	0.99	0.59
Main	9313.9	10-yr SBCFCD	1230.00	2829.50	2831.59	0.010619	7.99	7.99	153.88	77.49	1.00	1.00	1.30
Main	9313.9	5-yr SBCFCD	830.00	2829.50	2831.13	0.011210	7.01	7.01	118.35	75.72	0.99	0.99	1.08
Main	9313.9	2-yr SBCFCD	510.00	2829.50	2830.68	0.012397	6.01	6.01	84.86	74.02	0.99	0.99	0.88
Main	9300	100-yr SBCFCD	2620.00	2825.50	2833.72	0.000139	2.18	2.18	1203.41	162.87	0.14	0.14	0.06
Main	9300	100-yr FIS	2700.00	2825.50	2833.88	0.000138	2.20	2.20	1229.67	163.52	0.14	0.14	0.06
Main	9300	50-yr FIS	1500.00	2825.50	2831.21	0.000157	1.86	1.86	806.94	152.83	0.14	0.14	0.05
Main	9300	10-yr FIS	200.00	2825.50	2826.76	0.000442	1.20	1.20	167.08	135.04	0.19	0.19	0.03
Main	9300	10-yr SBCFCD	1230.00	2825.50	2830.49	0.000166	1.76	1.76	698.86	149.97	0.14	0.14	0.05
Main	9300	5-yr SBCFCD	830.00	2825.50	2829.30	0.000189	1.59	1.59	523.24	145.21	0.15	0.15	0.04
Main	9300	2-yr SBCFCD	510.00	2825.50	2828.17	0.000234	1.41	1.41	361.38	140.68	0.16	0.16	0.04
Main	9035.8	100-yr SBCFCD	2620.00	2825.00	2833.43	0.000117	4.44	4.44	589.99	70.00	0.27	0.27	0.05
Main	9035.8	100-yr FIS	2700.00	2825.00	2833.58	0.000118	4.49	4.49	600.81	70.00	0.27	0.27	0.05
Main	9035.8	50-yr FIS	1500.00	2825.00	2831.01	0.000110	3.56	3.56	420.97	70.00	0.26	0.26	0.04
Main	9035.8	10-yr FIS	200.00	2825.00	2826.68	0.000118	1.70	1.70	117.71	70.00	0.23	0.23	0.01
Main	9035.8	10-yr SBCFCD	1230.00	2825.00	2830.32	0.000108	3.30	3.30	372.70	70.00	0.25	0.25	0.03
Main	9035.8	5-yr SBCFCD	830.00	2825.00	2829.17	0.000107	2.84	2.84	291.95	70.00	0.25	0.25	0.02
Main	9035.8	2-yr SBCFCD	510.00	2825.00	2828.07	0.000108	2.38	2.38	214.72	70.00	0.24	0.24	0.02
Main	9020.4		Culvert										
Main	9005	100-yr SBCFCD	2620.00	2825.00	2832.38	0.000177	5.07	5.07	516.78	70.00	0.33	0.33	0.07
Main	9005	100-yr FIS	2700.00	2825.00	2832.51	0.000178	5.14	5.14	525.62	70.00	0.33	0.33	0.07
Main	9005	50-yr FIS	1500.00	2825.00	2830.37	0.000157	3.99	3.99	375.72	70.00	0.30	0.30	0.05
Main	9005	10-yr FIS	200.00	2825.00	2826.53	0.000160	1.87	1.87	107.19	70.00	0.27	0.27	0.01
Main	9005	10-yr SBCFCD	1230.00	2825.00	2829.78	0.000153	3.68	3.68	334.23	70.00	0.30	0.30	0.04
Main	9005	5-yr SBCFCD	830.00	2825.00	2828.77	0.000148	3.15	3.15	263.68	70.00	0.29	0.29	0.03
Main	9005	2-yr SBCFCD	510.00	2825.00	2827.79	0.000148	2.62	2.62	194.96	70.00	0.28	0.28	0.02
Main	8713.9	100-yr SBCFCD	2620.00	2825.00	2832.41	0.000114	4.16	4.16	629.57	85.00	0.27	0.27	0.04
Main	8713.9	100-yr FIS	2700.00	2825.00	2832.54	0.000114	4.22	4.22	640.45	85.00	0.27	0.27	0.05
Main	8713.9	50-yr FIS	1500.00	2825.00	2830.37	0.000103	3.29	3.29	456.50	85.00	0.25	0.25	0.03
Main	8713.9	10-yr FIS	200.00	2825.00	2826.50	0.000115	1.57	1.57	127.50	85.00	0.23	0.23	0.01
Main	8713.9	10-yr SBCFCD	1230.00	2825.00	2829.77	0.000101	3.03	3.03	405.66	85.00	0.24	0.24	0.03
Main	8713.9	5-yr SBCFCD	830.00	2825.00	2828.76	0.000099	2.60	2.60	319.29	85.00	0.24	0.24	0.02
Main	8713.9	2-yr SBCFCD	510.00	2825.00	2827.77	0.000101	2.17	2.17	235.16	85.00	0.23	0.23	0.02
Main	8470	100-yr SBCFCD	2620.00	2824.80	2830.24	0.011734	11.77	11.77	222.56	51.77	1.00	1.00	3.00
Main	8470	100-yr FIS	2700.00	2824.80	2830.33	0.011802	11.90	11.90	226.83	52.10	1.01	1.01	3.05
Main	8470	50-yr FIS	1500.00	2824.80	2828.68	0.012886	10.23	10.23	146.56	45.52	1.01	1.01	2.49
Main	8470	10-yr FIS	200.00	2824.80	2825.88	0.018460	5.76	5.76	34.74	34.32	1.01	1.01	1.15
Main	8470	10-yr SBCFCD	1230.00	2824.80	2828.24	0.013313	9.71	9.71	126.64	43.74	1.01	1.01	2.32
Main	8470	5-yr SBCFCD	830.00	2824.80	2827.49	0.014232	8.73	8.73	95.08	40.75	1.01	1.01	2.01
Main	8470	2-yr SBCFCD	510.00	2824.80	2826.78	0.015427	7.60	7.60	67.15	37.91	1.01	1.01	1.66
Main	8416	100-yr SBCFCD	2620.00	2823.10	2827.39	0.027543	15.82	15.82	165.57	47.17	1.49	1.49	5.79
Main	8416	100-yr FIS	2700.00	2823.10	2827.48	0.027313	15.93	15.93	169.52	47.50	1.49	1.49	5.83

Main	8416	50-yr FIS	1500.00	2823.10	2826.08	0.032501	14.00	14.00	107.16	41.92	1.54	1.54	5.02
Main	8416	10-yr FIS	200.00	2823.10	2823.92	0.047263	7.74	7.74	25.84	33.27	1.55	1.55	2.27
Main	8416	10-yr SBCFCD	1230.00	2823.10	2825.72	0.034255	13.34	13.34	92.22	40.47	1.56	1.56	4.73
Main	8416	5-yr SBCFCD	830.00	2823.10	2825.12	0.037933	12.06	12.06	68.80	38.08	1.58	1.58	4.17
Main	8416	2-yr SBCFCD	510.00	2823.10	2824.57	0.042459	10.54	10.54	48.38	35.88	1.60	1.60	3.51
Main	8382	100-yr SBCFCD	2620.00	2813.50	2816.13	0.153731	28.31	28.31	92.56	40.50	3.30	3.30	21.28
Main	8382	100-yr FIS	2700.00	2813.50	2816.19	0.150939	28.42	28.42	95.01	40.74	3.28	3.28	21.31
Main	8382	50-yr FIS	1500.00	2813.50	2820.91	0.001239	4.52	4.52	331.98	59.63	0.34	0.34	0.41
Main	8382	10-yr FIS	200.00	2813.50	2817.13	0.000290	1.48	1.48	135.17	44.51	0.15	0.15	0.05
Main	8382	10-yr SBCFCD	1230.00	2813.50	2820.33	0.001125	4.12	4.12	298.36	57.33	0.32	0.32	0.35
Main	8382	5-yr SBCFCD	830.00	2813.50	2819.35	0.000905	3.40	3.40	244.09	53.41	0.28	0.28	0.25
Main	8382	2-yr SBCFCD	510.00	2813.50	2818.39	0.000655	2.62	2.62	194.46	49.55	0.23	0.23	0.15
Main	8330	100-yr SBCFCD	2620.00	2813.50	2822.83	0.001393	5.36	5.36	488.97	74.79	0.37	0.37	0.54
Main	8330	100-yr FIS	2700.00	2813.50	2822.96	0.001405	5.42	5.42	498.21	75.38	0.37	0.37	0.55
Main	8330	50-yr FIS	1500.00	2813.50	2820.87	0.001140	4.27	4.27	351.44	65.37	0.32	0.32	0.37
Main	8330	10-yr FIS	200.00	2813.50	2817.12	0.000279	1.43	1.43	139.81	47.35	0.15	0.15	0.05
Main	8330	10-yr SBCFCD	1230.00	2813.50	2820.30	0.001044	3.91	3.91	314.67	62.62	0.31	0.31	0.31
Main	8330	5-yr SBCFCD	830.00	2813.50	2819.32	0.000851	3.24	3.24	255.78	57.93	0.27	0.27	0.23
Main	8330	2-yr SBCFCD	510.00	2813.50	2818.36	0.000623	2.52	2.52	202.56	53.33	0.23	0.23	0.14
Main	8326	100-yr SBCFCD	2620.00	2815.50	2820.94	0.011768	11.78	11.78	222.33	51.76	1.00	1.00	3.01
Main	8326	100-yr FIS	2700.00	2815.50	2821.03	0.011781	11.90	11.90	226.97	52.11	1.00	1.00	3.05
Main	8326	50-yr FIS	1500.00	2815.50	2819.38	0.012895	10.24	10.24	146.53	45.52	1.01	1.01	2.49
Main	8326	10-yr FIS	200.00	2815.50	2816.58	0.018446	5.76	5.76	34.74	34.32	1.01	1.01	1.15
Main	8326	10-yr SBCFCD	1230.00	2815.50	2818.94	0.013310	9.71	9.71	126.65	43.74	1.01	1.01	2.32
Main	8326	5-yr SBCFCD	830.00	2815.50	2818.19	0.014197	8.72	8.72	95.16	40.76	1.01	1.01	2.01
Main	8326	2-yr SBCFCD	510.00	2815.50	2817.48	0.015356	7.58	7.58	67.25	37.92	1.00	1.00	1.66
Main	8323	100-yr SBCFCD	2620.00	2815.50	2821.78	0.001020	4.82	4.82	543.57	99.22	0.36	0.36	0.34
Main	8323	100-yr FIS	2700.00	2815.50	2821.89	0.001021	4.87	4.87	554.37	99.65	0.36	0.36	0.34
Main	8323	50-yr FIS	1500.00	2815.50	2820.04	0.001016	3.98	3.98	377.24	92.24	0.35	0.35	0.25
Main	8323	10-yr FIS	200.00	2815.50	2816.84	0.001120	1.95	1.95	102.37	79.36	0.30	0.30	0.09
Main	8323	10-yr SBCFCD	1230.00	2815.50	2819.54	0.001019	3.71	3.71	331.40	90.22	0.34	0.34	0.23
Main	8323	5-yr SBCFCD	830.00	2815.50	2818.69	0.001027	3.23	3.23	256.75	86.83	0.33	0.33	0.19
Main	8323	2-yr SBCFCD	510.00	2815.50	2817.88	0.001044	2.72	2.72	187.57	83.57	0.32	0.32	0.14
Main	8113.9	100-yr SBCFCD	2620.00	2815.00	2819.61	0.008849	11.07	11.07	236.71	62.81	1.00	1.00	2.02
Main	8113.9	100-yr FIS	2700.00	2815.00	2819.69	0.008805	11.15	11.15	242.06	63.23	1.00	1.00	2.04
Main	8113.9	50-yr FIS	1500.00	2815.00	2818.27	0.009673	9.53	9.53	157.39	56.20	1.00	1.00	1.65
Main	8113.9	10-yr FIS	200.00	2815.00	2816.00	0.009773	4.70	4.70	42.60	44.97	0.85	0.85	0.57
Main	8113.9	10-yr SBCFCD	1230.00	2815.00	2817.89	0.009991	9.02	9.02	136.39	54.32	1.00	1.00	1.53
Main	8113.9	5-yr SBCFCD	830.00	2815.00	2817.25	0.010814	8.09	8.09	102.54	51.14	1.01	1.01	1.33
Main	8113.9	2-yr SBCFCD	510.00	2815.00	2816.65	0.011751	7.01	7.01	72.80	48.18	1.00	1.00	1.09
Main	7800	100-yr SBCFCD	2620.00	2814.00	2819.29	0.000127	3.68	3.68	712.11	145.17	0.29	0.29	0.04
Main	7800	100-yr FIS	2700.00	2814.00	2819.47	0.000120	3.66	3.66	738.69	145.90	0.29	0.29	0.04
Main	7800	50-yr FIS	1500.00	2814.00	2816.60	0.000457	4.47	4.47	335.67	134.39	0.50	0.50	0.07
Main	7800	10-yr FIS	200.00	2814.00	2814.43	0.003299	3.72	3.72	53.74	125.72	1.00	1.00	0.09
Main	7800	10-yr SBCFCD	1230.00	2814.00	2815.01	0.007317	9.69	9.69	126.88	128.03	1.72	1.72	0.45
Main	7800	5-yr SBCFCD	830.00	2814.00	2814.85	0.005931	7.79	7.79	106.48	127.39	1.50	1.50	0.31
Main	7800	2-yr SBCFCD	510.00	2814.00	2814.69	0.004371	5.87	5.87	86.94	126.77	1.25	1.25	0.19
Main	7761.1	100-yr SBCFCD	2620.00	2811.00	2819.29	0.000081	3.65	3.65	717.70	103.16	0.24	0.24	0.03
Main	7761.1	100-yr FIS	2700.00	2811.00	2819.47	0.000080	3.67	3.67	736.23	103.87	0.24	0.24	0.03
Main	7761.1	50-yr FIS	1500.00	2811.00	2816.69	0.000098	3.24	3.24	463.45	92.78	0.26	0.26	0.03
Main	7761.1	10-yr FIS	200.00	2811.00	2812.48	0.000167	1.86	1.86	107.79	75.91	0.27	0.27	0.01
Main	7761.1	10-yr SBCFCD	1230.00	2811.00	2815.98	0.000104	3.09	3.09	398.29	89.92	0.26	0.26	0.03
Main	7761.1	5-yr SBCFCD	830.00	2811.00	2814.82	0.000117	2.80	2.80	296.74	85.29	0.26	0.26	0.02
Main	7761.1	2-yr SBCFCD	510.00	2811.00	2813.76	0.000133	2.45	2.45	208.16	81.03	0.27	0.27	0.02
Main	7749.9		Culvert										
Main	7738.6	100-yr SBCFCD	2970.00	2811.00	2816.76	0.000214	4.94	4.94	601.58	116.02	0.38	0.38	0.07
Main	7738.6	100-yr FIS	2700.00	2811.00	2816.04	0.000279	5.20	5.20	519.17	113.15	0.43	0.43	0.08

Main	7738.6	50-yr FIS	1500.00	2811.00	2813.42	0.001028	6.34	6.34	236.41	102.67	0.74	0.74	0.15
Main	7738.6	10-yr FIS	200.00	2811.00	2811.51	0.003407	4.20	4.20	47.60	95.03	1.05	1.05	0.11
Main	7738.6	10-yr SBCFCD	1400.00	2811.00	2813.20	0.001227	6.53	6.53	214.32	101.80	0.79	0.79	0.16
Main	7738.6	5-yr SBCFCD	930.00	2811.00	2812.45	0.002190	6.69	6.69	139.07	98.80	0.99	0.99	0.19
Main	7738.6	2-yr SBCFCD	570.00	2811.00	2812.04	0.002525	5.78	5.78	98.60	97.15	1.01	1.01	0.16
Main	7456.8	100-yr SBCFCD	2970.00	2809.00	2816.69	0.000688	4.43	4.43	669.77	102.62	0.31	0.31	0.27
Main	7456.8	100-yr FIS	2700.00	2809.00	2815.96	0.000805	4.53	4.53	595.91	99.67	0.33	0.33	0.29
Main	7456.8	50-yr FIS	1500.00	2809.00	2813.25	0.001361	4.41	4.41	340.09	88.68	0.40	0.40	0.32
Main	7456.8	10-yr FIS	200.00	2809.00	2809.60	0.017242	4.57	4.57	43.74	73.93	1.05	1.05	0.63
Main	7456.8	10-yr SBCFCD	1400.00	2809.00	2813.01	0.001443	4.39	4.39	319.07	87.71	0.41	0.41	0.32
Main	7456.8	5-yr SBCFCD	930.00	2809.00	2811.78	0.002190	4.33	4.33	214.71	82.76	0.47	0.47	0.35
Main	7456.8	2-yr SBCFCD	570.00	2809.00	2810.68	0.004519	4.53	4.53	125.69	78.29	0.63	0.63	0.45
Main	7267	100-yr SBCFCD	2970.00	2808.00	2816.83	0.000029	2.39	2.39	1241.89	158.32	0.15	0.15	0.01
Main	7267	100-yr FIS	2700.00	2808.00	2816.11	0.000032	2.39	2.39	1128.52	155.43	0.16	0.16	0.01
Main	7267	50-yr FIS	1500.00	2808.00	2813.39	0.000040	2.08	2.08	720.88	144.55	0.16	0.16	0.01
Main	7267	10-yr FIS	200.00	2808.00	2809.44	0.000060	1.11	1.11	180.91	128.75	0.16	0.16	0.01
Main	7267	10-yr SBCFCD	1400.00	2808.00	2813.15	0.000040	2.04	2.04	686.41	143.60	0.16	0.16	0.01
Main	7267	5-yr SBCFCD	930.00	2808.00	2811.93	0.000045	1.81	1.81	513.73	138.70	0.17	0.17	0.01
Main	7267	2-yr SBCFCD	570.00	2808.00	2810.84	0.000050	1.56	1.56	365.82	134.37	0.17	0.17	0.01
Main	7249.1		Culvert										
Main	7231.3	100-yr SBCFCD	3150.00	2808.00	2814.94	0.000074	3.32	3.32	950.01	150.76	0.23	0.23	0.03
Main	7231.3	100-yr FIS	2700.00	2808.00	2814.04	0.000088	3.31	3.31	815.21	147.14	0.25	0.25	0.03
Main	7231.3	50-yr FIS	1500.00	2808.00	2811.40	0.000189	3.40	3.40	440.64	136.58	0.33	0.33	0.04
Main	7231.3	10-yr FIS	200.00	2808.00	2808.43	0.003353	3.75	3.75	53.31	124.72	1.01	1.01	0.09
Main	7231.3	10-yr SBCFCD	1480.00	2808.00	2811.35	0.000193	3.41	3.41	434.11	136.39	0.34	0.34	0.04
Main	7231.3	5-yr SBCFCD	990.00	2808.00	2810.09	0.000416	3.72	3.72	266.40	131.38	0.46	0.46	0.05
Main	7231.3	2-yr SBCFCD	610.00	2808.00	2808.97	0.002098	5.05	5.05	120.72	126.87	0.91	0.91	0.12
Main	7010.2	100-yr SBCFCD	3150.00	2807.00	2814.99	0.000085	1.72	1.72	1828.35	244.94	0.11	0.11	0.04
Main	7010.2	100-yr FIS	2700.00	2807.00	2814.08	0.000093	1.68	1.68	1607.96	241.31	0.11	0.11	0.04
Main	7010.2	50-yr FIS	1500.00	2807.00	2811.43	0.000139	1.53	1.53	983.11	230.72	0.13	0.13	0.04
Main	7010.2	10-yr FIS	200.00	2807.00	2807.43	0.005816	2.16	2.16	92.73	214.73	0.58	0.58	0.16
Main	7010.2	10-yr SBCFCD	1480.00	2807.00	2811.38	0.000140	1.52	1.52	972.07	230.53	0.13	0.13	0.04
Main	7010.2	5-yr SBCFCD	990.00	2807.00	2810.13	0.000195	1.45	1.45	685.10	225.50	0.15	0.15	0.04
Main	7010.2	2-yr SBCFCD	610.00	2807.00	2809.00	0.000331	1.41	1.41	433.35	220.99	0.18	0.18	0.04
Main	6801.5	100-yr SBCFCD	3150.00	2806.00	2814.93	0.000028	2.42	2.42	1302.68	154.00	0.15	0.15	0.01
Main	6801.5	100-yr FIS	2700.00	2806.00	2814.03	0.000029	2.32	2.32	1163.80	154.00	0.15	0.15	0.01
Main	6801.5	50-yr FIS	1500.00	2806.00	2811.39	0.000036	1.98	1.98	758.97	151.56	0.16	0.16	0.01
Main	6801.5	10-yr FIS	200.00	2806.00	2807.43	0.000054	1.05	1.05	190.58	135.74	0.16	0.16	0.00
Main	6801.5	10-yr SBCFCD	1480.00	2806.00	2811.34	0.000036	1.97	1.97	751.72	151.37	0.16	0.16	0.01
Main	6801.5	5-yr SBCFCD	990.00	2806.00	2810.09	0.000039	1.75	1.75	565.53	146.37	0.16	0.16	0.01
Main	6801.5	2-yr SBCFCD	610.00	2806.00	2808.97	0.000044	1.51	1.51	404.05	141.89	0.16	0.16	0.01
Main	6785.6		Culvert										
Main	6769.7	100-yr SBCFCD	3150.00	2806.00	2809.33	0.001728	10.15	10.15	310.35	96.65	1.00	1.00	0.34
Main	6769.7	100-yr FIS	2700.00	2806.00	2809.02	0.001752	9.62	9.62	280.78	96.04	0.99	0.99	0.31
Main	6769.7	50-yr FIS	1500.00	2806.00	2808.05	0.001966	7.96	7.96	188.50	94.10	0.99	0.99	0.24
Main	6769.7	10-yr FIS	200.00	2806.00	2806.53	0.003092	4.15	4.15	48.23	91.07	1.00	1.00	0.10
Main	6769.7	10-yr SBCFCD	1480.00	2806.00	2808.03	0.001977	7.93	7.93	186.62	94.06	0.99	0.99	0.24
Main	6769.7	5-yr SBCFCD	990.00	2806.00	2807.56	0.002119	6.93	6.93	142.79	93.12	0.99	0.99	0.20
Main	6769.7	2-yr SBCFCD	610.00	2806.00	2807.13	0.002372	5.94	5.94	102.70	92.25	0.99	0.99	0.16
Main	6769.1	100-yr SBCFCD	3150.00	2804.30	2807.21	0.023104	14.41	14.41	218.61	81.25	1.55	1.55	3.82
Main	6769.1	100-yr FIS	2700.00	2804.30	2806.88	0.025679	14.09	14.09	191.61	79.84	1.60	1.60	3.79
Main	6769.1	50-yr FIS	1500.00	2804.30	2805.89	0.040164	13.04	13.04	115.04	75.70	1.86	1.86	3.77
Main	6769.1	10-yr FIS	200.00	2804.30	2804.57	0.270701	10.68	10.68	18.73	70.13	3.64	3.64	4.51
Main	6769.1	10-yr SBCFCD	1480.00	2804.30	2805.87	0.040608	13.02	13.02	113.69	75.62	1.87	1.87	3.78
Main	6769.1	5-yr SBCFCD	990.00	2804.30	2805.42	0.056983	12.41	12.41	79.79	73.71	2.10	2.10	3.82
Main	6769.1	2-yr SBCFCD	610.00	2804.30	2805.03	0.088429	11.78	11.78	51.79	72.09	2.45	2.45	3.95

Main	6555.8	100-yr SBCFCD	3150.00	2802.80	2807.83	0.001012	4.38	4.38	719.86	153.13	0.36	0.36	0.29
Main	6555.8	100-yr FIS	2700.00	2802.80	2806.95	0.001425	4.61	4.61	586.09	149.59	0.41	0.41	0.34
Main	6555.8	50-yr FIS	1500.00	2802.80	2805.09	0.003229	4.76	4.76	315.10	142.16	0.56	0.56	0.44
Main	6555.8	10-yr FIS	200.00	2802.80	2803.44	0.004084	2.33	2.33	85.83	135.56	0.52	0.52	0.16
Main	6555.8	10-yr SBCFCD	1480.00	2802.80	2805.07	0.003238	4.74	4.74	312.22	142.08	0.56	0.56	0.44
Main	6555.8	5-yr SBCFCD	990.00	2802.80	2804.55	0.003432	4.13	4.13	239.49	140.02	0.56	0.56	0.36
Main	6555.8	2-yr SBCFCD	610.00	2802.80	2804.08	0.003702	3.51	3.51	174.03	138.13	0.55	0.55	0.29
Main	6540	100-yr SBCFCD	3150.00	2802.70	2807.69	0.001448	5.12	5.12	615.26	135.49	0.42	0.42	0.40
Main	6540	100-yr FIS	2700.00	2802.70	2806.77	0.002131	5.48	5.48	492.35	130.96	0.50	0.50	0.49
Main	6540	50-yr FIS	1500.00	2802.70	2804.46	0.011203	7.41	7.41	202.32	119.61	1.00	1.00	1.18
Main	6540	10-yr FIS	200.00	2802.70	2803.17	0.016808	3.83	3.83	52.24	113.29	0.99	0.99	0.48
Main	6540	10-yr SBCFCD	1480.00	2802.70	2804.44	0.011165	7.37	7.37	200.86	119.55	1.00	1.00	1.16
Main	6540	5-yr SBCFCD	990.00	2802.70	2804.03	0.012237	6.50	6.50	152.41	117.54	1.01	1.01	0.99
Main	6540	2-yr SBCFCD	610.00	2802.70	2803.68	0.012999	5.48	5.48	111.22	115.81	0.99	0.99	0.78
Main	6535	100-yr SBCFCD	3150.00	2800.00	2807.87	0.000289	3.03	3.03	1038.43	148.47	0.20	0.20	0.12
Main	6535	100-yr FIS	2700.00	2800.00	2806.99	0.000319	2.97	2.97	909.44	144.96	0.21	0.21	0.12
Main	6535	50-yr FIS	1500.00	2800.00	2804.46	0.000457	2.70	2.70	555.83	134.85	0.23	0.23	0.12
Main	6535	10-yr FIS	200.00	2800.00	2800.15	0.762145	12.08	12.08	16.55	112.04	5.54	5.54	7.03
Main	6535	10-yr SBCFCD	1480.00	2800.00	2804.42	0.000461	2.69	2.69	549.51	134.66	0.23	0.23	0.12
Main	6535	5-yr SBCFCD	990.00	2800.00	2803.19	0.000626	2.55	2.55	387.51	129.76	0.26	0.26	0.12
Main	6535	2-yr SBCFCD	610.00	2800.00	2802.09	0.001007	2.47	2.47	247.46	125.37	0.31	0.31	0.12
Main	6385	100-yr SBCFCD	3150.00	2799.50	2807.86	0.000048	2.95	2.95	1067.65	144.44	0.19	0.19	0.02
Main	6385	100-yr FIS	2700.00	2799.50	2806.98	0.000052	2.87	2.87	942.21	140.92	0.20	0.20	0.02
Main	6385	50-yr FIS	1500.00	2799.50	2804.45	0.000065	2.51	2.51	598.74	130.81	0.21	0.21	0.02
Main	6385	10-yr FIS	200.00	2799.50	2800.57	0.000200	1.66	1.66	120.50	115.26	0.29	0.29	0.01
Main	6385	10-yr SBCFCD	1480.00	2799.50	2804.41	0.000065	2.50	2.50	592.58	130.62	0.21	0.21	0.02
Main	6385	5-yr SBCFCD	990.00	2799.50	2803.18	0.000077	2.27	2.27	435.43	125.72	0.22	0.22	0.02
Main	6385	2-yr SBCFCD	610.00	2799.50	2802.08	0.000096	2.04	2.04	299.52	121.31	0.23	0.23	0.01
Main	6344.7	100-yr SBCFCD	3150.00	2799.20	2807.88	0.000030	2.45	2.45	1284.45	148.00	0.15	0.15	0.01
Main	6344.7	100-yr FIS	2700.00	2799.20	2807.00	0.000031	2.34	2.34	1154.37	148.00	0.15	0.15	0.01
Main	6344.7	50-yr FIS	1500.00	2799.20	2804.47	0.000034	1.92	1.92	780.04	148.00	0.15	0.15	0.01
Main	6344.7	10-yr FIS	200.00	2799.20	2800.58	0.000049	0.98	0.98	203.61	148.00	0.15	0.15	0.00
Main	6344.7	10-yr SBCFCD	1480.00	2799.20	2804.42	0.000034	1.91	1.91	773.06	148.00	0.15	0.15	0.01
Main	6344.7	5-yr SBCFCD	990.00	2799.20	2803.20	0.000036	1.67	1.67	591.31	148.00	0.15	0.15	0.01
Main	6344.7	2-yr SBCFCD	610.00	2799.20	2802.09	0.000040	1.42	1.42	428.14	148.00	0.15	0.15	0.01
Main	6328.7		Culvert										
Main	6312.5	100-yr SBCFCD	3150.00	2799.00	2804.75	0.000206	4.93	4.93	638.55	111.00	0.36	0.36	0.07
Main	6312.5	100-yr FIS	2700.00	2799.00	2804.10	0.000224	4.77	4.77	565.62	111.00	0.37	0.37	0.07
Main	6312.5	50-yr FIS	1500.00	2799.00	2802.03	0.000374	4.47	4.47	335.90	111.00	0.45	0.45	0.07
Main	6312.5	10-yr FIS	200.00	2799.00	2799.46	0.003380	3.93	3.93	50.89	111.00	1.02	1.02	0.10
Main	6312.5	10-yr SBCFCD	1480.00	2799.00	2801.99	0.000380	4.46	4.46	331.54	111.00	0.46	0.46	0.07
Main	6312.5	5-yr SBCFCD	990.00	2799.00	2800.92	0.000727	4.65	4.65	212.84	111.00	0.59	0.59	0.08
Main	6312.5	2-yr SBCFCD	610.00	2799.00	2799.99	0.002490	5.58	5.58	109.32	111.00	0.99	0.99	0.15
Main	6275	100-yr SBCFCD	3150.00	2798.00	2804.81	0.000573	3.90	3.90	807.94	132.24	0.28	0.28	0.21
Main	6275	100-yr FIS	2700.00	2798.00	2804.15	0.000596	3.74	3.74	721.45	129.60	0.28	0.28	0.20
Main	6275	50-yr FIS	1500.00	2798.00	2802.08	0.000740	3.25	3.25	461.67	121.32	0.29	0.29	0.17
Main	6275	10-yr FIS	200.00	2798.00	2798.82	0.002820	2.28	2.28	87.72	108.29	0.45	0.45	0.14
Main	6275	10-yr SBCFCD	1480.00	2798.00	2802.04	0.000744	3.24	3.24	456.91	121.16	0.29	0.29	0.17
Main	6275	5-yr SBCFCD	990.00	2798.00	2800.99	0.000923	2.99	2.99	331.29	116.94	0.31	0.31	0.16
Main	6275	2-yr SBCFCD	610.00	2798.00	2800.03	0.001273	2.75	2.75	221.67	113.13	0.35	0.35	0.15
Main	6170	100-yr SBCFCD	3150.00	2796.80	2802.40	0.011621	12.11	12.11	260.11	57.83	1.01	1.01	3.12
Main	6170	100-yr FIS	2700.00	2796.80	2801.91	0.011860	11.63	11.63	232.17	55.82	1.00	1.00	2.95
Main	6170	50-yr FIS	1500.00	2796.80	2800.37	0.012983	9.94	9.94	150.86	49.54	1.00	1.00	2.39
Main	6170	10-yr FIS	200.00	2796.80	2797.78	0.018784	5.51	5.51	36.32	39.00	1.01	1.01	1.08
Main	6170	10-yr SBCFCD	1480.00	2796.80	2800.34	0.013036	9.91	9.91	149.30	49.41	1.00	1.00	2.38
Main	6170	5-yr SBCFCD	990.00	2796.80	2799.55	0.014000	8.88	8.88	111.52	46.19	1.01	1.01	2.05
Main	6170	2-yr SBCFCD	610.00	2796.80	2798.82	0.015203	7.72	7.72	79.05	43.23	1.01	1.01	1.70

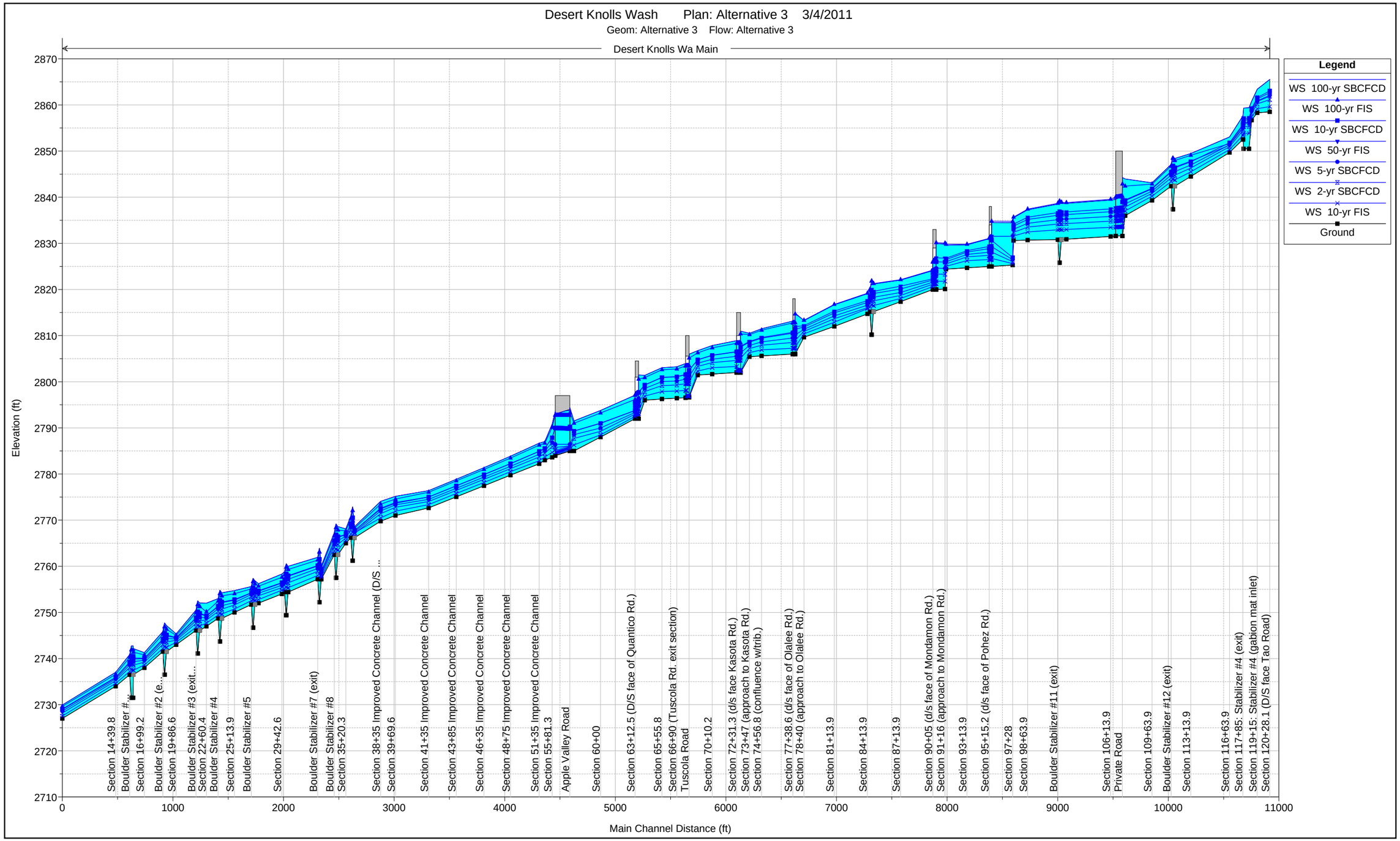
Main	6114	100-yr SBCFCD	3150.00	2795.00	2799.39	0.027828	16.35	16.35	192.62	52.86	1.51	1.51	6.10
Main	6114	100-yr FIS	2700.00	2795.00	2798.97	0.029098	15.80	15.80	170.84	51.15	1.52	1.52	5.86
Main	6114	50-yr FIS	1500.00	2795.00	2797.69	0.034669	13.79	13.79	108.76	45.94	1.58	1.58	4.99
Main	6114	10-yr FIS	200.00	2795.00	2795.73	0.049841	7.46	7.46	26.79	37.99	1.57	1.57	2.17
Main	6114	10-yr SBCFCD	1480.00	2795.00	2797.66	0.034794	13.75	13.75	107.67	45.85	1.58	1.58	4.97
Main	6114	5-yr SBCFCD	990.00	2795.00	2797.04	0.038975	12.41	12.41	79.75	43.30	1.61	1.61	4.39
Main	6114	2-yr SBCFCD	610.00	2795.00	2796.48	0.043797	10.84	10.84	56.25	41.03	1.63	1.63	3.69
Main	6084	100-yr SBCFCD	3150.00	2786.90	2798.59	0.000750	4.58	4.58	687.35	82.38	0.28	0.28	0.37
Main	6084	100-yr FIS	2700.00	2786.90	2797.86	0.000708	4.30	4.30	627.94	79.47	0.27	0.27	0.33
Main	6084	50-yr FIS	1500.00	2786.90	2795.48	0.000554	3.33	3.33	450.08	69.94	0.23	0.23	0.21
Main	6084	10-yr FIS	200.00	2786.90	2790.97	0.000145	1.13	1.13	176.31	51.59	0.11	0.11	0.03
Main	6084	10-yr SBCFCD	1480.00	2786.90	2795.43	0.000551	3.31	3.31	446.83	69.75	0.23	0.23	0.21
Main	6084	5-yr SBCFCD	990.00	2786.90	2794.15	0.000451	2.74	2.74	360.73	64.52	0.20	0.20	0.15
Main	6084	2-yr SBCFCD	610.00	2786.90	2792.90	0.000341	2.15	2.15	283.25	59.43	0.17	0.17	0.10
Main	6031	100-yr SBCFCD	3150.00	2786.90	2798.55	0.000761	4.61	4.61	683.73	82.21	0.28	0.28	0.37
Main	6031	100-yr FIS	2700.00	2786.90	2797.82	0.000719	4.32	4.32	624.65	79.31	0.27	0.27	0.33
Main	6031	50-yr FIS	1500.00	2786.90	2795.45	0.000562	3.35	3.35	447.87	69.81	0.23	0.23	0.21
Main	6031	10-yr FIS	200.00	2786.90	2790.97	0.000146	1.14	1.14	175.91	51.55	0.11	0.11	0.03
Main	6031	10-yr SBCFCD	1480.00	2786.90	2795.40	0.000558	3.33	3.33	444.63	69.62	0.23	0.23	0.21
Main	6031	5-yr SBCFCD	990.00	2786.90	2794.12	0.000457	2.76	2.76	359.09	64.42	0.21	0.21	0.15
Main	6031	2-yr SBCFCD	610.00	2786.90	2792.88	0.000345	2.16	2.16	282.12	59.36	0.17	0.17	0.10
Main	6027	100-yr SBCFCD	3150.00	2788.90	2798.24	0.001775	6.24	6.24	504.59	73.04	0.42	0.42	0.72
Main	6027	100-yr FIS	2700.00	2788.90	2797.53	0.001759	5.95	5.95	453.43	70.13	0.41	0.41	0.67
Main	6027	50-yr FIS	1500.00	2788.90	2795.21	0.001714	4.96	4.96	302.13	60.71	0.39	0.39	0.51
Main	6027	10-yr FIS	200.00	2788.90	2790.87	0.001785	2.60	2.60	76.83	43.02	0.34	0.34	0.19
Main	6027	10-yr SBCFCD	1480.00	2788.90	2795.17	0.001713	4.94	4.94	299.41	60.53	0.39	0.39	0.50
Main	6027	5-yr SBCFCD	990.00	2788.90	2793.93	0.001694	4.35	4.35	227.37	55.47	0.38	0.38	0.42
Main	6027	2-yr SBCFCD	610.00	2788.90	2792.72	0.001696	3.73	3.73	163.36	50.55	0.37	0.37	0.33
Main	6024	100-yr SBCFCD	3150.00	2788.90	2796.12	0.008263	12.74	12.74	247.18	48.45	0.99	0.99	2.46
Main	6024	100-yr FIS	2700.00	2788.90	2795.54	0.008433	12.31	12.31	219.42	46.14	0.99	0.99	2.34
Main	6024	50-yr FIS	1500.00	2788.90	2793.66	0.009128	10.72	10.72	139.93	38.76	0.99	0.99	1.94
Main	6024	10-yr FIS	200.00	2788.90	2790.29	0.012776	6.34	6.34	31.52	25.46	1.00	1.00	0.96
Main	6024	10-yr SBCFCD	1480.00	2788.90	2793.62	0.009222	10.72	10.72	138.09	38.57	1.00	1.00	1.95
Main	6024	5-yr SBCFCD	990.00	2788.90	2792.61	0.009961	9.78	9.78	101.23	34.60	1.01	1.01	1.73
Main	6024	2-yr SBCFCD	610.00	2788.90	2791.68	0.010638	8.62	8.62	70.75	30.94	1.00	1.00	1.46
Main	5742.1	100-yr SBCFCD	3150.00	2785.00	2794.62	0.000227	6.36	6.36	495.13	55.89	0.38	0.38	0.10
Main	5742.1	100-yr FIS	2700.00	2785.00	2793.38	0.000259	6.33	6.33	426.24	54.74	0.40	0.40	0.10
Main	5742.1	50-yr FIS	1500.00	2785.00	2790.39	0.000329	5.62	5.62	266.76	51.98	0.44	0.44	0.09
Main	5742.1	10-yr FIS	200.00	2785.00	2785.47	0.016974	8.94	8.94	22.38	47.44	2.29	2.29	0.49
Main	5742.1	10-yr SBCFCD	1480.00	2785.00	2790.34	0.000331	5.61	5.61	263.91	51.93	0.44	0.44	0.09
Main	5742.1	5-yr SBCFCD	990.00	2785.00	2786.28	0.015495	16.24	16.24	60.98	48.18	2.54	2.54	1.18
Main	5742.1	2-yr SBCFCD	610.00	2785.00	2785.93	0.017024	13.85	13.85	44.04	47.86	2.54	2.54	0.95
Main	5742	100-yr SBCFCD	3150.00	2785.00	2794.57	0.000268	6.58	6.58	478.86	59.29	0.41	0.41	0.11
Main	5742	100-yr FIS	2700.00	2785.00	2793.29	0.000318	6.67	6.67	404.91	56.25	0.44	0.44	0.12
Main	5742	50-yr FIS	1500.00	2785.00	2790.30	0.000398	6.02	6.02	249.03	47.83	0.47	0.47	0.11
Main	5742	10-yr FIS	200.00	2785.00	2785.48	0.016782	8.92	8.92	22.42	47.00	2.28	2.28	0.49
Main	5742	10-yr SBCFCD	1480.00	2785.00	2790.24	0.000400	6.00	6.00	246.48	47.68	0.47	0.47	0.11
Main	5742	5-yr SBCFCD	990.00	2785.00	2786.30	0.015150	16.18	16.18	61.18	47.00	2.50	2.50	1.17
Main	5742	2-yr SBCFCD	610.00	2785.00	2785.94	0.016715	13.81	13.81	44.17	47.00	2.51	2.51	0.94
Main	5679.8		Culvert										
Main	5609.6	100-yr SBCFCD	3150.00	2784.00	2793.73	0.000359	6.52	6.52	483.22	74.93	0.45	0.45	0.12
Main	5609.6	100-yr FIS	2700.00	2784.00	2792.80	0.000395	6.52	6.52	414.37	69.27	0.47	0.47	0.12
Main	5609.6	50-yr FIS	1500.00	2784.00	2790.03	0.000279	5.41	5.41	277.20	46.00	0.39	0.39	0.08
Main	5609.6	10-yr FIS	200.00	2784.00	2784.84	0.002675	5.15	5.15	38.81	46.00	0.99	0.99	0.14
Main	5609.6	10-yr SBCFCD	1480.00	2784.00	2789.98	0.000278	5.38	5.38	274.88	46.00	0.39	0.39	0.08
Main	5609.6	5-yr SBCFCD	990.00	2784.00	2786.44	0.002086	8.84	8.84	112.04	46.00	1.00	1.00	0.29
Main	5609.6	2-yr SBCFCD	610.00	2784.00	2785.78	0.002194	7.47	7.47	81.66	46.00	0.99	0.99	0.23

Main	5581.3	100-yr SBCFCD	3150.00	2783.60	2790.79	0.001834	13.68	13.68	230.19	39.35	1.00	1.00	0.54
Main	5581.3	100-yr FIS	2700.00	2783.60	2790.10	0.001876	13.26	13.26	203.69	36.97	1.00	1.00	0.51
Main	5581.3	50-yr FIS	1500.00	2783.60	2787.92	0.002044	11.52	11.52	130.20	31.06	0.99	0.99	0.42
Main	5581.3	10-yr FIS	200.00	2783.60	2784.72	0.002563	5.95	5.95	33.62	30.02	0.99	0.99	0.17
Main	5581.3	10-yr SBCFCD	1480.00	2783.60	2787.87	0.002068	11.52	11.52	128.52	31.00	1.00	1.00	0.43
Main	5581.3	5-yr SBCFCD	990.00	2783.60	2786.85	0.002126	10.15	10.15	97.56	30.03	0.99	0.99	0.35
Main	5581.3	2-yr SBCFCD	610.00	2783.60	2785.95	0.002221	8.64	8.64	70.57	30.02	0.99	0.99	0.28
Main	5515.3	100-yr SBCFCD	3150.00	2783.00	2787.05	0.006259	19.86	19.86	158.57	46.68	1.90	1.90	1.27
Main	5515.3	100-yr FIS	2700.00	2783.00	2786.68	0.006422	19.06	19.06	141.65	45.36	1.90	1.90	1.20
Main	5515.3	50-yr FIS	1500.00	2783.00	2785.57	0.006887	16.03	16.03	93.55	41.31	1.88	1.88	0.94
Main	5515.3	10-yr FIS	200.00	2783.00	2783.69	0.010362	8.81	8.81	22.70	34.13	1.90	1.90	0.43
Main	5515.3	10-yr SBCFCD	1480.00	2783.00	2785.55	0.006894	15.97	15.97	92.70	41.23	1.88	1.88	0.94
Main	5515.3	5-yr SBCFCD	990.00	2783.00	2784.99	0.007157	14.06	14.06	70.39	39.16	1.85	1.85	0.78
Main	5515.3	2-yr SBCFCD	610.00	2783.00	2784.47	0.007644	12.10	12.10	50.43	37.17	1.83	1.83	0.64
Main	5135	100-yr SBCFCD	3150.00	2782.21	2786.70	0.004477	19.12	20.80	164.78	43.46	1.73	1.81	1.25
Main	5135	100-yr FIS	2700.00	2782.21	2786.26	0.004750	18.51	20.00	145.88	42.13	1.75	1.83	1.20
Main	5135	50-yr FIS	1500.00	2782.21	2784.94	0.005815	16.12	17.02	93.06	38.19	1.82	1.87	0.99
Main	5135	10-yr FIS	200.00	2782.21	2782.89	0.011998	9.52	9.66	21.01	32.03	2.07	2.09	0.51
Main	5135	10-yr SBCFCD	1480.00	2782.21	2784.91	0.005850	16.07	16.97	92.08	38.11	1.82	1.88	0.99
Main	5135	5-yr SBCFCD	990.00	2782.21	2784.28	0.006642	14.48	15.11	68.36	36.20	1.85	1.90	0.86
Main	5135	2-yr SBCFCD	610.00	2782.21	2783.69	0.007866	12.77	13.18	47.75	34.45	1.91	1.95	0.73
Main	4875	100-yr SBCFCD	3150.00	2779.75	2783.87	0.006074	21.15	22.88	148.92	42.35	1.99	2.07	1.56
Main	4875	100-yr FIS	2700.00	2779.75	2783.46	0.006448	20.47	21.99	131.90	41.13	2.01	2.09	1.49
Main	4875	50-yr FIS	1500.00	2779.75	2782.26	0.007767	17.69	18.61	84.79	37.53	2.07	2.13	1.22
Main	4875	10-yr FIS	200.00	2779.75	2780.50	0.008377	8.52	8.66	23.46	32.26	1.76	1.78	0.39
Main	4875	10-yr SBCFCD	1480.00	2779.75	2782.24	0.007801	17.63	18.54	83.94	37.47	2.07	2.13	1.21
Main	4875	5-yr SBCFCD	990.00	2779.75	2781.67	0.008595	15.72	16.35	63.00	35.75	2.08	2.13	1.03
Main	4875	2-yr SBCFCD	610.00	2779.75	2781.16	0.009262	13.44	13.85	45.37	34.24	2.05	2.09	0.82
Main	4635	100-yr SBCFCD	3150.00	2777.45	2781.38	0.007137	22.31	24.06	141.20	41.80	2.14	2.23	1.75
Main	4635	100-yr FIS	2700.00	2777.45	2781.00	0.007522	21.53	23.07	125.41	40.65	2.16	2.24	1.67
Main	4635	50-yr FIS	1500.00	2777.45	2779.88	0.008699	18.35	19.27	81.76	37.29	2.18	2.24	1.32
Main	4635	10-yr FIS	200.00	2777.45	2778.17	0.010001	9.00	9.14	22.22	32.15	1.90	1.92	0.45
Main	4635	10-yr SBCFCD	1480.00	2777.45	2779.86	0.008727	18.28	19.19	80.98	37.23	2.18	2.24	1.31
Main	4635	5-yr SBCFCD	990.00	2777.45	2779.33	0.009220	16.07	16.70	61.61	35.63	2.15	2.20	1.08
Main	4635	2-yr SBCFCD	610.00	2777.45	2778.85	0.009523	13.56	13.97	44.98	34.20	2.08	2.12	0.83
Main	4385	100-yr SBCFCD	3150.00	2775.05	2778.87	0.007917	23.09	24.85	136.45	41.46	2.24	2.33	1.89
Main	4385	100-yr FIS	2700.00	2775.05	2778.51	0.008267	22.21	23.76	121.59	40.37	2.25	2.34	1.78
Main	4385	50-yr FIS	1500.00	2775.05	2777.45	0.009155	18.65	19.57	80.44	37.18	2.23	2.29	1.37
Main	4385	10-yr FIS	200.00	2775.05	2775.78	0.009382	8.83	8.97	22.66	32.19	1.85	1.87	0.43
Main	4385	10-yr SBCFCD	1480.00	2775.05	2777.43	0.009175	18.57	19.49	79.69	37.12	2.23	2.29	1.36
Main	4385	5-yr SBCFCD	990.00	2775.05	2776.91	0.009467	16.20	16.84	61.10	35.59	2.17	2.23	1.10
Main	4385	2-yr SBCFCD	610.00	2775.05	2776.45	0.009597	13.59	14.00	44.87	34.19	2.09	2.13	0.84
Main	4135	100-yr SBCFCD	3150.00	2772.65	2776.40	0.008459	23.59	25.37	133.51	41.24	2.31	2.40	1.98
Main	4135	100-yr FIS	2700.00	2772.65	2776.05	0.008741	22.61	24.17	119.40	40.20	2.31	2.40	1.86
Main	4135	50-yr FIS	1500.00	2772.65	2775.03	0.009388	18.80	19.73	79.79	37.13	2.25	2.32	1.39
Main	4135	10-yr FIS	200.00	2772.65	2773.37	0.009707	8.92	9.06	22.42	32.16	1.88	1.90	0.44
Main	4135	10-yr SBCFCD	1480.00	2772.65	2775.01	0.009400	18.72	19.63	79.08	37.07	2.25	2.32	1.38
Main	4135	5-yr SBCFCD	990.00	2772.65	2774.51	0.009570	16.26	16.89	60.89	35.57	2.18	2.24	1.11
Main	4135	2-yr SBCFCD	610.00	2772.65	2774.05	0.009603	13.60	14.00	44.86	34.19	2.09	2.13	0.84
Main	3969.6	100-yr SBCFCD	3380.00	2771.00	2774.83	0.010134	24.57	24.57	137.57	41.83	2.39	2.39	1.97
Main	3969.6	100-yr FIS	2700.00	2771.00	2774.26	0.011260	23.63	23.63	114.25	40.08	2.47	2.47	1.91
Main	3969.6	50-yr FIS	1500.00	2771.00	2773.31	0.011223	19.32	19.32	77.64	37.17	2.36	2.36	1.41
Main	3969.6	10-yr FIS	200.00	2771.00	2771.71	0.010357	9.00	9.00	22.22	32.24	1.91	1.91	0.44
Main	3969.6	10-yr SBCFCD	1600.00	2771.00	2773.49	0.009971	19.01	19.01	84.18	37.70	2.24	2.24	1.34
Main	3969.6	5-yr SBCFCD	1070.00	2771.00	2772.97	0.009813	16.43	16.43	65.14	36.12	2.16	2.16	1.07
Main	3969.6	2-yr SBCFCD	650.00	2771.00	2772.47	0.009802	13.73	13.73	47.34	34.57	2.07	2.07	0.82
Main	3835	100-yr SBCFCD	3380.00	2769.77	2773.79	0.007585	23.31	25.18	144.97	42.07	2.21	2.31	1.91
Main	3835	100-yr FIS	2700.00	2769.77	2773.21	0.008377	22.30	23.85	121.07	40.33	2.27	2.35	1.80

Main	3835	50-yr FIS	1500.00	2769.77	2772.21	0.008636	18.30	19.23	81.96	37.31	2.17	2.24	1.31
Main	3835	10-yr FIS	200.00	2769.77	2770.52	0.008525	8.57	8.71	23.34	32.25	1.77	1.79	0.40
Main	3835	10-yr SBCFCD	1600.00	2769.77	2772.35	0.008057	18.32	19.29	87.34	37.74	2.12	2.18	1.30
Main	3835	5-yr SBCFCD	1070.00	2769.77	2771.80	0.008272	15.97	16.65	66.99	36.08	2.06	2.11	1.05
Main	3835	2-yr SBCFCD	650.00	2769.77	2771.28	0.008465	13.39	13.81	48.56	34.52	1.98	2.02	0.80
Main	3695.2	100-yr SBCFCD	3380.00	2769.30	2771.54	0.116471	23.45	23.45	144.17	68.99	2.86	2.86	14.97
Main	3695.2	100-yr FIS	2700.00	2769.30	2771.30	0.108908	21.13	21.13	127.76	68.02	2.72	2.72	12.60
Main	3695.2	50-yr FIS	1500.00	2769.30	2770.87	0.075153	15.11	15.11	99.24	66.32	2.18	2.18	6.94
Main	3695.2	10-yr FIS	200.00	2769.30	2770.00	0.020488	4.68	4.68	42.71	62.80	1.00	1.00	0.87
Main	3695.2	10-yr SBCFCD	1600.00	2769.30	2770.90	0.079992	15.79	15.79	101.33	66.44	2.25	2.25	7.53
Main	3695.2	5-yr SBCFCD	1070.00	2769.30	2770.71	0.055123	12.08	12.08	88.54	65.67	1.83	1.83	4.59
Main	3695.2	2-yr SBCFCD	650.00	2769.30	2770.57	0.028889	8.19	8.19	79.40	65.10	1.31	1.31	2.18
Main	3680.9	100-yr SBCFCD	3380.00	2764.50	2766.46	0.181510	26.96	26.96	125.39	68.02	3.50	3.50	20.62
Main	3680.9	100-yr FIS	2700.00	2764.50	2766.20	0.187516	25.05	25.05	107.76	66.95	3.48	3.48	18.63
Main	3680.9	50-yr FIS	1500.00	2764.50	2765.65	0.212122	20.86	20.86	71.91	64.72	3.49	3.49	14.59
Main	3680.9	10-yr FIS	200.00	2764.50	2766.35	0.000777	1.70	1.70	117.70	67.55	0.23	0.23	0.08
Main	3680.9	10-yr SBCFCD	1600.00	2764.50	2765.71	0.208028	21.25	21.25	75.29	64.93	3.48	3.48	14.93
Main	3680.9	5-yr SBCFCD	1070.00	2764.50	2765.40	0.249662	19.28	19.28	55.51	63.67	3.64	3.64	13.50
Main	3680.9	2-yr SBCFCD	650.00	2764.50	2767.66	0.001329	3.09	3.09	210.19	72.94	0.32	0.32	0.23
Main	3488.2	100-yr SBCFCD	3380.00	2764.90	2769.27	0.011897	11.23	11.23	301.11	77.74	1.01	1.01	2.80
Main	3488.2	100-yr FIS	2700.00	2764.90	2768.69	0.012383	10.53	10.53	256.53	75.38	1.01	1.01	2.57
Main	3488.2	50-yr FIS	1500.00	2764.90	2767.50	0.013770	8.84	8.84	169.65	70.55	1.00	1.00	2.03
Main	3488.2	10-yr FIS	200.00	2764.90	2765.59	0.021046	4.72	4.72	42.36	62.80	1.01	1.01	0.88
Main	3488.2	10-yr SBCFCD	1600.00	2764.90	2767.61	0.013610	9.02	9.02	177.46	70.99	1.00	1.00	2.09
Main	3488.2	5-yr SBCFCD	1070.00	2764.90	2766.99	0.014753	7.99	7.99	133.92	68.46	1.01	1.01	1.78
Main	3488.2	2-yr SBCFCD	650.00	2764.90	2766.41	0.016087	6.82	6.82	95.29	66.13	1.00	1.00	1.43
Main	3473.9	100-yr SBCFCD	3380.00	2760.10	2762.42	0.102102	22.47	22.47	150.44	69.51	2.69	2.69	13.59
Main	3473.9	100-yr FIS	2700.00	2760.10	2762.03	0.121027	21.83	21.83	123.67	67.91	2.85	2.85	13.58
Main	3473.9	50-yr FIS	1500.00	2760.10	2761.28	0.195415	20.34	20.34	73.76	64.84	3.36	3.36	13.76
Main	3473.9	10-yr FIS	200.00	2760.10	2761.94	0.000781	1.70	1.70	117.52	67.54	0.23	0.23	0.08
Main	3473.9	10-yr SBCFCD	1600.00	2760.10	2761.35	0.185093	20.49	20.49	78.07	65.11	3.30	3.30	13.73
Main	3473.9	5-yr SBCFCD	1070.00	2760.10	2760.99	0.261852	19.56	19.56	54.70	63.62	3.72	3.72	13.97
Main	3473.9	2-yr SBCFCD	650.00	2760.10	2760.67	0.416448	18.58	18.58	34.98	62.34	4.37	4.37	14.52
Main	3281.2	100-yr SBCFCD	3380.00	2760.50	2764.87	0.011906	11.24	11.24	300.82	77.58	1.01	1.01	2.81
Main	3281.2	100-yr FIS	2700.00	2760.50	2764.29	0.012399	10.54	10.54	256.26	75.24	1.01	1.01	2.58
Main	3281.2	50-yr FIS	1500.00	2760.50	2763.10	0.013826	8.86	8.86	169.35	70.44	1.01	1.01	2.04
Main	3281.2	10-yr FIS	200.00	2760.50	2761.20	0.020536	4.69	4.69	42.68	62.79	1.00	1.00	0.87
Main	3281.2	10-yr SBCFCD	1600.00	2760.50	2763.21	0.013614	9.02	9.02	177.36	70.89	1.01	1.01	2.09
Main	3281.2	5-yr SBCFCD	1070.00	2760.50	2762.59	0.014687	7.98	7.98	134.05	68.39	1.00	1.00	1.77
Main	3281.2	2-yr SBCFCD	650.00	2760.50	2762.01	0.016182	6.84	6.84	95.09	66.06	1.00	1.00	1.44
Main	3261.9	100-yr SBCFCD	3380.00	2754.10	2761.97	0.001546	5.67	5.67	596.39	91.63	0.39	0.39	0.60
Main	3261.9	100-yr FIS	2700.00	2754.10	2761.17	0.001437	5.15	5.15	524.64	88.42	0.37	0.37	0.51
Main	3261.9	50-yr FIS	1500.00	2754.10	2759.46	0.001162	3.95	3.95	379.48	81.55	0.32	0.32	0.33
Main	3261.9	10-yr FIS	200.00	2754.10	2756.31	0.000427	1.41	1.41	142.04	68.86	0.17	0.17	0.05
Main	3261.9	10-yr SBCFCD	1600.00	2754.10	2759.63	0.001191	4.07	4.07	392.93	82.21	0.33	0.33	0.34
Main	3261.9	5-yr SBCFCD	1070.00	2754.10	2758.69	0.001013	3.37	3.37	317.49	78.44	0.30	0.30	0.25
Main	3261.9	2-yr SBCFCD	650.00	2754.10	2757.76	0.000811	2.64	2.64	246.41	74.71	0.26	0.26	0.16
Main	2906.2	100-yr SBCFCD	3380.00	2754.80	2759.17	0.011887	11.23	11.23	301.07	77.65	1.00	1.00	2.80
Main	2906.2	100-yr FIS	2700.00	2754.80	2758.59	0.012395	10.53	10.53	256.35	75.29	1.01	1.01	2.57
Main	2906.2	50-yr FIS	1500.00	2754.80	2757.40	0.013777	8.85	8.85	169.58	70.49	1.01	1.01	2.03
Main	2906.2	10-yr FIS	200.00	2754.80	2755.50	0.020534	4.69	4.69	42.68	62.81	1.00	1.00	0.87
Main	2906.2	10-yr SBCFCD	1600.00	2754.80	2757.51	0.013622	9.02	9.02	177.37	70.93	1.01	1.01	2.09
Main	2906.2	5-yr SBCFCD	1070.00	2754.80	2756.89	0.014741	7.99	7.99	133.92	68.42	1.01	1.01	1.78
Main	2906.2	2-yr SBCFCD	650.00	2754.80	2756.31	0.016153	6.83	6.83	95.15	66.09	1.00	1.00	1.44
Main	2894.8	100-yr SBCFCD	3380.00	2751.10	2753.59	0.081038	20.89	20.89	161.81	70.04	2.42	2.42	11.50
Main	2894.8	100-yr FIS	2700.00	2751.10	2753.18	0.095057	20.24	20.24	133.39	68.39	2.55	2.55	11.41
Main	2894.8	50-yr FIS	1500.00	2751.10	2755.76	0.001882	4.64	4.64	323.49	78.81	0.40	0.40	0.47
Main	2894.8	10-yr FIS	200.00	2751.10	2752.89	0.000865	1.76	1.76	113.74	67.22	0.24	0.24	0.09

Main	2894.8	10-yr SBCFCD	1600.00	2751.10	2755.91	0.001918	4.77	4.77	335.49	79.42	0.41	0.41	0.49
Main	2894.8	5-yr SBCFCD	1070.00	2751.10	2755.05	0.001688	3.98	3.98	268.56	75.95	0.37	0.37	0.36
Main	2894.8	2-yr SBCFCD	650.00	2751.10	2754.20	0.001420	3.16	3.16	205.58	72.52	0.33	0.33	0.25
Main	2697.2	100-yr SBCFCD	3380.00	2751.40	2755.77	0.011923	11.23	11.23	300.91	77.74	1.01	1.01	2.81
Main	2697.2	100-yr FIS	2700.00	2751.40	2755.19	0.012385	10.53	10.53	256.53	75.39	1.01	1.01	2.57
Main	2697.2	50-yr FIS	1500.00	2751.40	2754.00	0.013778	8.84	8.84	169.63	70.55	1.01	1.01	2.03
Main	2697.2	10-yr FIS	200.00	2751.40	2752.10	0.020459	4.68	4.68	42.73	62.83	1.00	1.00	0.86
Main	2697.2	10-yr SBCFCD	1600.00	2751.40	2754.11	0.013651	9.02	9.02	177.30	70.99	1.01	1.01	2.09
Main	2697.2	5-yr SBCFCD	1070.00	2751.40	2753.49	0.014705	7.98	7.98	134.06	68.47	1.01	1.01	1.77
Main	2697.2	2-yr SBCFCD	650.00	2751.40	2752.91	0.016183	6.83	6.83	95.12	66.13	1.00	1.00	1.44
Main	2679	100-yr SBCFCD	3380.00	2745.30	2747.49	0.125770	24.12	24.12	140.14	68.00	2.96	2.96	15.92
Main	2679	100-yr FIS	2700.00	2745.30	2747.12	0.150648	23.49	23.49	114.96	66.63	3.15	3.15	16.00
Main	2679	50-yr FIS	1500.00	2745.30	2746.40	0.249927	22.00	22.00	68.17	64.02	3.76	3.76	16.47
Main	2679	10-yr FIS	200.00	2745.30	2747.36	0.000539	1.52	1.52	131.52	67.53	0.19	0.19	0.06
Main	2679	10-yr SBCFCD	1600.00	2745.30	2746.46	0.235983	22.16	22.16	72.21	64.25	3.68	3.68	16.41
Main	2679	5-yr SBCFCD	1070.00	2745.30	2749.65	0.001233	3.62	3.62	295.55	75.89	0.32	0.32	0.29
Main	2679	2-yr SBCFCD	650.00	2745.30	2748.76	0.000996	2.84	2.84	229.16	72.62	0.28	0.28	0.19
Main	2410.8	100-yr SBCFCD	3380.00	2745.90	2750.27	0.011922	11.24	11.24	300.69	77.57	1.01	1.01	2.81
Main	2410.8	100-yr FIS	2700.00	2745.90	2749.69	0.012402	10.54	10.54	256.24	75.23	1.01	1.01	2.58
Main	2410.8	50-yr FIS	1500.00	2745.90	2748.50	0.013800	8.85	8.85	169.46	70.44	1.01	1.01	2.04
Main	2410.8	10-yr FIS	200.00	2745.90	2746.60	0.020536	4.69	4.69	42.68	62.79	1.00	1.00	0.87
Main	2410.8	10-yr SBCFCD	1600.00	2745.90	2748.61	0.013656	9.03	9.03	177.19	70.88	1.01	1.01	2.09
Main	2410.8	5-yr SBCFCD	1070.00	2745.90	2747.99	0.014769	8.00	8.00	133.82	68.38	1.01	1.01	1.78
Main	2410.8	2-yr SBCFCD	650.00	2745.90	2747.41	0.016182	6.84	6.84	95.09	66.06	1.00	1.00	1.44
Main	2395.1	100-yr SBCFCD	3380.00	2740.60	2742.86	0.111709	23.13	23.13	146.11	69.14	2.80	2.80	14.52
Main	2395.1	100-yr FIS	2700.00	2740.60	2742.48	0.133135	22.51	22.51	119.94	67.59	2.98	2.98	14.56
Main	2395.1	50-yr FIS	1500.00	2740.60	2741.75	0.216817	21.01	21.01	71.40	64.63	3.52	3.52	14.83
Main	2395.1	10-yr FIS	200.00	2740.60	2742.43	0.000799	1.72	1.72	116.60	67.39	0.23	0.23	0.09
Main	2395.1	10-yr SBCFCD	1600.00	2740.60	2741.81	0.204926	21.16	21.16	75.62	64.89	3.45	3.45	14.78
Main	2395.1	5-yr SBCFCD	1070.00	2740.60	2741.46	0.292636	20.25	20.25	52.85	63.46	3.91	3.91	15.12
Main	2395.1	2-yr SBCFCD	650.00	2740.60	2741.15	0.467159	19.25	19.25	33.77	62.23	4.61	4.61	15.76
Main	2210.8	100-yr SBCFCD	3380.00	2741.00	2745.37	0.011909	11.23	11.23	301.02	77.75	1.01	1.01	2.81
Main	2210.8	100-yr FIS	2700.00	2741.00	2744.79	0.012401	10.53	10.53	256.42	75.38	1.01	1.01	2.57
Main	2210.8	50-yr FIS	1500.00	2741.00	2743.60	0.013849	8.86	8.86	169.35	70.54	1.01	1.01	2.04
Main	2210.8	10-yr FIS	200.00	2741.00	2741.70	0.020459	4.68	4.68	42.73	62.83	1.00	1.00	0.86
Main	2210.8	10-yr SBCFCD	1600.00	2741.00	2743.71	0.013614	9.02	9.02	177.46	71.00	1.01	1.01	2.09
Main	2210.8	5-yr SBCFCD	1070.00	2741.00	2743.09	0.014752	7.99	7.99	133.92	68.47	1.01	1.01	1.78
Main	2210.8	2-yr SBCFCD	650.00	2741.00	2742.51	0.016183	6.83	6.83	95.12	66.13	1.00	1.00	1.44
Main	2198.3	100-yr SBCFCD	3380.00	2736.80	2744.49	0.001684	5.85	5.85	577.75	90.22	0.41	0.41	0.65
Main	2198.3	100-yr FIS	2700.00	2736.80	2743.60	0.001654	5.41	5.41	499.07	86.73	0.40	0.40	0.57
Main	2198.3	50-yr FIS	1500.00	2736.80	2741.94	0.001351	4.16	4.16	360.25	80.19	0.35	0.35	0.37
Main	2198.3	10-yr FIS	200.00	2736.80	2738.88	0.000520	1.50	1.50	133.37	68.18	0.19	0.19	0.06
Main	2198.3	10-yr SBCFCD	1600.00	2736.80	2742.17	0.001320	4.22	4.22	378.91	81.10	0.34	0.34	0.37
Main	2198.3	5-yr SBCFCD	1070.00	2736.80	2741.27	0.001112	3.48	3.48	307.31	77.55	0.31	0.31	0.27
Main	2198.3	2-yr SBCFCD	650.00	2736.80	2740.35	0.000904	2.74	2.74	237.49	73.93	0.27	0.27	0.18
Main	1910.8	100-yr SBCFCD	3480.00	2737.40	2741.85	0.011850	11.32	11.32	307.36	78.08	1.01	1.01	2.84
Main	1910.8	100-yr FIS	2700.00	2737.40	2741.19	0.012406	10.53	10.53	256.38	75.38	1.01	1.01	2.57
Main	1910.8	50-yr FIS	1500.00	2737.40	2740.00	0.013778	8.84	8.84	169.63	70.55	1.01	1.01	2.03
Main	1910.8	10-yr FIS	200.00	2737.40	2738.09	0.020750	4.70	4.70	42.55	62.81	1.01	1.01	0.87
Main	1910.8	10-yr SBCFCD	1650.00	2737.40	2740.16	0.013579	9.11	9.11	181.14	71.21	1.01	1.01	2.12
Main	1910.8	5-yr SBCFCD	1120.00	2737.40	2739.55	0.014563	8.09	8.09	138.41	68.73	1.00	1.00	1.80
Main	1910.8	2-yr SBCFCD	680.00	2737.40	2738.95	0.016150	6.95	6.95	97.90	66.30	1.01	1.01	1.47
Main	1901.8	100-yr SBCFCD	3480.00	2734.10	2736.71	0.072929	20.41	20.41	170.53	70.60	2.31	2.31	10.81
Main	1901.8	100-yr FIS	2700.00	2734.10	2740.33	0.002230	5.97	5.97	452.59	85.28	0.46	0.46	0.71
Main	1901.8	50-yr FIS	1500.00	2734.10	2738.88	0.001724	4.50	4.50	333.20	79.40	0.39	0.39	0.44
Main	1901.8	10-yr FIS	200.00	2734.10	2735.95	0.000771	1.70	1.70	117.95	67.51	0.23	0.23	0.08
Main	1901.8	10-yr SBCFCD	1650.00	2734.10	2739.10	0.001786	4.70	4.70	350.78	80.29	0.40	0.40	0.47
Main	1901.8	5-yr SBCFCD	1120.00	2734.10	2738.27	0.001536	3.92	3.92	285.50	76.92	0.36	0.36	0.35

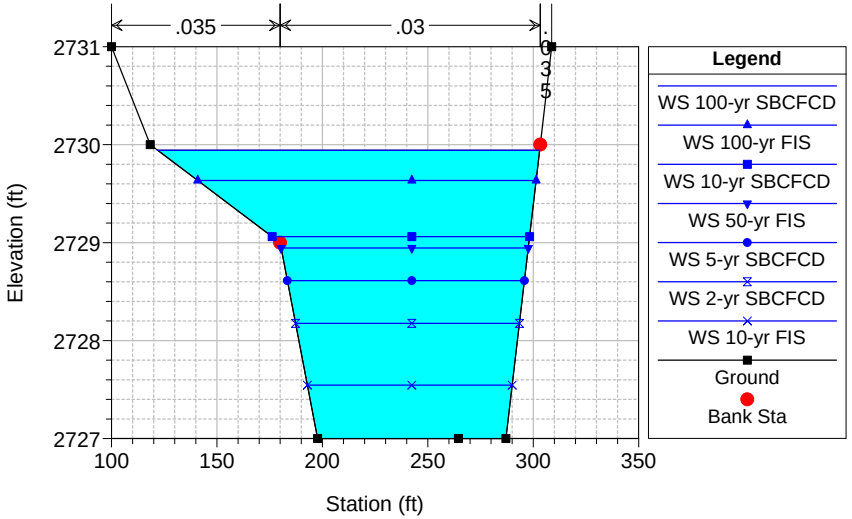
Main	1901.8	2-yr SBCFCD	680.00	2734.10	2737.40	0.001261	3.09	3.09	219.96	73.38	0.31	0.31	0.23
Main	1439.8	100-yr SBCFCD	3480.00	2734.00	2738.11	0.007829	9.97	10.50	349.09	118.01	0.95	1.06	1.81
Main	1439.8	100-yr FIS	2700.00	2734.00	2737.55	0.008326	9.45	9.72	285.66	108.57	0.96	1.05	1.64
Main	1439.8	50-yr FIS	1500.00	2734.00	2736.42	0.010508	8.38	8.38	179.04	83.28	1.01	1.01	1.39
Main	1439.8	10-yr FIS	200.00	2734.00	2734.71	0.014885	4.47	4.47	44.77	70.14	0.99	0.99	0.59
Main	1439.8	10-yr SBCFCD	1650.00	2734.00	2736.57	0.010305	8.62	8.62	191.31	83.88	1.01	1.01	1.45
Main	1439.8	5-yr SBCFCD	1120.00	2734.00	2736.02	0.011160	7.66	7.66	146.26	81.65	1.01	1.01	1.23
Main	1439.8	2-yr SBCFCD	680.00	2734.00	2735.49	0.012313	6.56	6.56	103.63	78.75	1.01	1.01	1.00
Main	957.5	100-yr SBCFCD	3480.00	2727.00	2729.24	0.035728	14.63	14.73	237.82	134.19	1.85	1.95	4.40
Main	957.5	100-yr FIS	2700.00	2727.00	2728.98	0.034100	13.20	13.20	204.49	117.61	1.76	1.76	3.69
Main	957.5	50-yr FIS	1500.00	2727.00	2728.54	0.025136	9.74	9.74	154.03	111.30	1.46	1.46	2.17
Main	957.5	10-yr FIS	200.00	2727.00	2727.55	0.015007	3.94	3.94	50.80	97.13	0.96	0.96	0.49
Main	957.5	10-yr SBCFCD	1650.00	2727.00	2728.61	0.025875	10.17	10.17	162.30	112.36	1.49	1.49	2.33
Main	957.5	5-yr SBCFCD	1120.00	2727.00	2728.33	0.022914	8.52	8.52	131.48	108.37	1.36	1.36	1.73
Main	957.5	2-yr SBCFCD	680.00	2727.00	2728.04	0.019623	6.77	6.77	100.49	104.19	1.21	1.21	1.18


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
Desert Knolls Wa Main
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Elevation (ft)
Main Channel Distance (ft)
Section 14+39.8
Boulder Stabilizer #...
Section 16+99.2
Boulder Stabilizer #2 (e...
Section 19+86.6
Boulder Stabilizer #3 (exit...
Section 22+60.4
Boulder Stabilizer #4
Section 25+13.9
Boulder Stabilizer #5
Section 29+42.6
Boulder Stabilizer #7 (exit)
Boulder Stabilizer #8
Section 35+20.3
Section 38+35 Improved Concrete Channel (D/S ...
Section 39+69.6
Section 41+35 Improved Concrete Channel
Section 43+85 Improved Concrete Channel
Section 46+35 Improved Concrete Channel
Section 48+75 Improved Concrete Channel
Section 51+35 Improved Concrete Channel
Section 55+81.3
Apple Valley Road
Section 60+00
Section 63+12.5 (D/S face of Quantico Rd.)
Section 65+55.8
Section 66+90 (Tuscola Rd. exit section)
Tuscola Road
Section 70+10.2
Section 72+31.3 (d/s face Kasota Rd.)
Section 73+47 (approach to Kasota Rd.)
Section 74+56.8 (confluence w/trib.)
Section 77+38.6 (d/s face of Olalee Rd.)
Section 78+40 (approach to Olalee Rd.)
Section 81+13.9
Section 84+13.9
Section 87+13.9
Section 90+05 (d/s face of Mondamon Rd.)
Section 91+16 (approach to Mondamon Rd.)
Section 93+13.9
Section 95+15.2 (d/s face of Pohez Rd.)
Section 97+28
Section 98+63.9
Boulder Stabilizer #11 (exit)
Section 106+13.9
Private Road
Section 109+63.9
Boulder Stabilizer #12 (exit)
Section 113+13.9
Section 116+63.9
Section 117+85: Stabilizer #4 (exit)
Section 119+15: Stabilizer #4 (gabion mat inlet)
Section 120+28.1 (D/S face Tao Road)

Desert Knolls Wash Plan: Alternative 3 3/4/2011

Geom: Alternative 3 Flow: Alternative 3

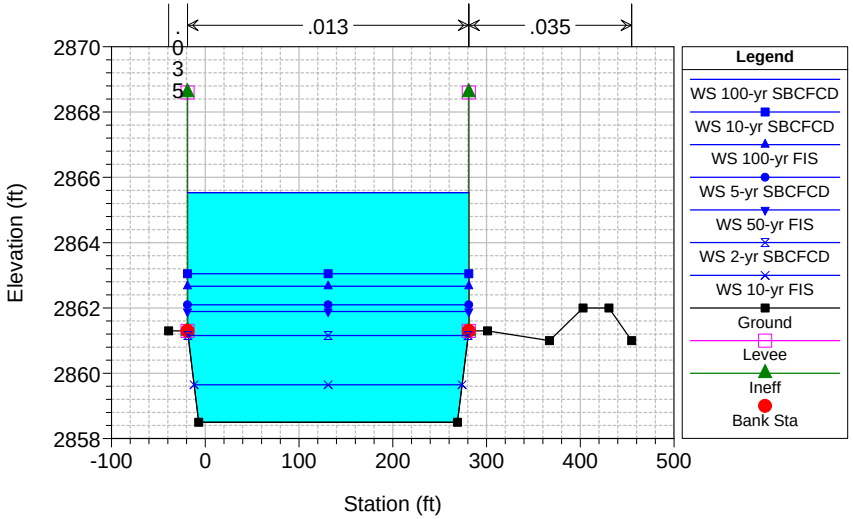
River = Desert Knolls Wa Reach = Main RS = 957.5 Section 9+57.5 - D/S Boundary



Desert Knolls Wash Plan: Alternative 3 3/4/2011

Geom: Alternative 3 Flow: Alternative 3

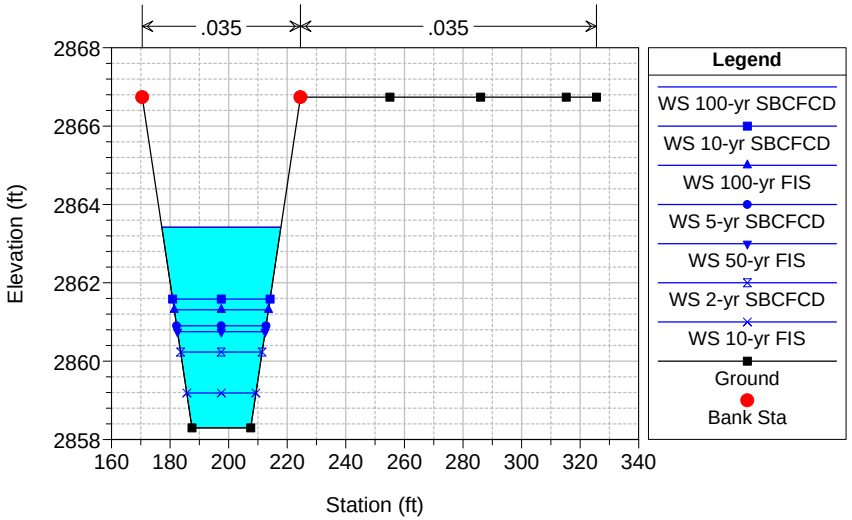
River = Desert Knolls Wa Reach = Main RS = 12028.1 Section 120+28.1 (D/S face Tao Road)



Desert Knolls Wash Plan: Alternative 3 3/4/2011

Geom: Alternative 3 Flow: Alternative 3

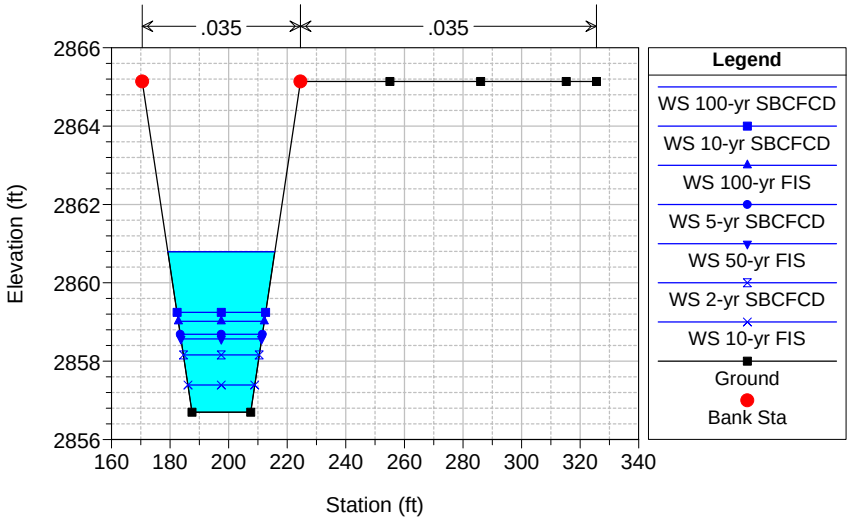
River = Desert Knolls Wa Reach = Main RS = 11915 Section 119+15: Stabilizer #4 (gabion mat inlet)

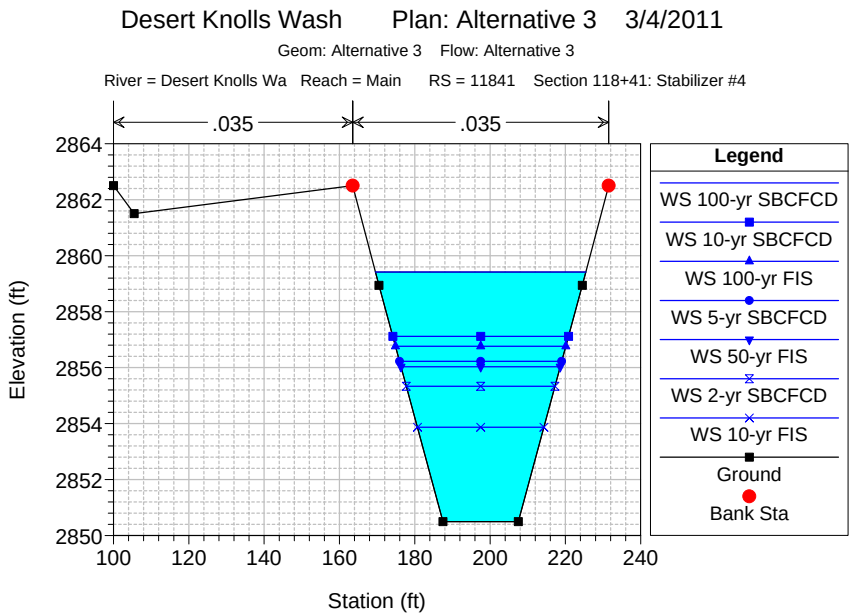


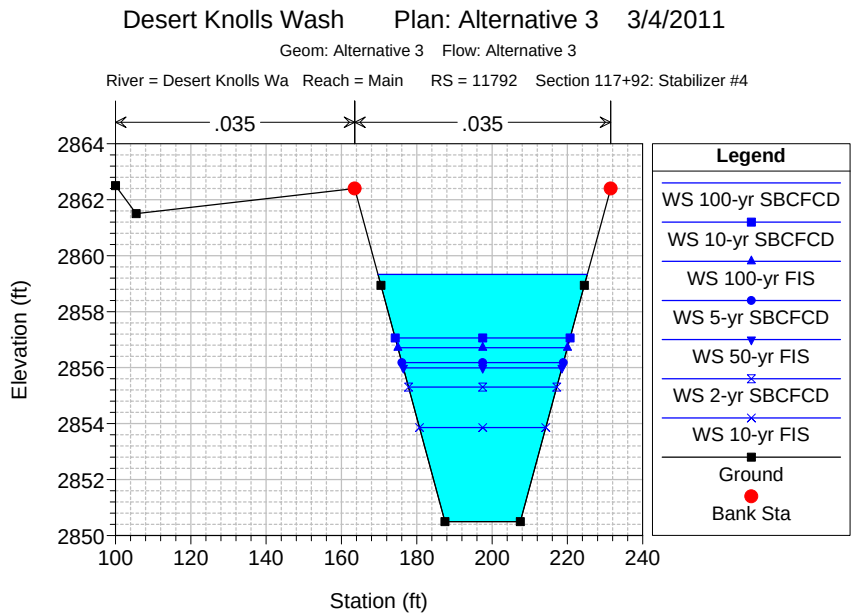
Desert Knolls Wash Plan: Alternative 3 3/4/2011

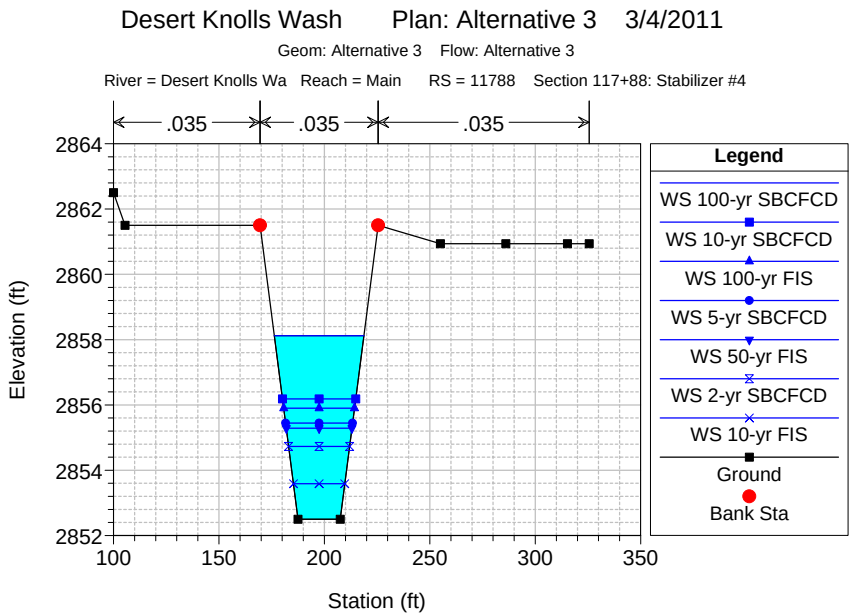
Geom: Alternative 3 Flow: Alternative 3

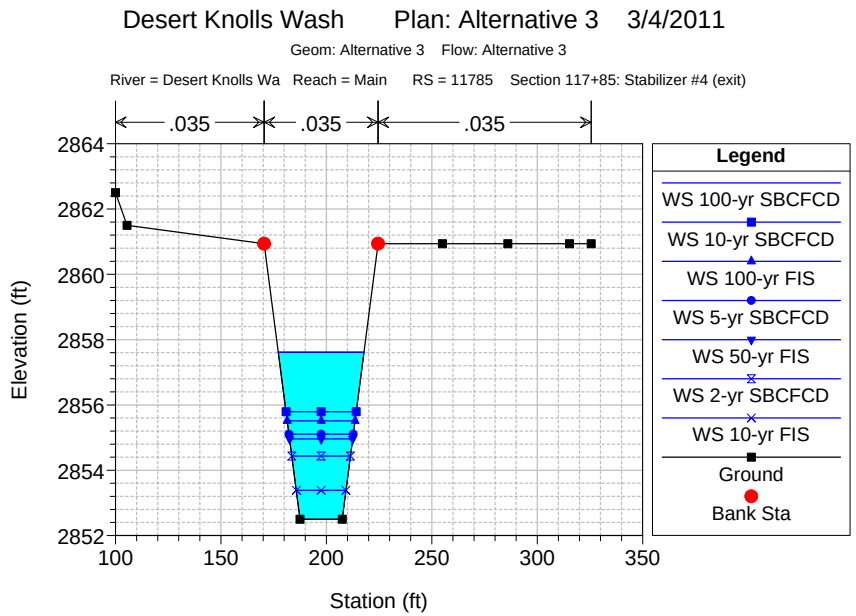
River = Desert Knolls Wa Reach = Main RS = 11864 Section 118+64: Stabilizer #4

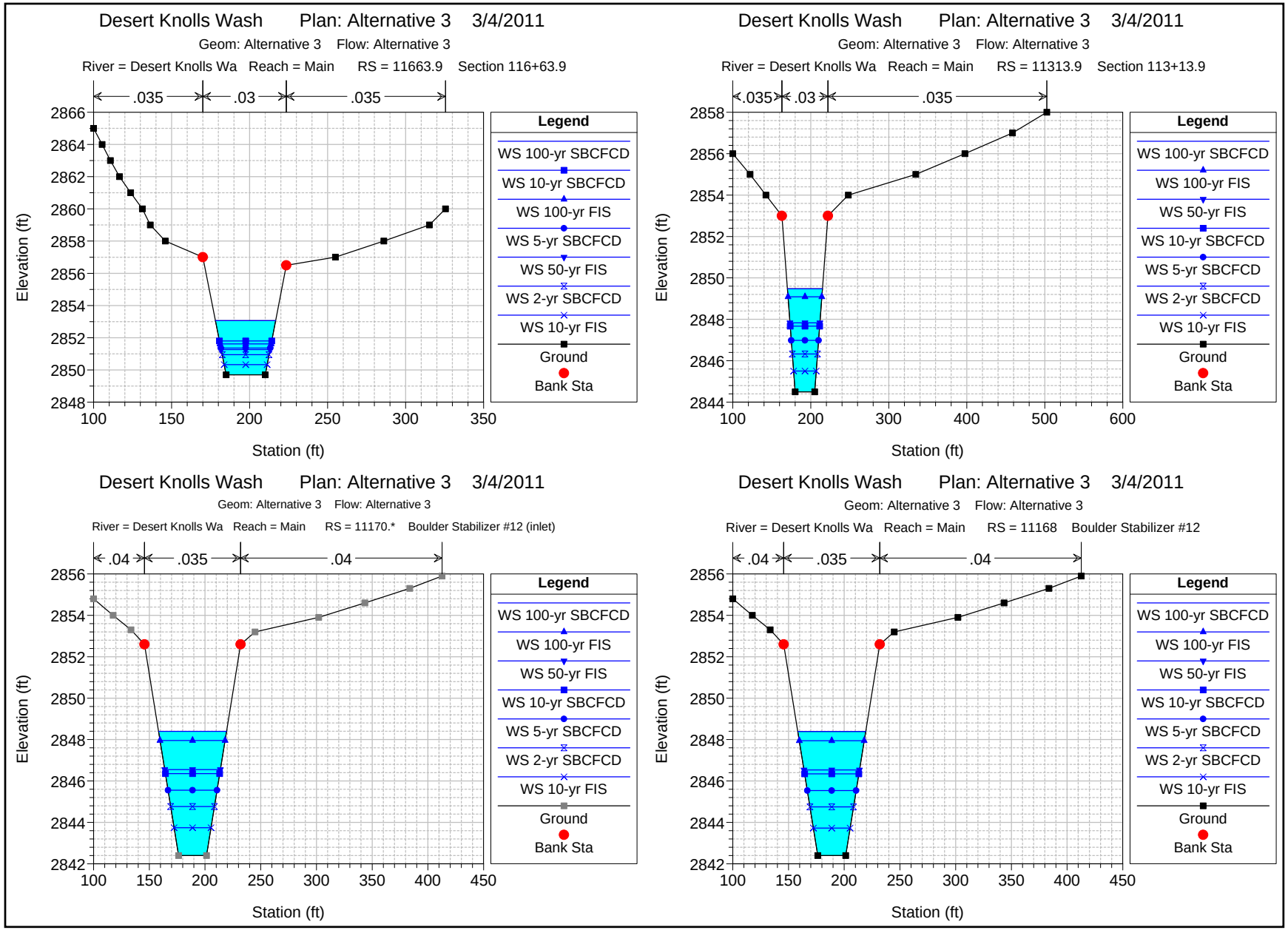


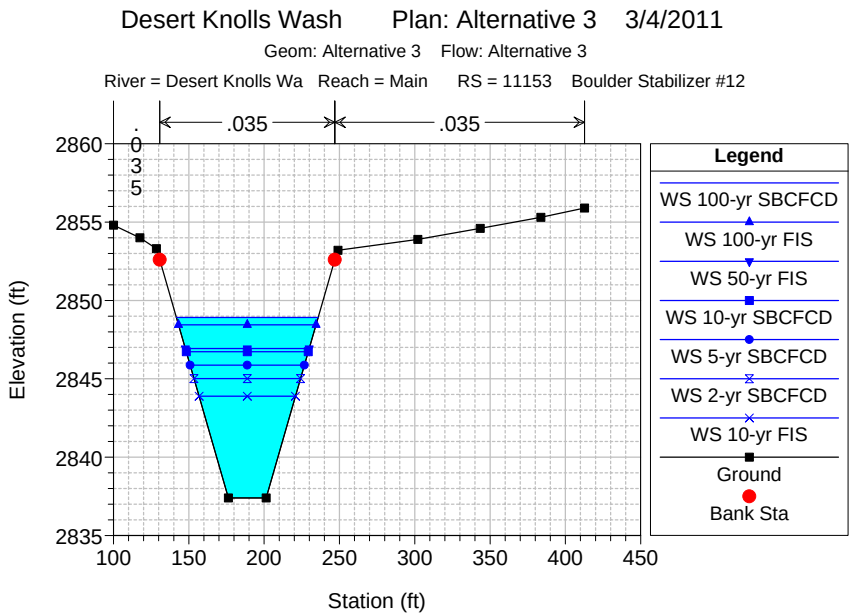

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 11841 Section 118+41: Stabilizer #4
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 10-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

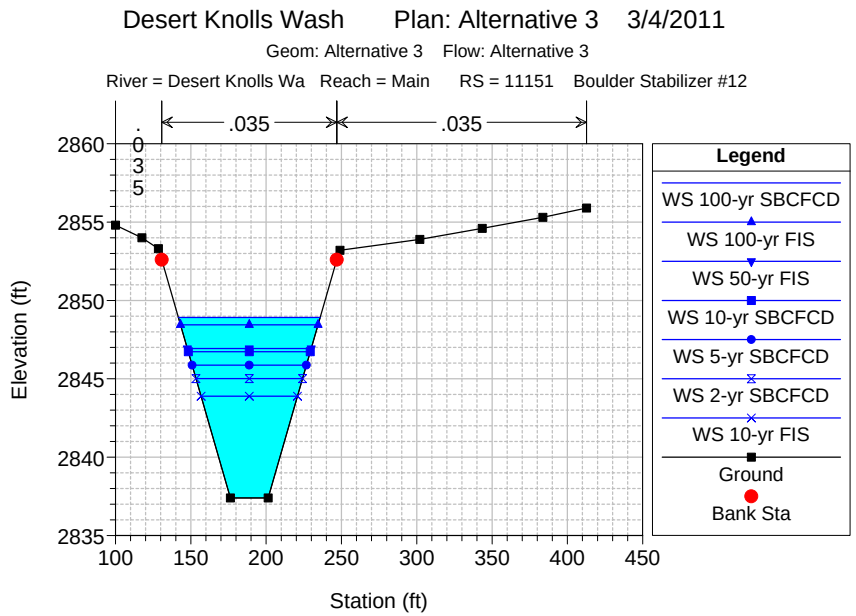

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 11792 Section 117+92: Stabilizer #4
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 10-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

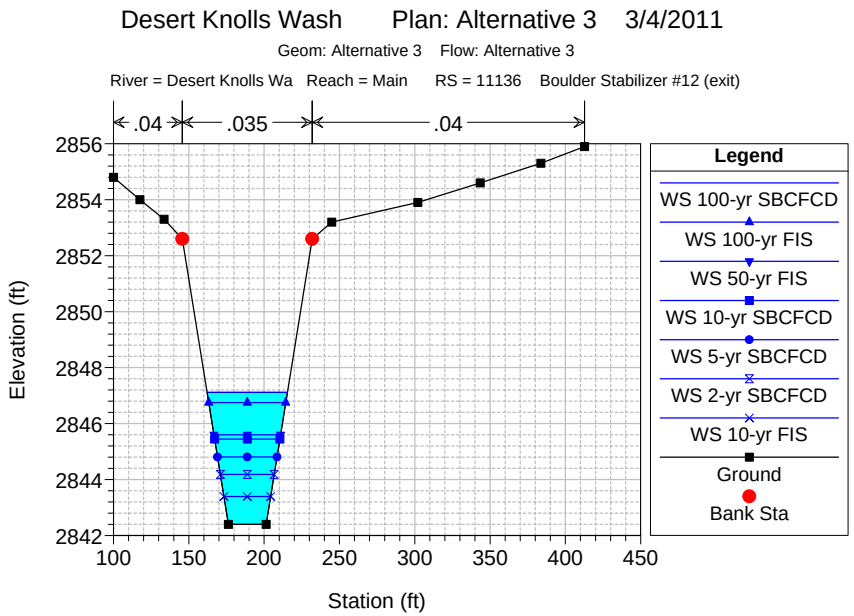

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 11788 Section 117+88: Stabilizer #4
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 10-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

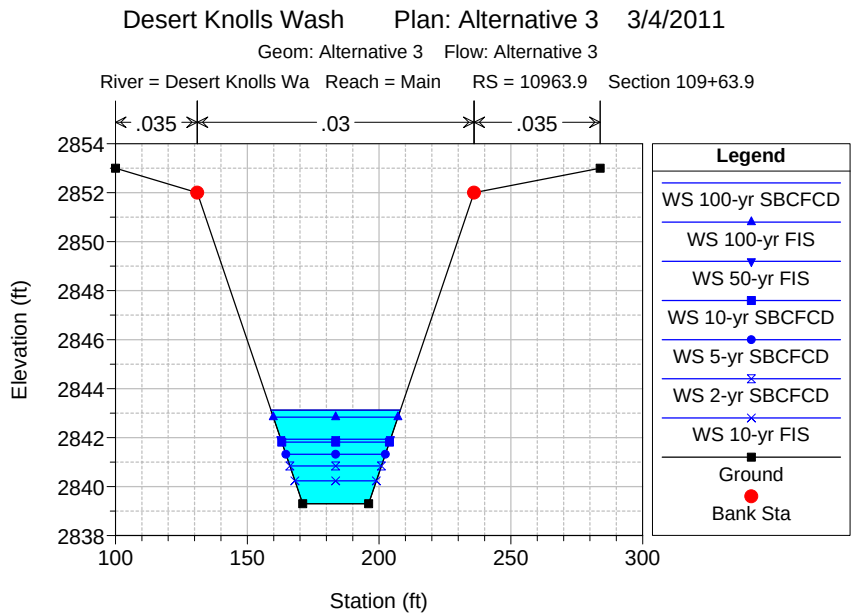

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 11785 Section 117+85: Stabilizer #4 (exit)
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 10-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

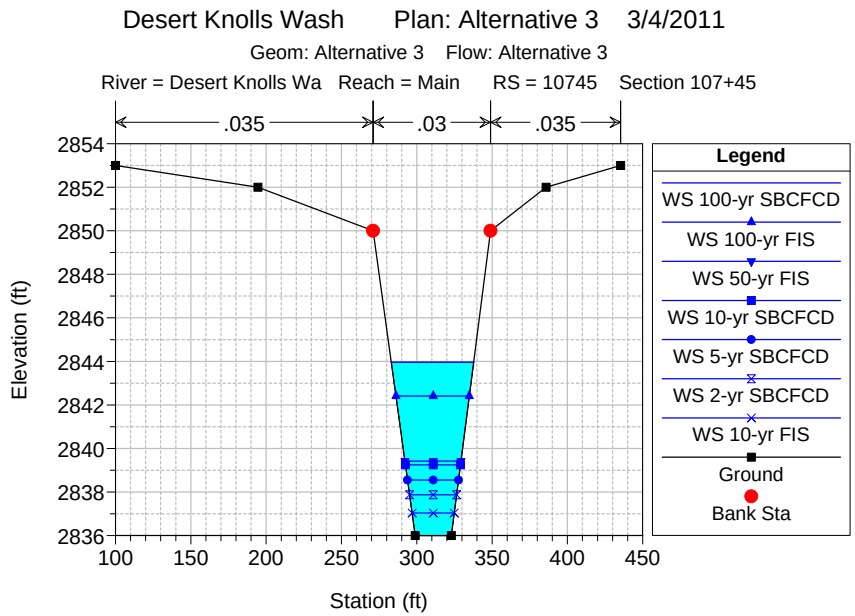

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 11663.9 Section 116+63.9
.035 .03 .035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 10-yr SBCFCD
WS 100-yr FIS
WS 5-yr SBCFCD
WS 50-yr FIS
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 11313.9 Section 113+13.9
.035 .03 .035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 11170.* Boulder Stabilizer #12 (inlet)
.04 .035 .04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 11168 Boulder Stabilizer #12
.04 .035 .04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

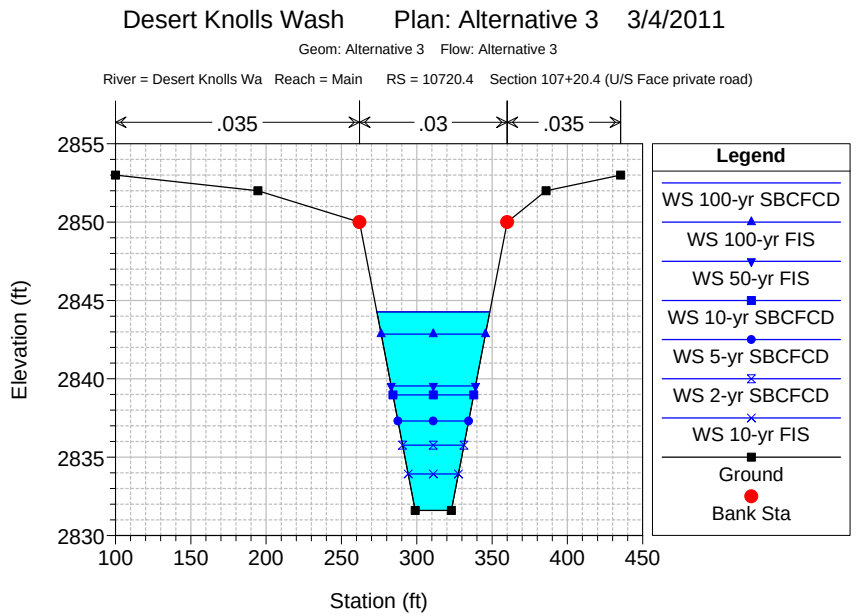

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 11153 Boulder Stabilizer #12
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

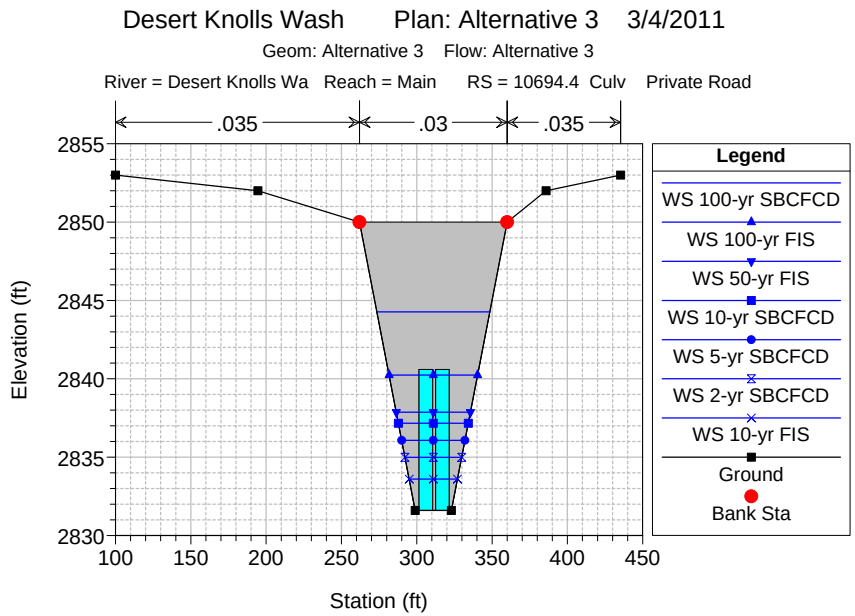

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 11151 Boulder Stabilizer #12
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

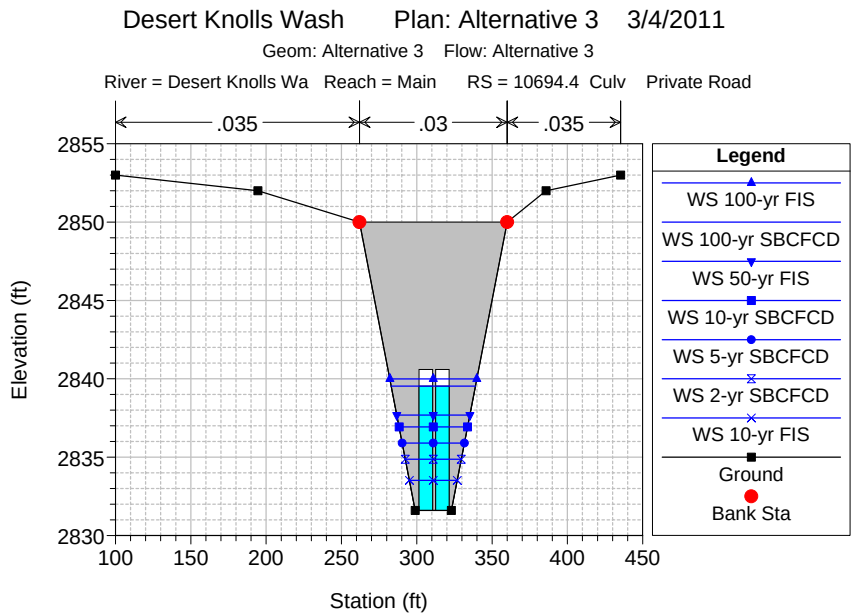

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 11136 Boulder Stabilizer #12 (exit)
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

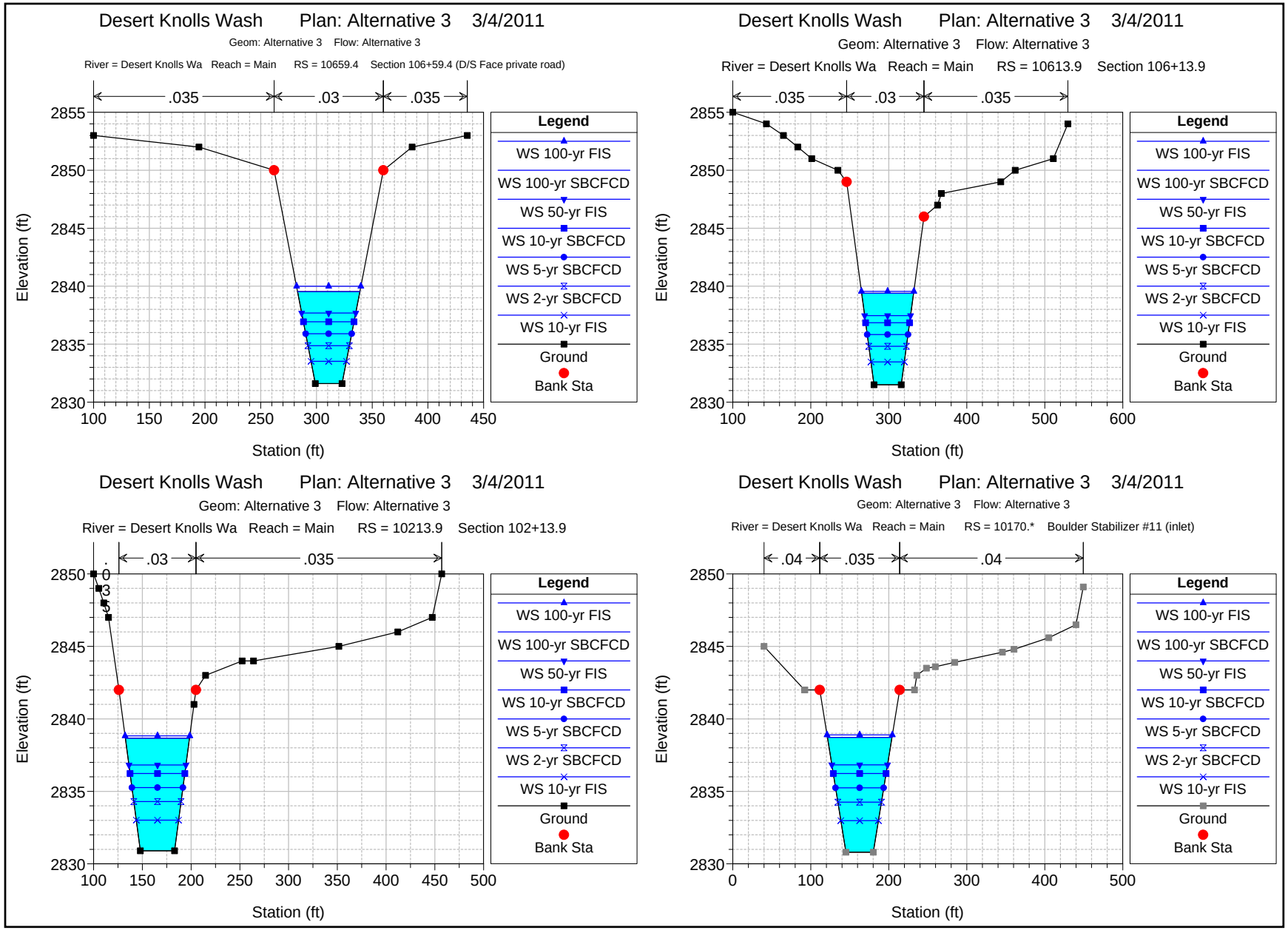

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 10963.9 Section 109+63.9
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

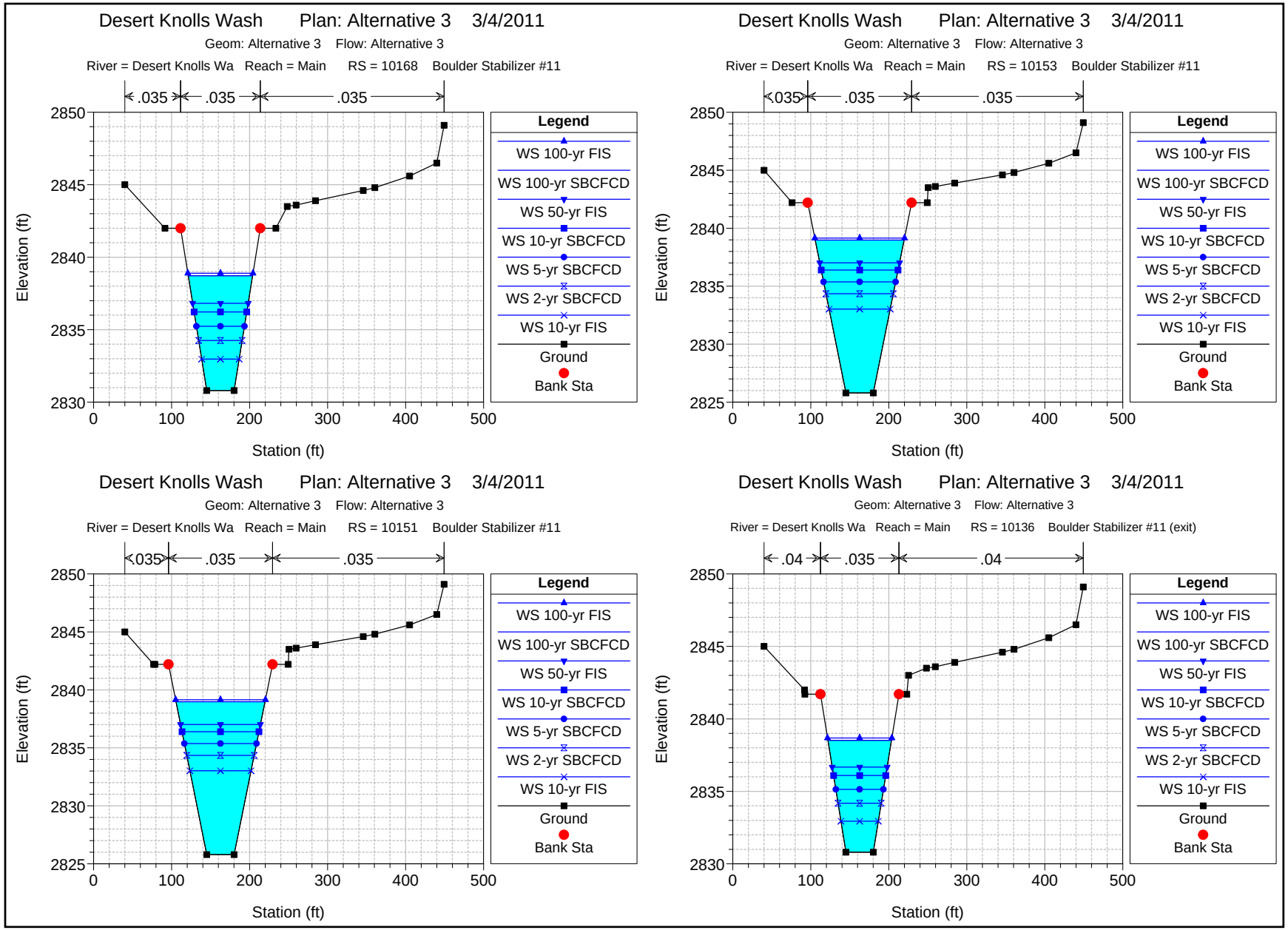

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 10745 Section 107+45
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

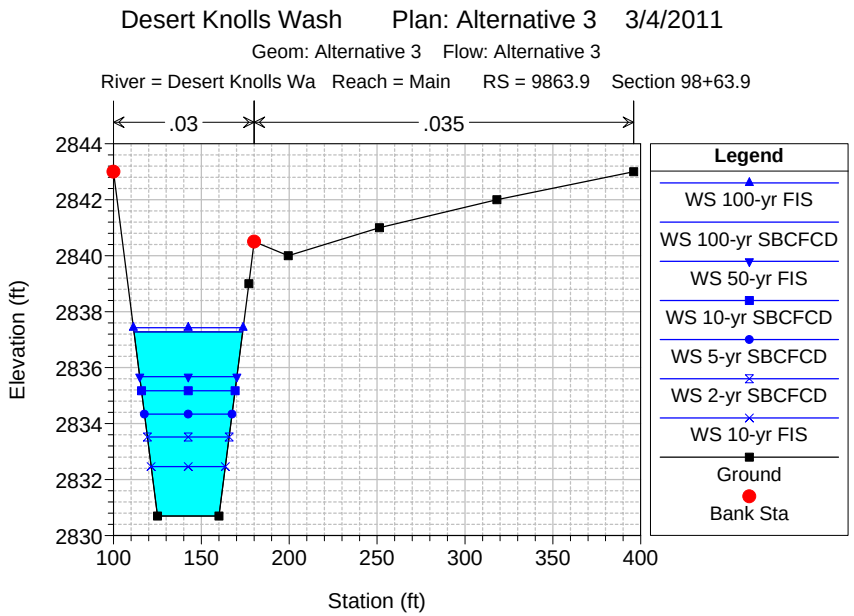

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 10720.4 Section 107+20.4 (U/S Face private road)
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

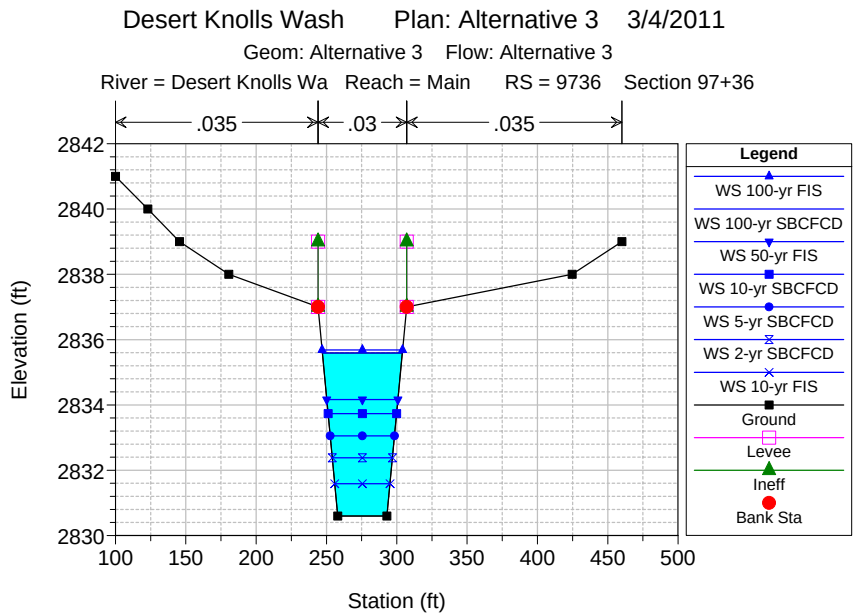

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 10694.4 Culv Private Road
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

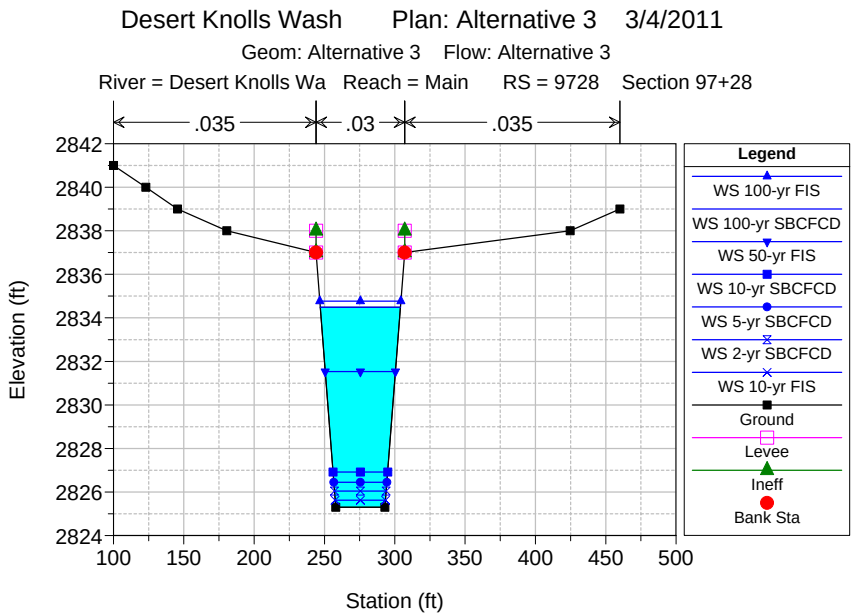

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 10694.4 Culv Private Road
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

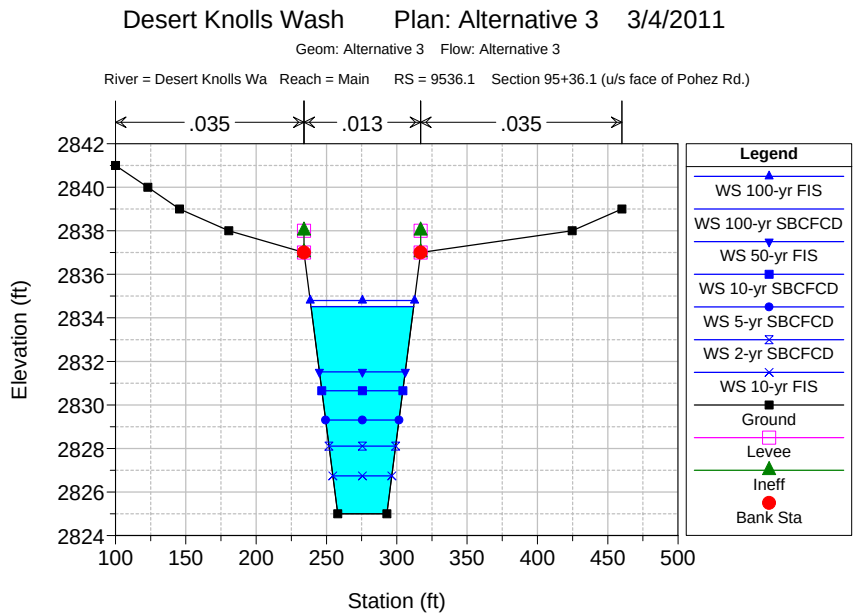

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 10659.4 Section 106+59.4 (D/S Face private road)
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 10613.9 Section 106+13.9
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 10213.9 Section 102+13.9
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 10170.* Boulder Stabilizer #11 (inlet)
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

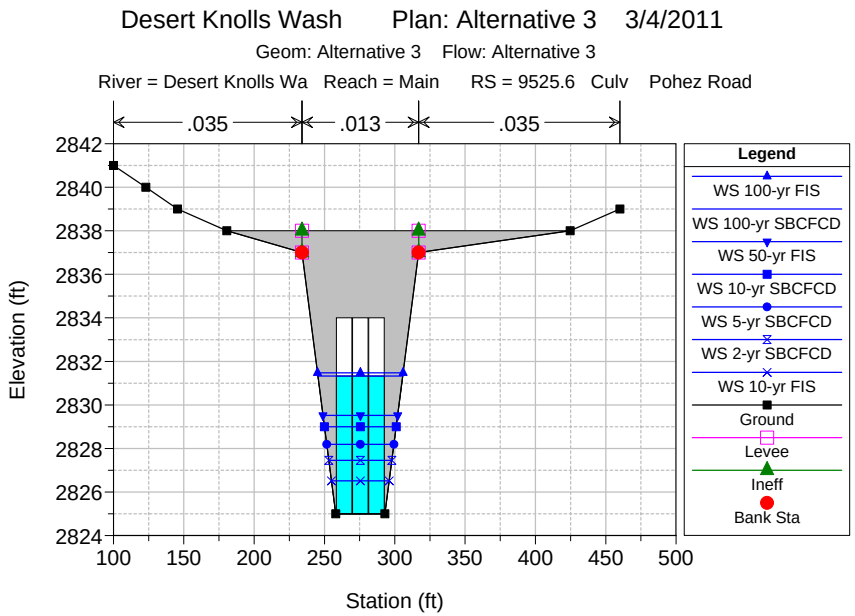

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 10168 Boulder Stabilizer #11
.035 .035 .035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 10153 Boulder Stabilizer #11
.035 .035 .035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 10151 Boulder Stabilizer #11
.035 .035 .035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 10136 Boulder Stabilizer #11 (exit)
.04 .035 .04
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

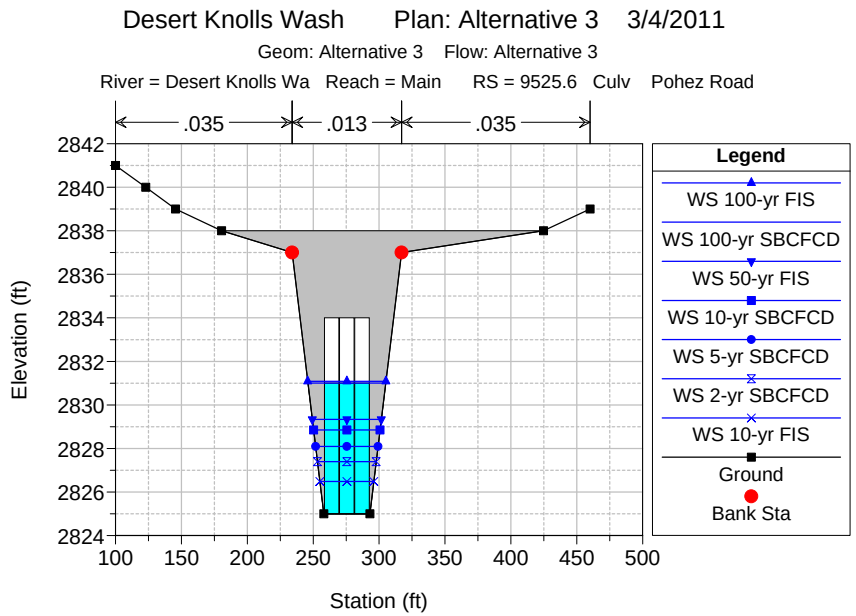

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9863.9 Section 98+63.9
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

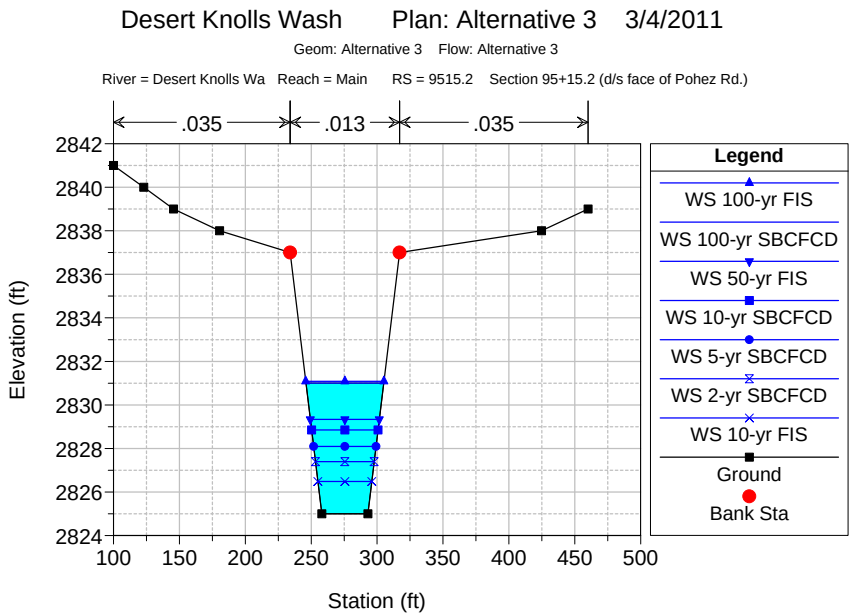

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9736 Section 97+36
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

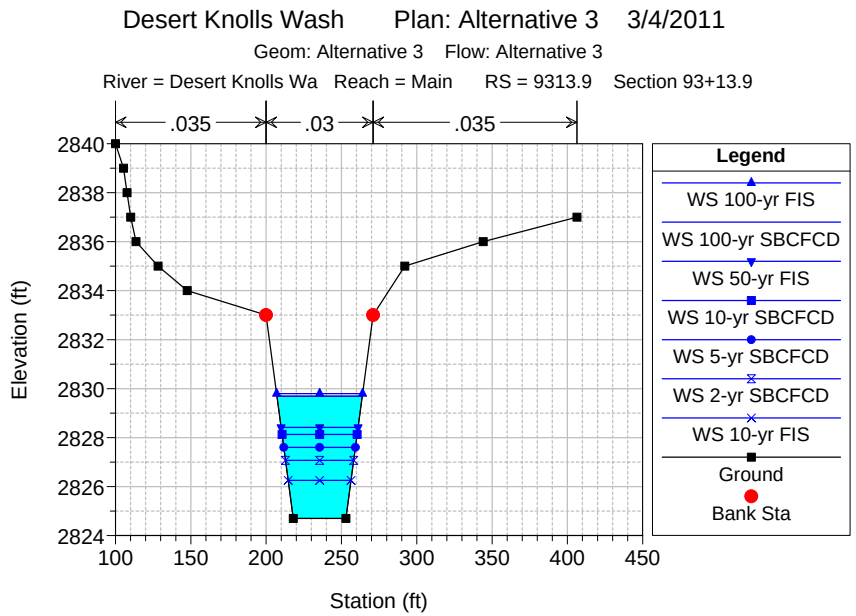

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9728 Section 97+28
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

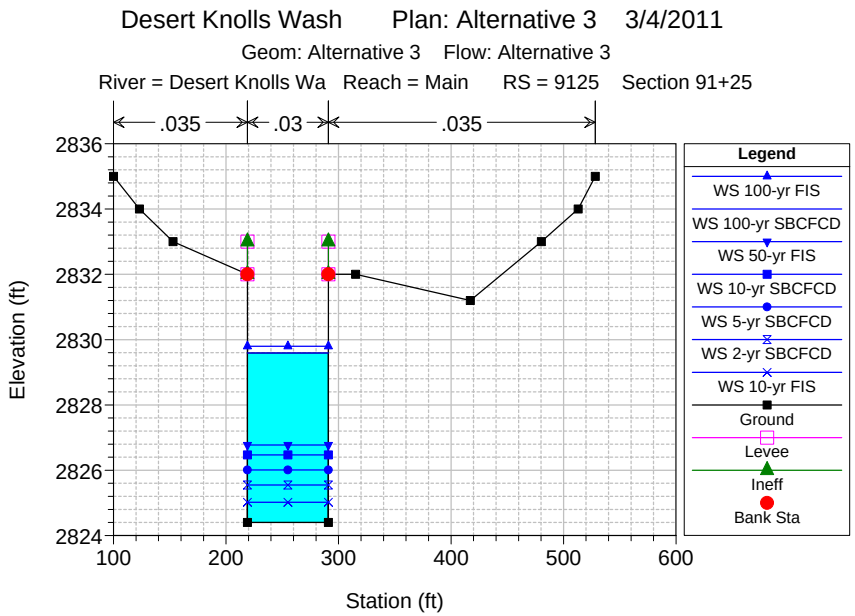

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9536.1 Section 95+36.1 (u/s face of Pohez Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

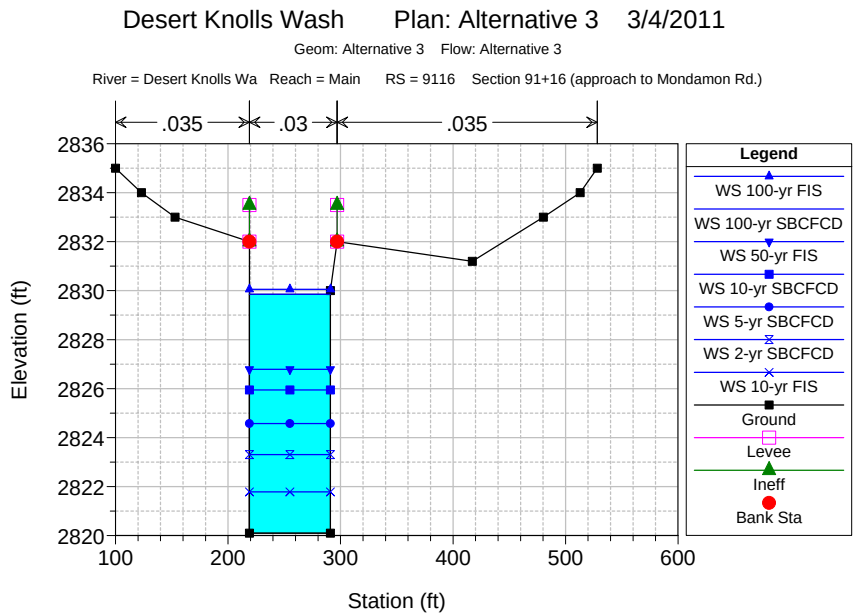

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9525.6 Culv Pohez Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

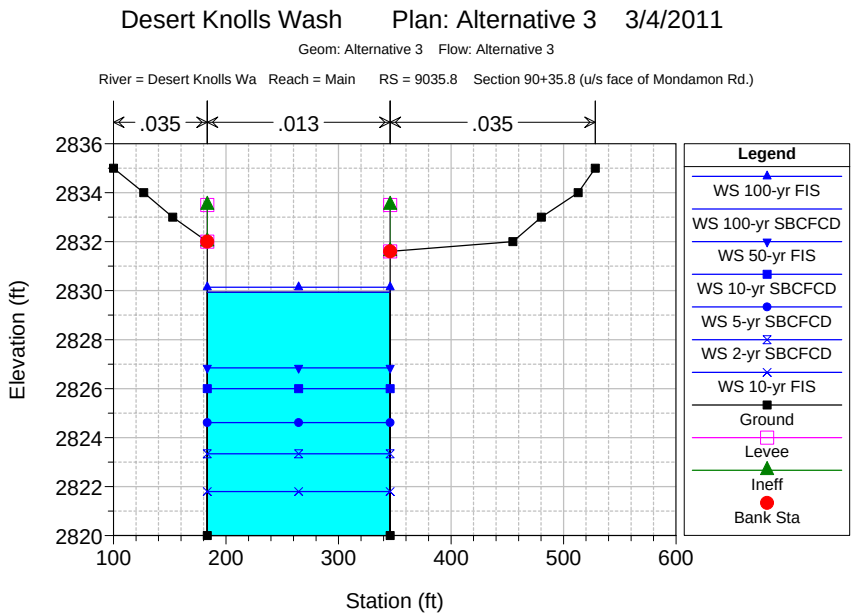

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9525.6 Culv Pohez Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

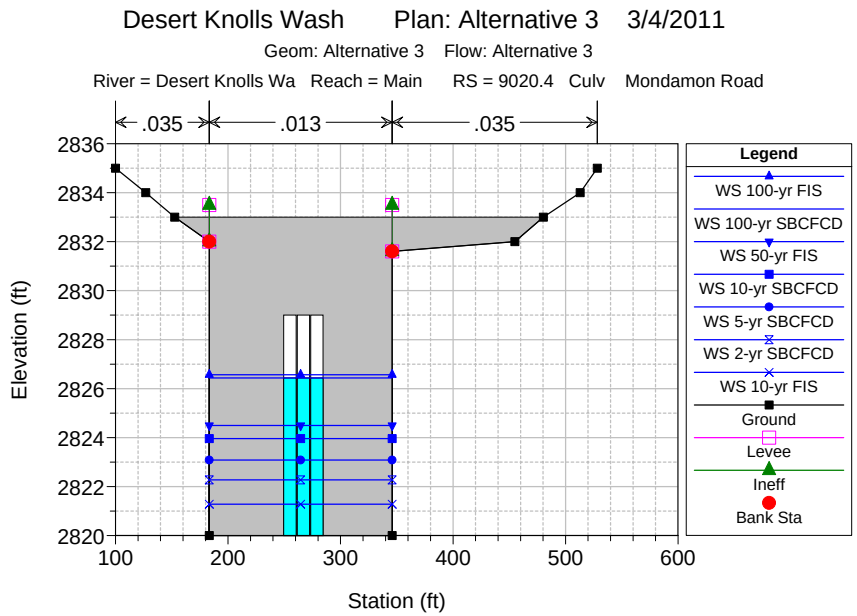

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9515.2 Section 95+15.2 (d/s face of Pohez Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

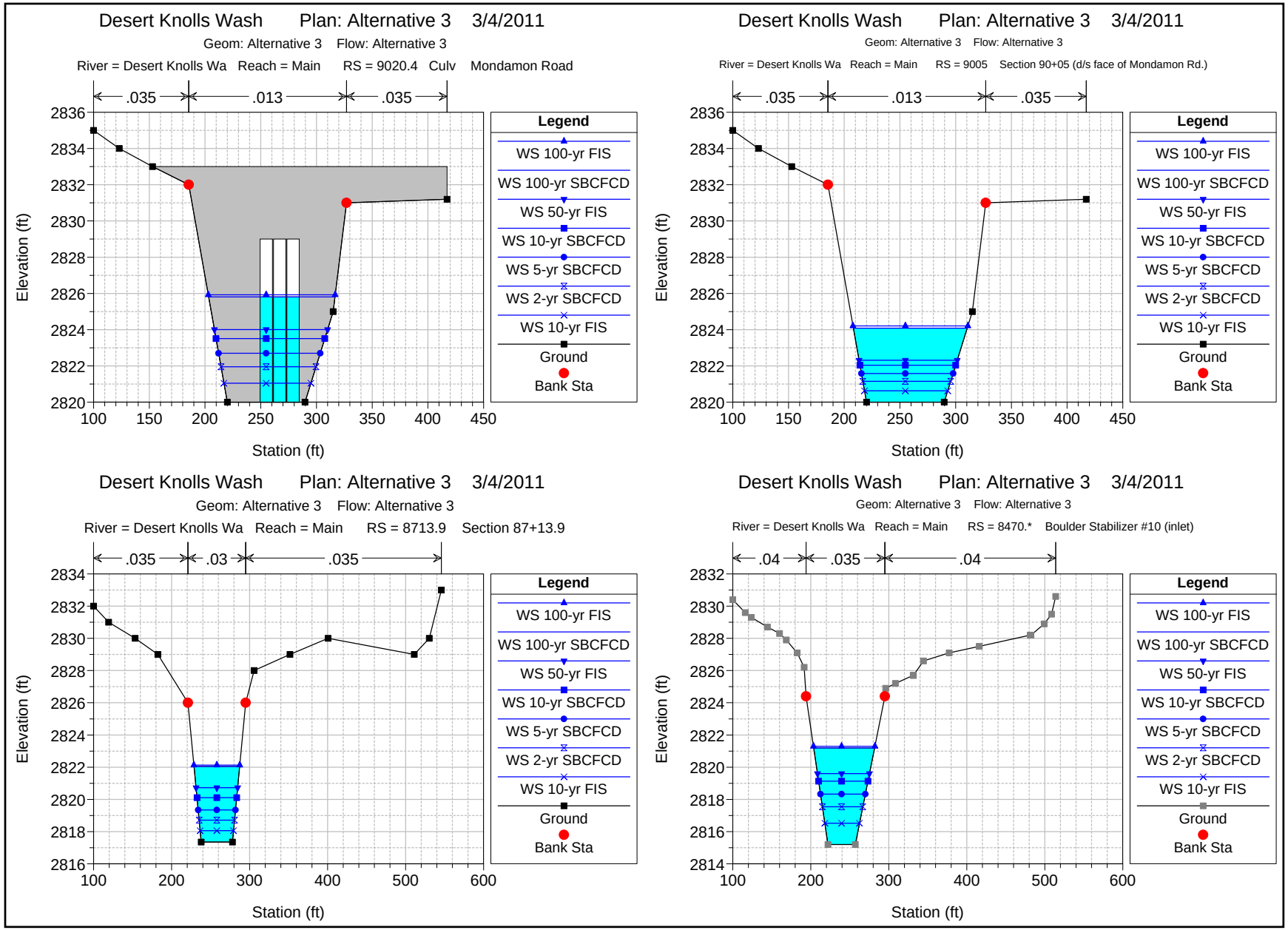

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9313.9 Section 93+13.9
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

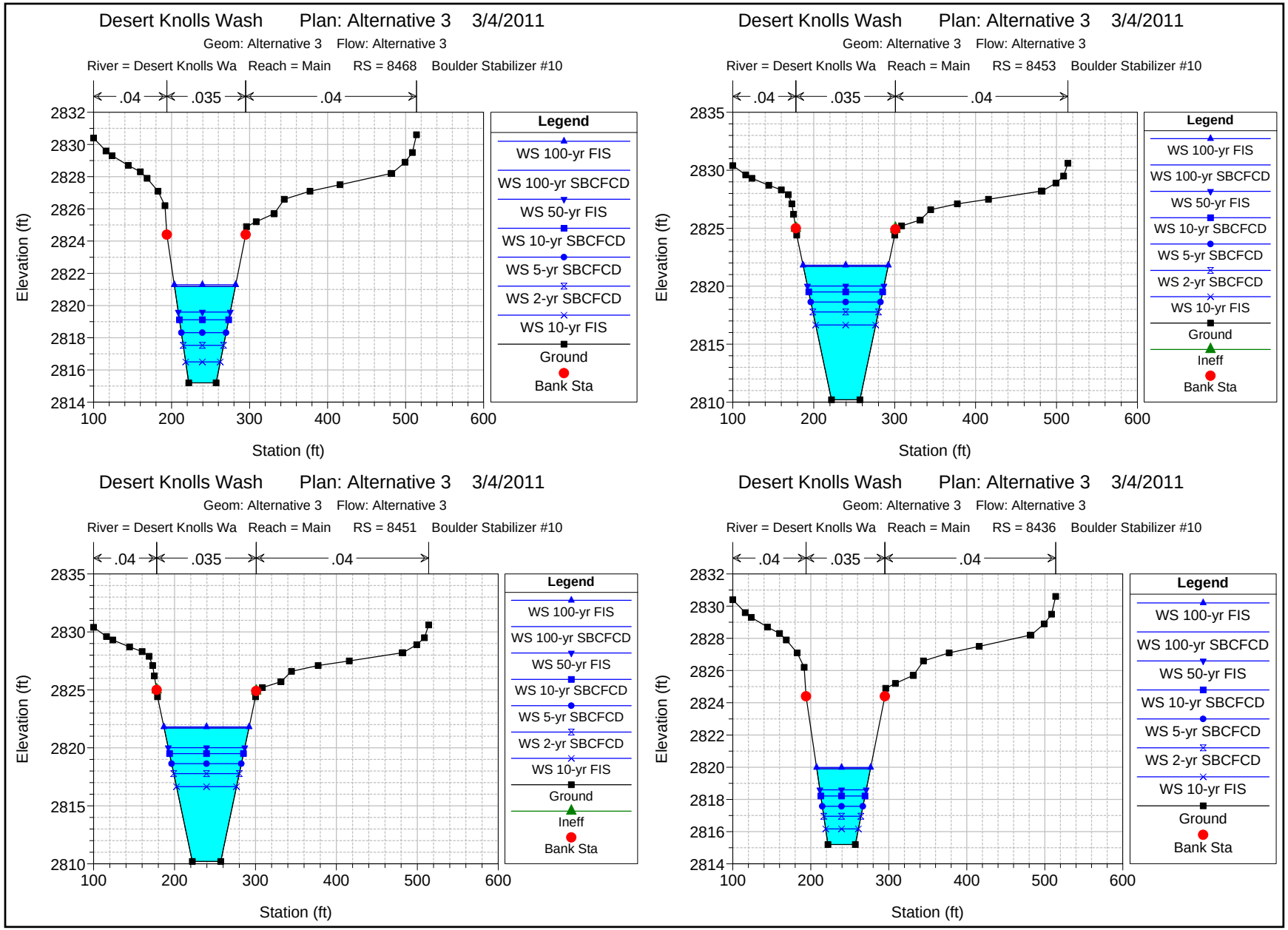

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9125 Section 91+25
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

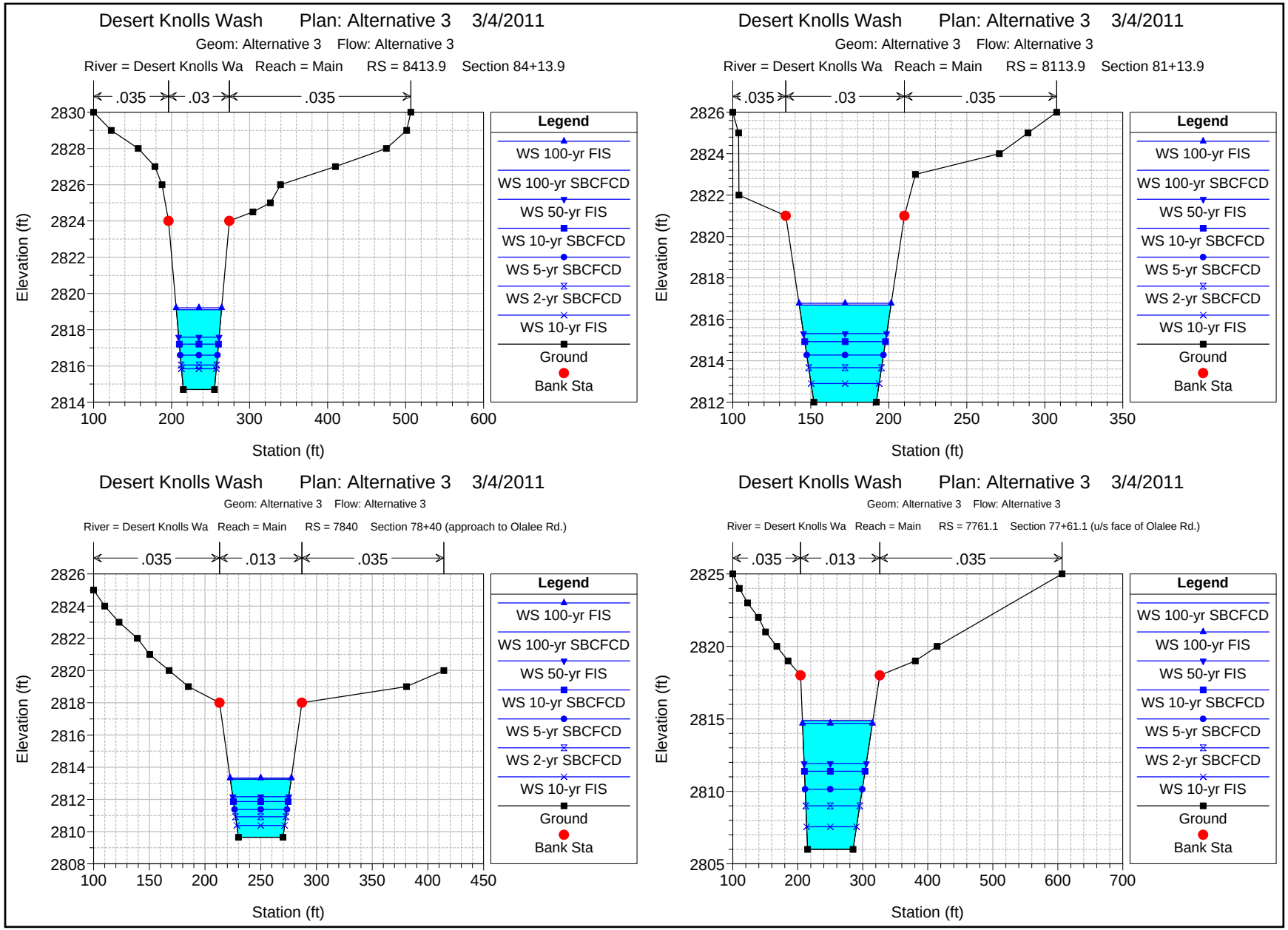

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9116 Section 91+16 (approach to Mondamon Rd.)
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

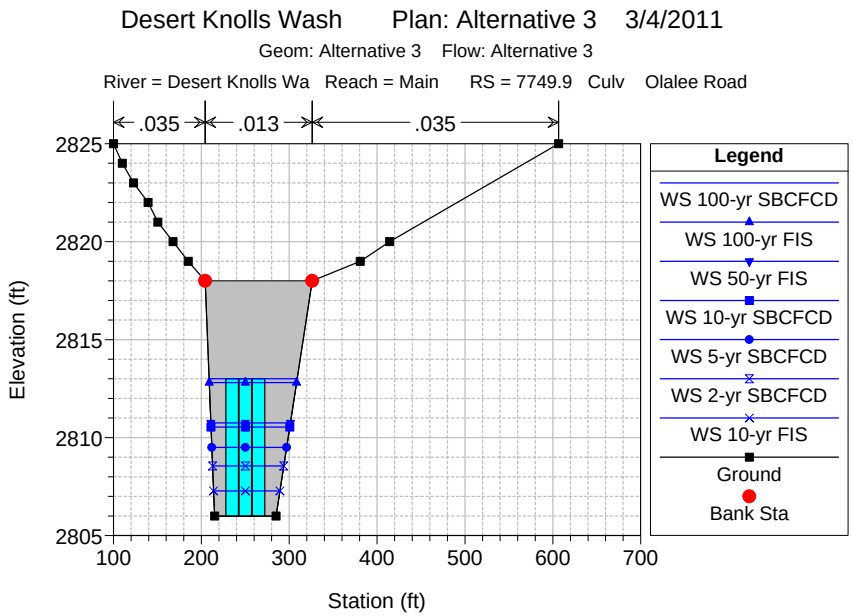

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9035.8 Section 90+35.8 (u/s face of Mondamon Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

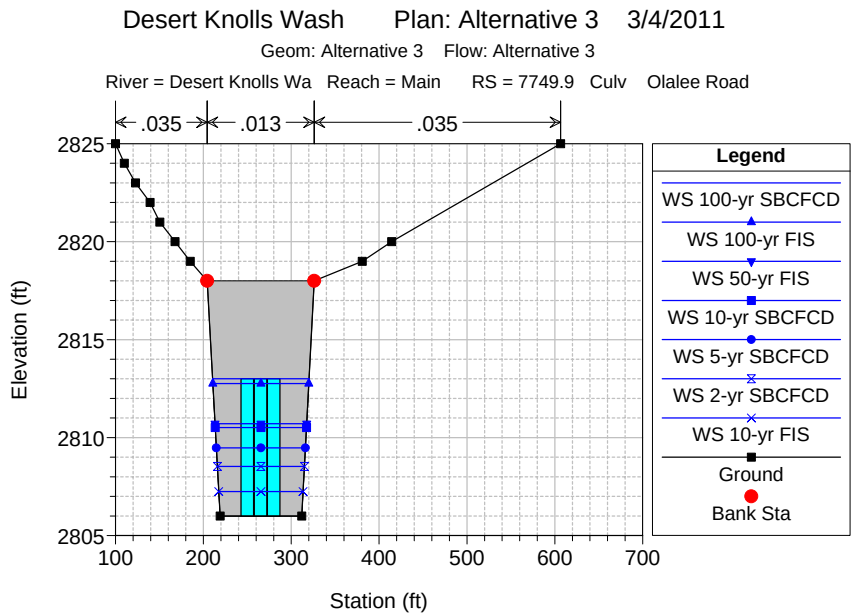

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9020.4 Culv Mondamon Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

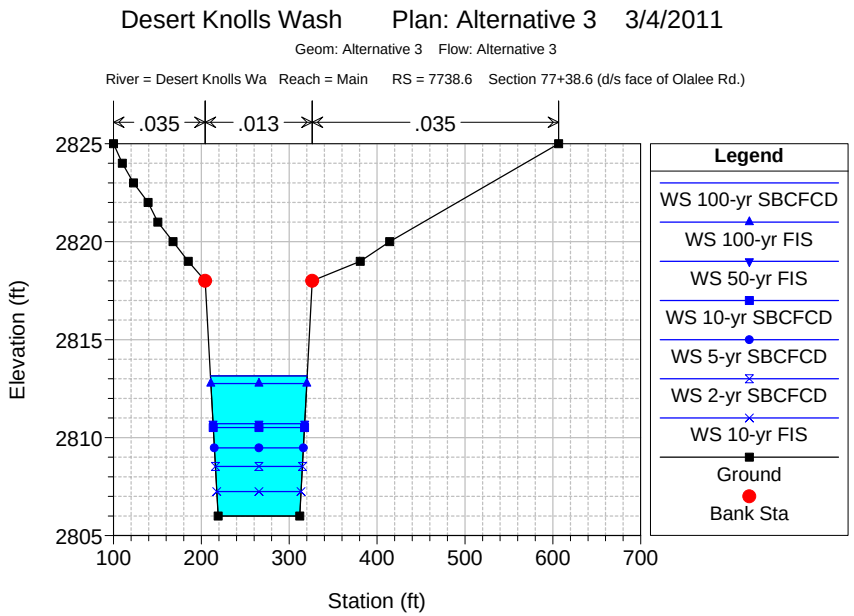

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9020.4 Culv Mondamon Road
.035 .013 .035
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 9005 Section 90+05 (d/s face of Mondamon Rd.)
.035 .013 .035
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 8713.9 Section 87+13.9
.035 .03 .035
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 8470.* Boulder Stabilizer #10 (inlet)
.04 .035 .04
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

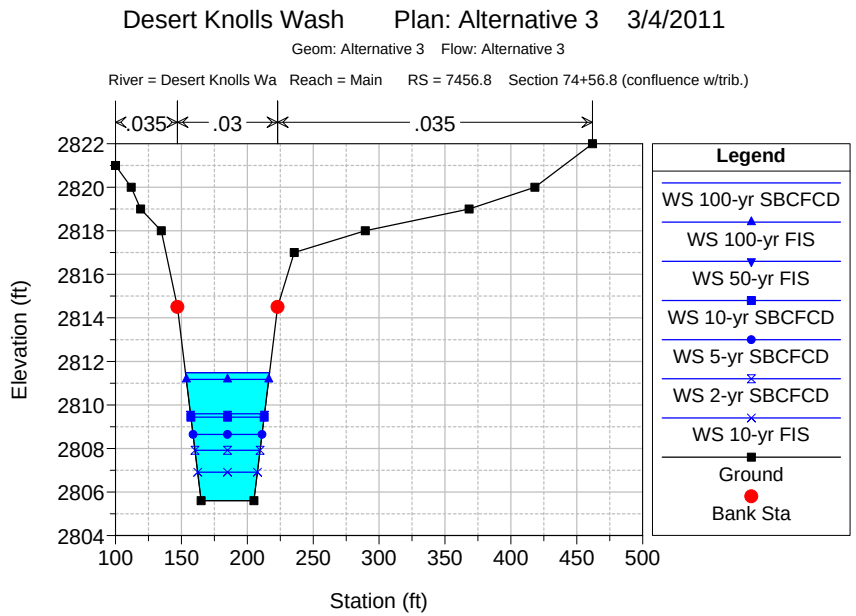

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 8468 Boulder Stabilizer #10
.04 .035 .04
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 8453 Boulder Stabilizer #10
.04 .035 .04
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 8451 Boulder Stabilizer #10
.04 .035 .04
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 8436 Boulder Stabilizer #10
.04 .035 .04
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

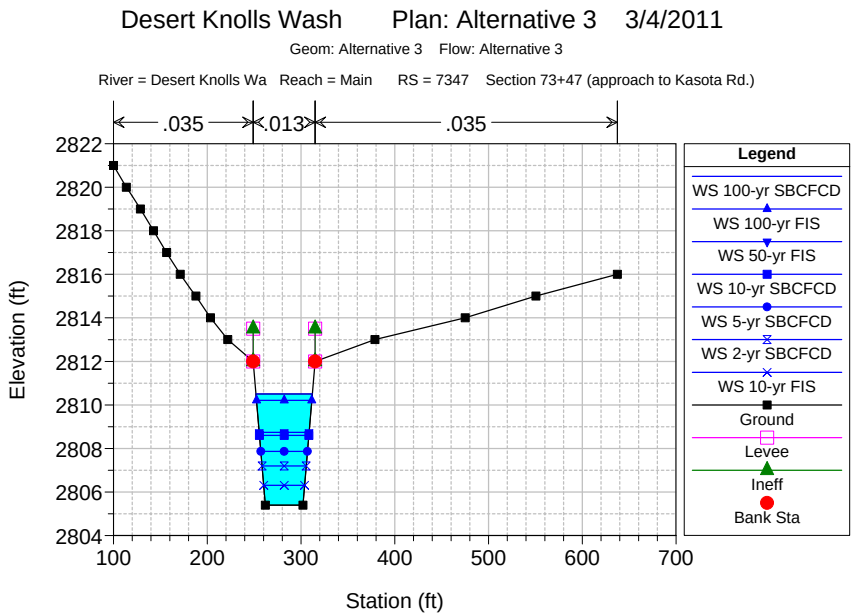

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 8413.9 Section 84+13.9
.035 .03 .035
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 8113.9 Section 81+13.9
.035 .03 .035
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 7840 Section 78+40 (approach to Olalee Rd.)
.035 .013 .035
Elevation (ft)
Station (ft)
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 7761.1 Section 77+61.1 (u/s face of Olalee Rd.)
.035 .013 .035
Elevation (ft)
Station (ft)
Legend
WS 100-yr FIS
WS 100-yr SBCFCD
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

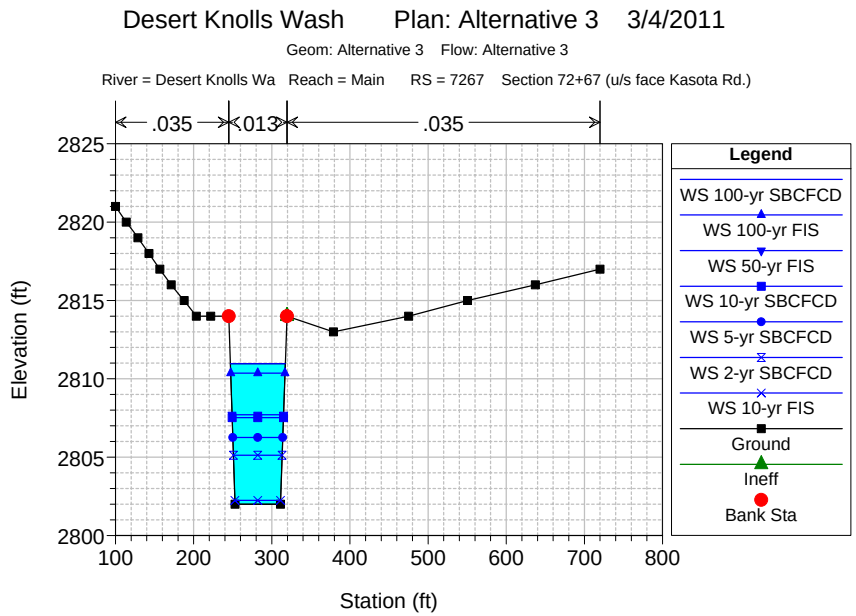

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 7749.9 Culv Olalee Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

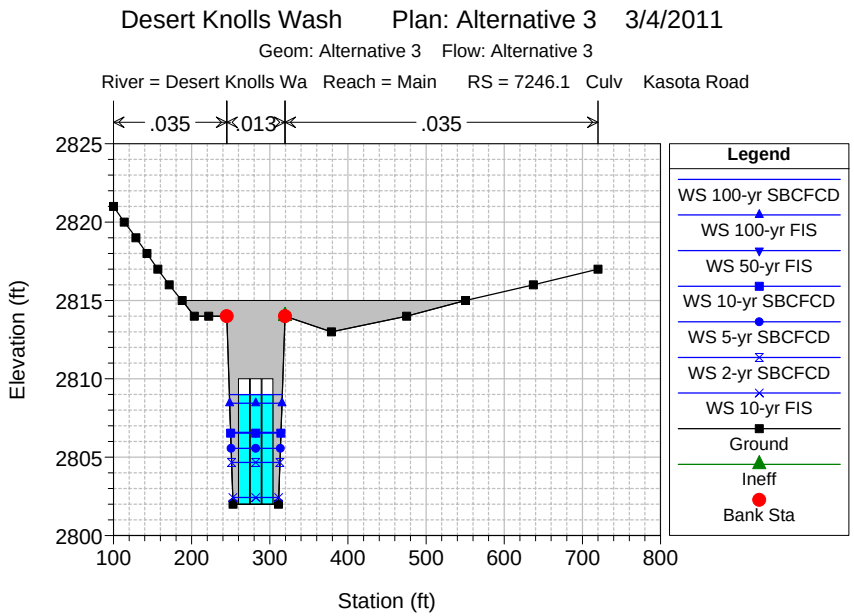

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 7749.9 Culv Olalee Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

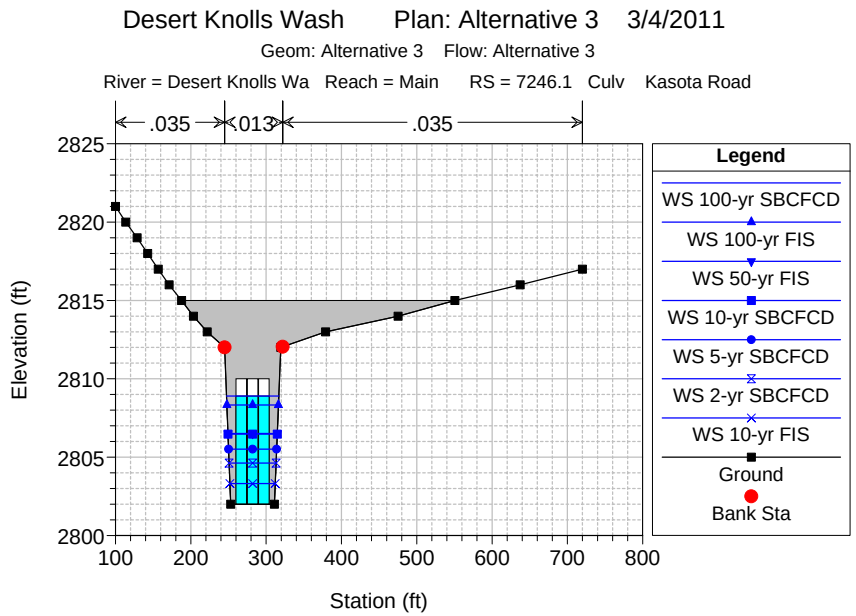

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 7738.6 Section 77+38.6 (d/s face of Olalee Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

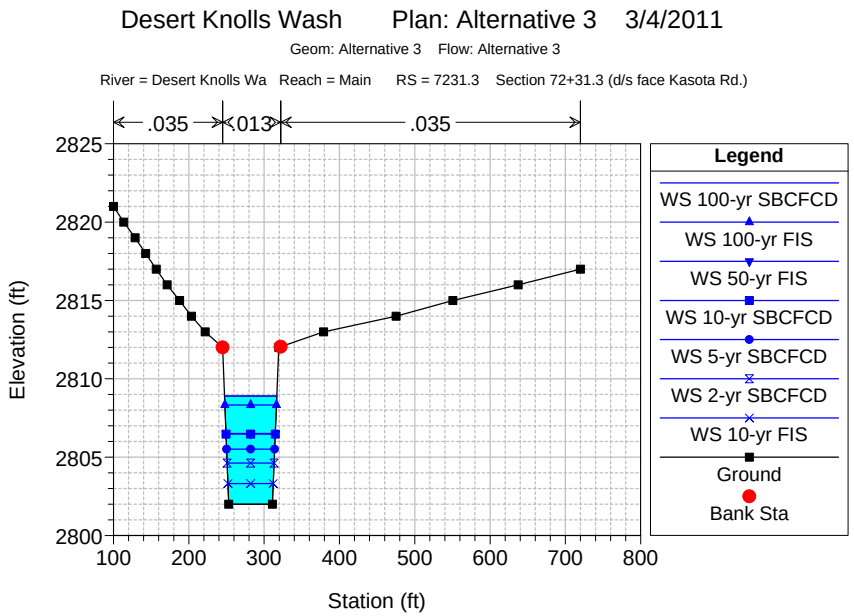

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 7456.8 Section 74+56.8 (confluence w/trib.)
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

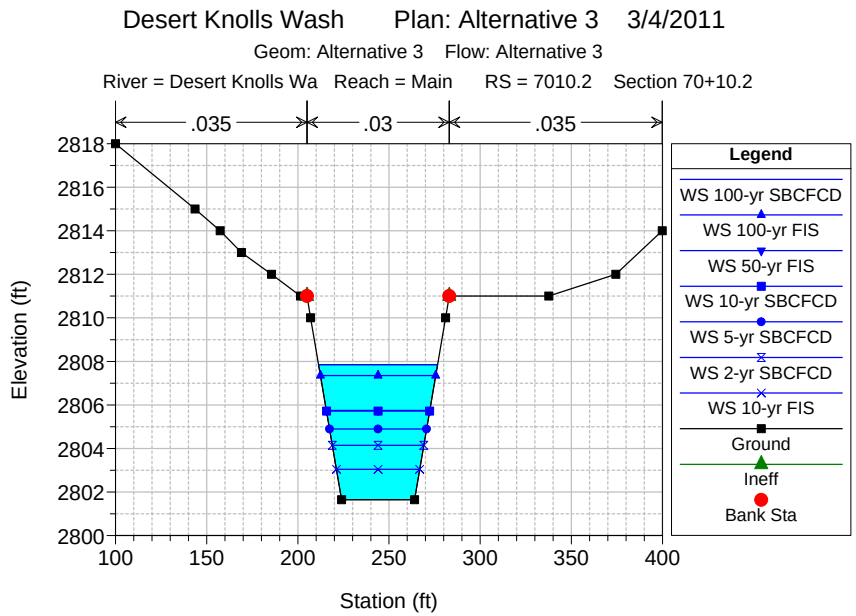

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 7347 Section 73+47 (approach to Kasota Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

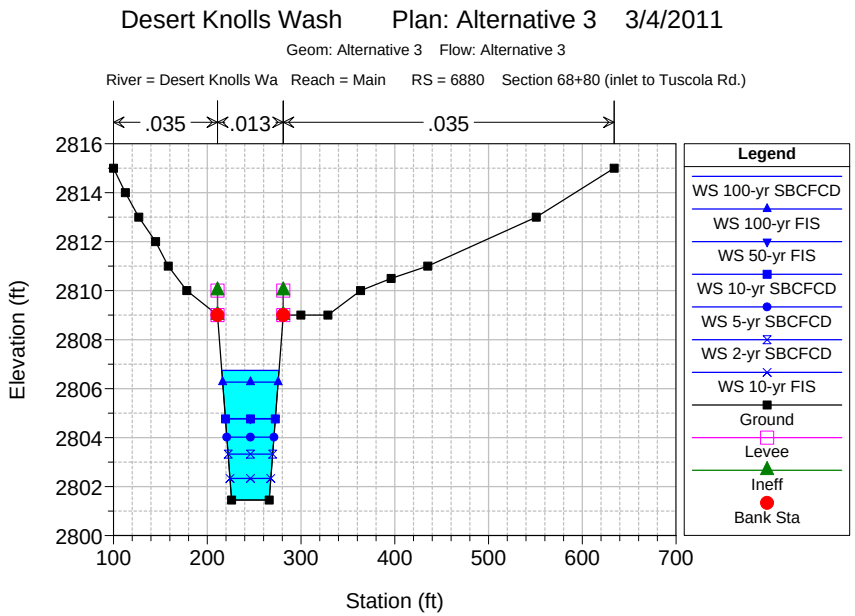

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 7267 Section 72+67 (u/s face Kasota Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

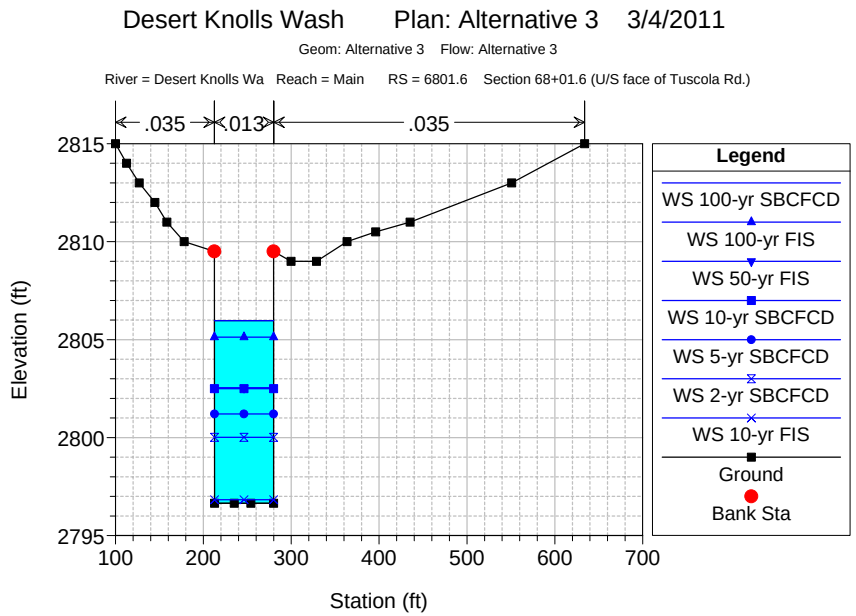

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 7246.1 Culv Kasota Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

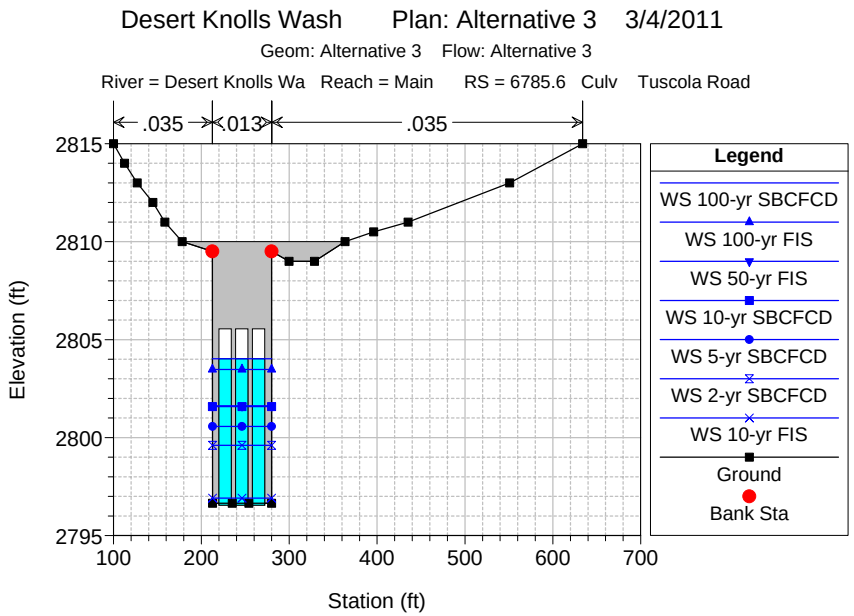

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 7246.1 Culv Kasota Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

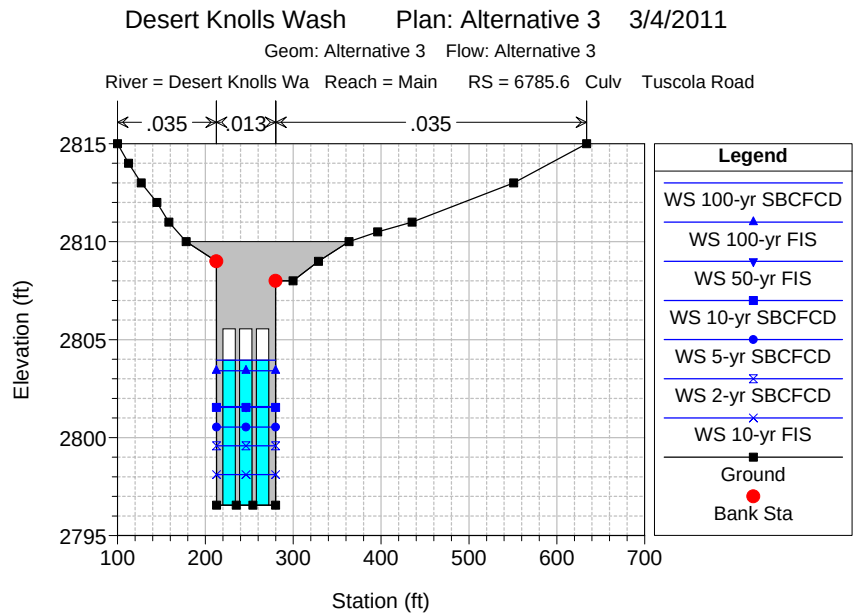

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 7231.3 Section 72+31.3 (d/s face Kasota Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

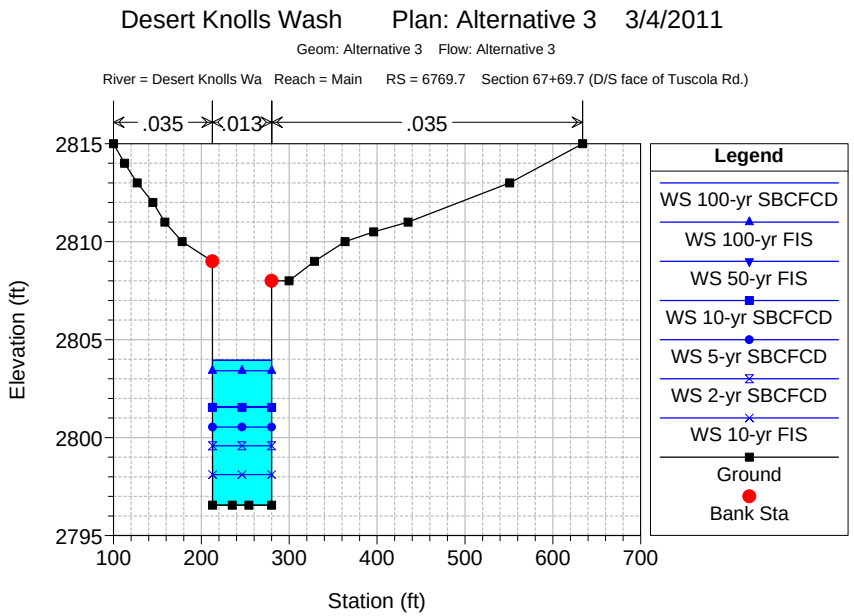

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 7010.2 Section 70+10.2
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

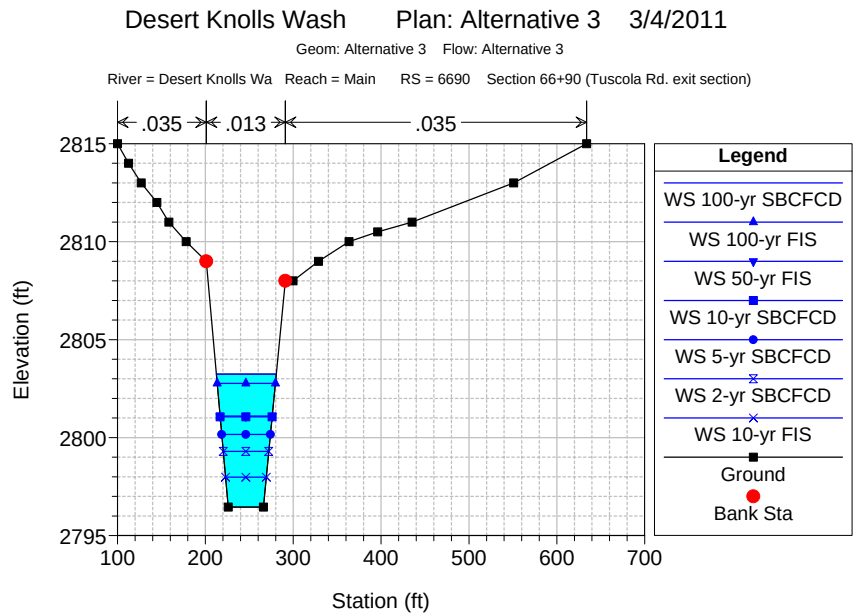

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 6880 Section 68+80 (inlet to Tuscola Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 6801.6 Section 68+01.6 (U/S face of Tuscola Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 6785.6 Culv Tuscola Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 6785.6 Culv Tuscola Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

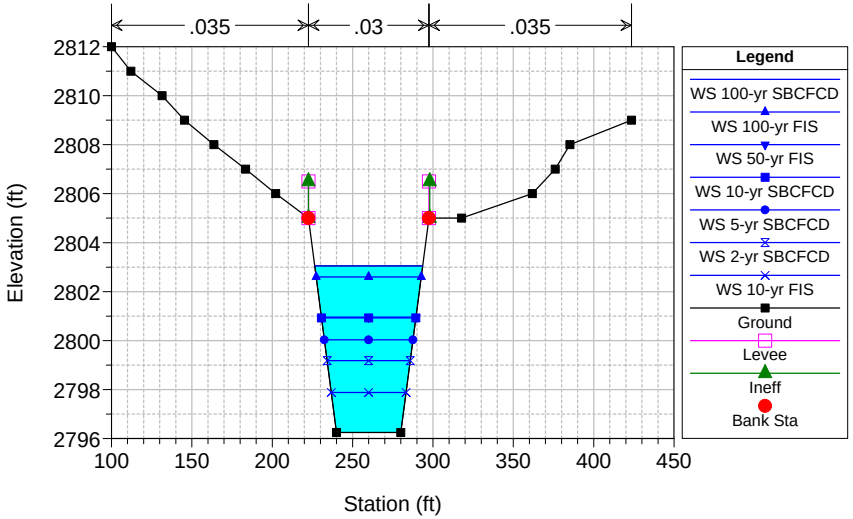

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 6769.7 Section 67+69.7 (D/S face of Tuscola Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 6690 Section 66+90 (Tuscola Rd. exit section)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

Desert Knolls Wash Plan: Alternative 3 3/4/2011

Geom: Alternative 3 Flow: Alternative 3

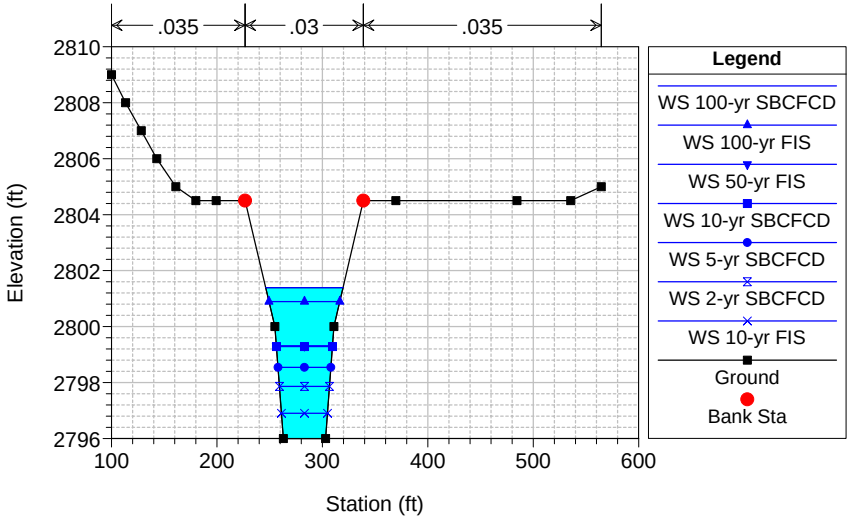
River = Desert Knolls Wa Reach = Main RS = 6555.8 Section 65+55.8



Desert Knolls Wash Plan: Alternative 3 3/4/2011

Geom: Alternative 3 Flow: Alternative 3

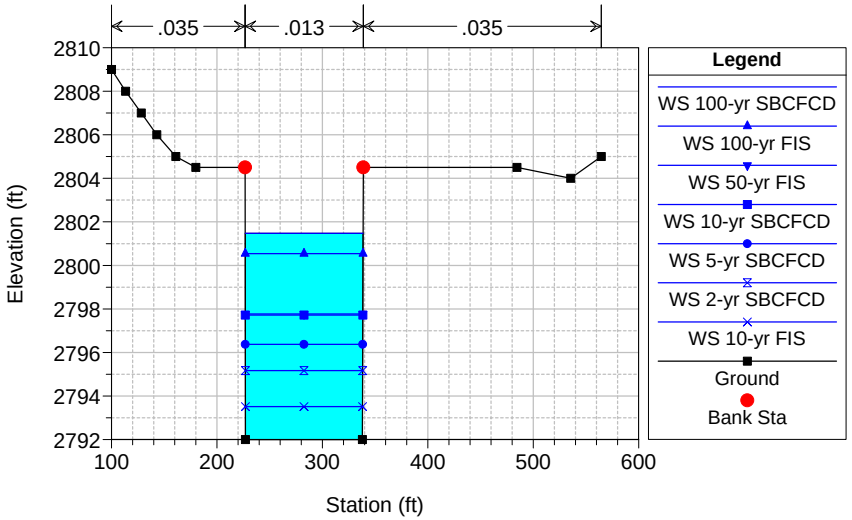
River = Desert Knolls Wa Reach = Main RS = 6400 Section 64+00 Approach



Desert Knolls Wash Plan: Alternative 3 3/4/2011

Geom: Alternative 3 Flow: Alternative 3

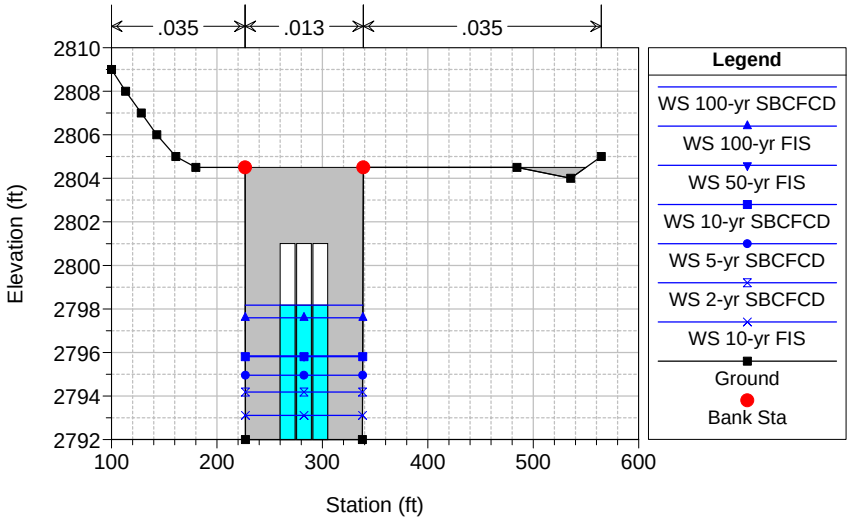
River = Desert Knolls Wa Reach = Main RS = 6344.7 Section 63+44.7 (U/S face of Quantico Rd.)

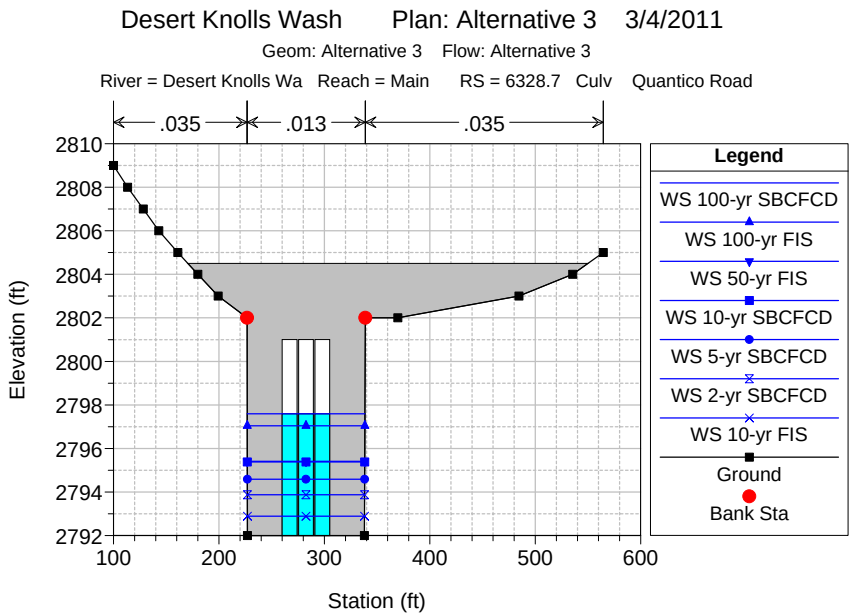


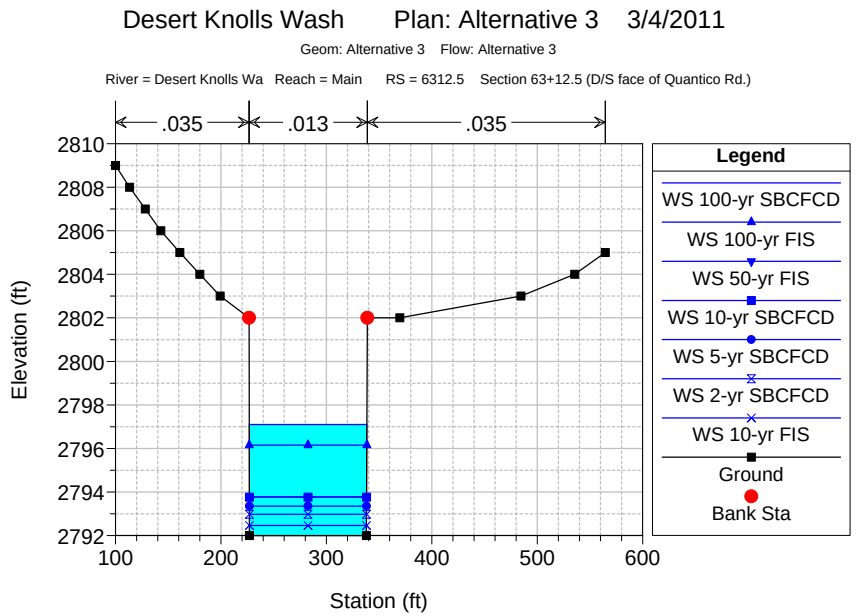
Desert Knolls Wash Plan: Alternative 3 3/4/2011

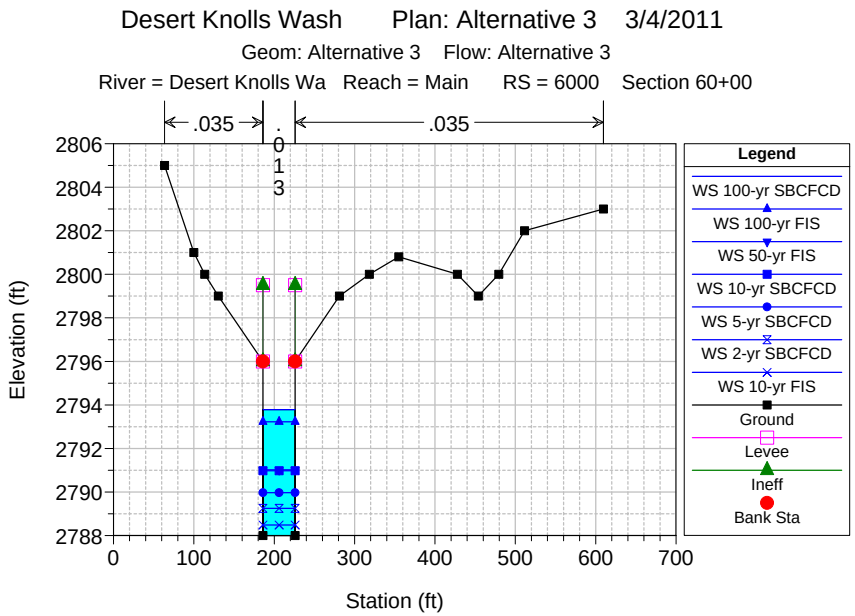
Geom: Alternative 3 Flow: Alternative 3

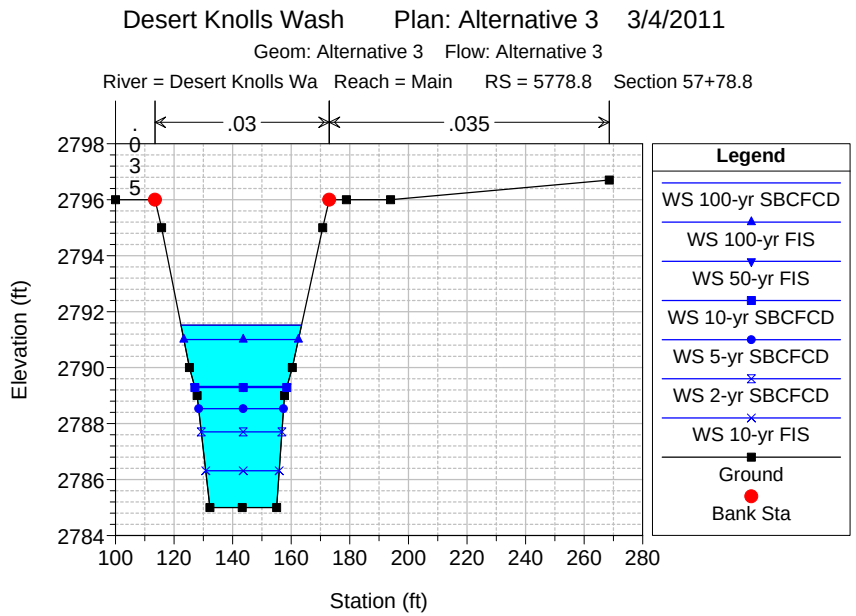
River = Desert Knolls Wa Reach = Main RS = 6328.7 Culv Quantico Road

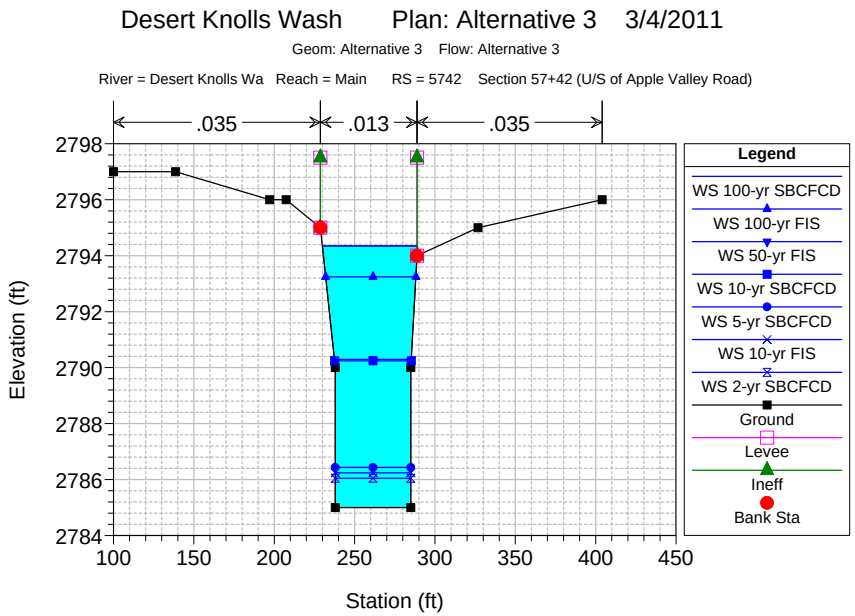


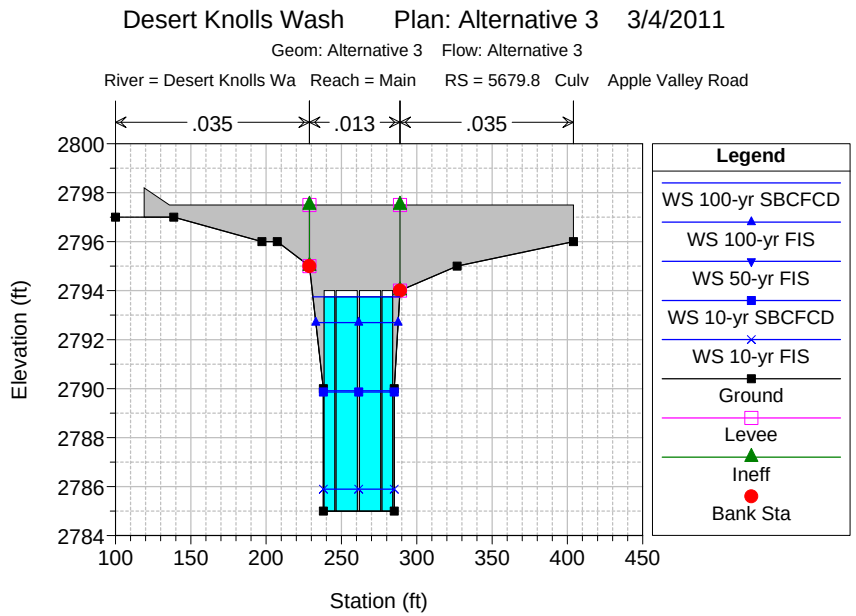

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 6328.7 Culv Quantico Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

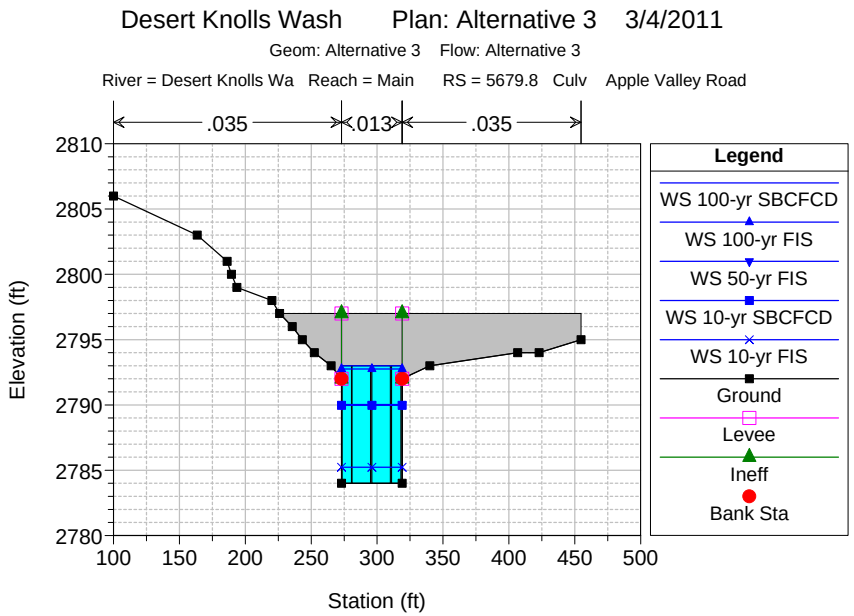

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 6312.5 Section 63+12.5 (D/S face of Quantico Rd.)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

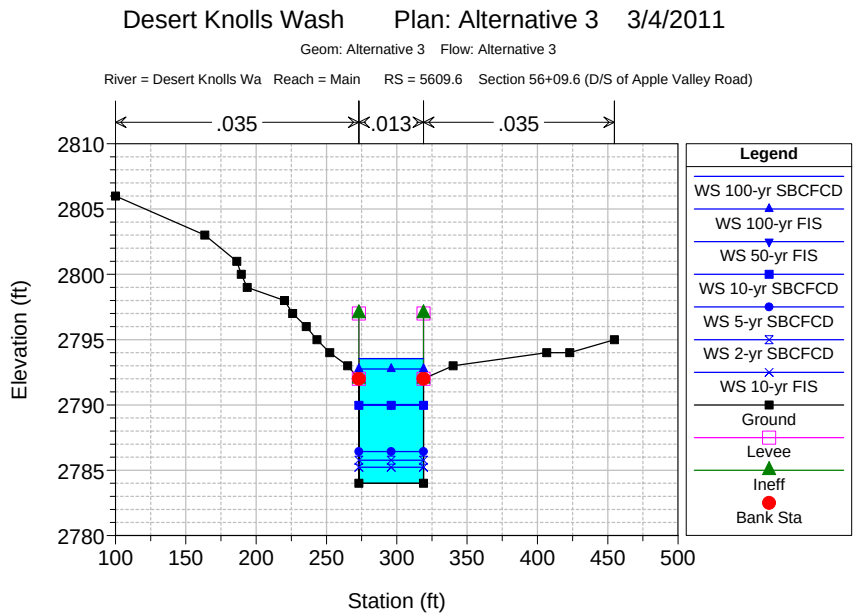

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 6000 Section 60+00
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 5778.8 Section 57+78.8
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 5742 Section 57+42 (U/S of Apple Valley Road)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 10-yr FIS
WS 2-yr SBCFCD
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 5679.8 Culv Apple Valley Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

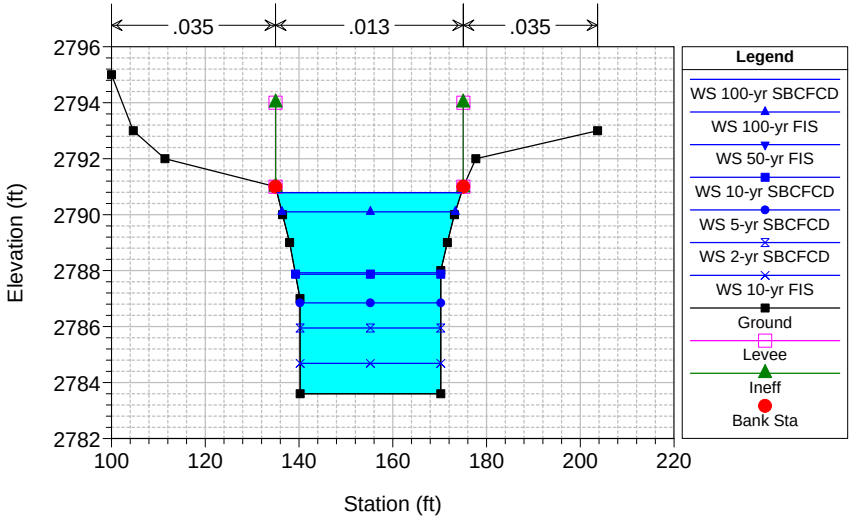

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 5679.8 Culv Apple Valley Road
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 5609.6 Section 56+09.6 (D/S of Apple Valley Road)
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

Desert Knolls Wash Plan: Alternative 3 3/4/2011

Geom: Alternative 3 Flow: Alternative 3

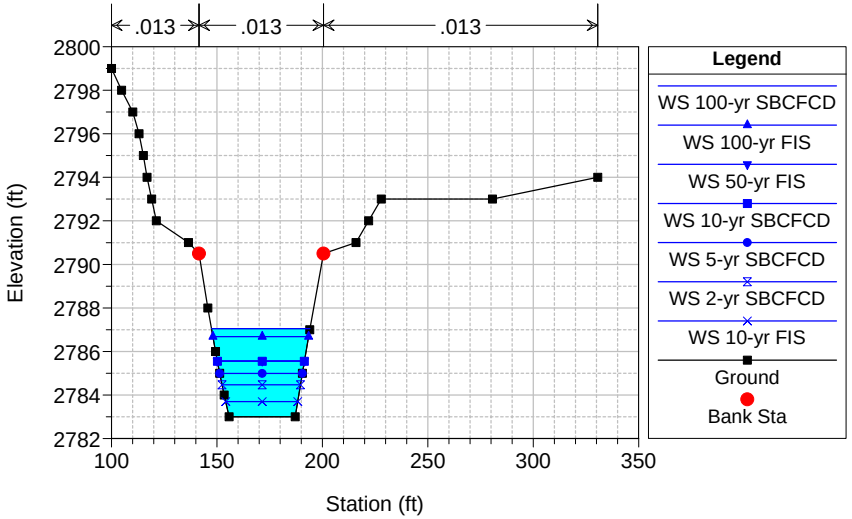
River = Desert Knolls Wa Reach = Main RS = 5581.3 Section 55+81.3



Desert Knolls Wash Plan: Alternative 3 3/4/2011

Geom: Alternative 3 Flow: Alternative 3

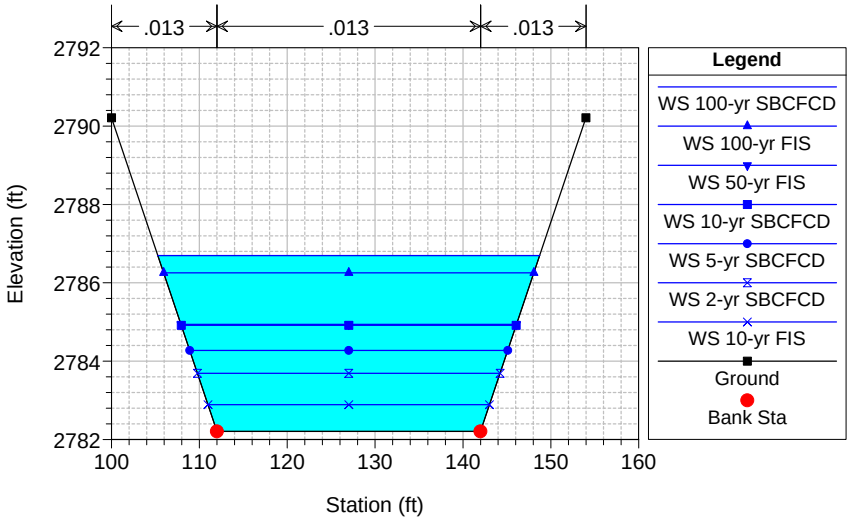
River = Desert Knolls Wa Reach = Main RS = 5515.3 Section 55+15.3 (D/S of Apple Valley Road)



Desert Knolls Wash Plan: Alternative 3 3/4/2011

Geom: Alternative 3 Flow: Alternative 3

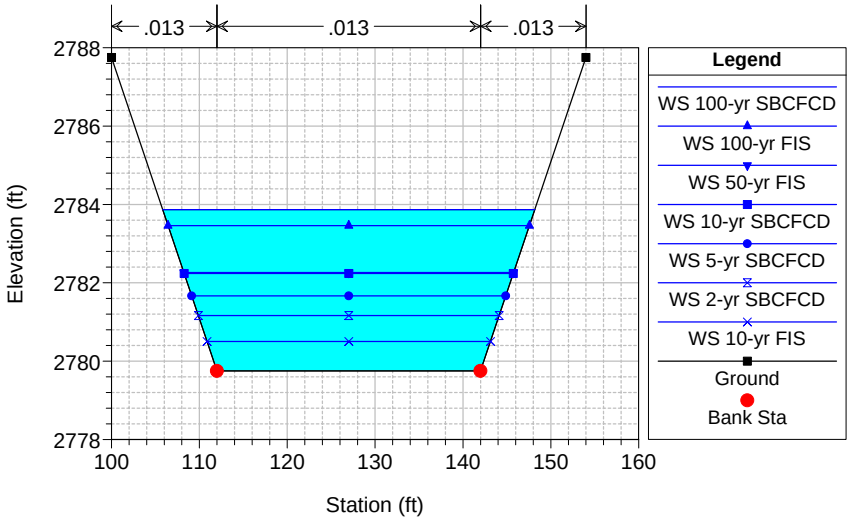
River = Desert Knolls Wa Reach = Main RS = 5135 Section 51+35 Improved Concrete Channel

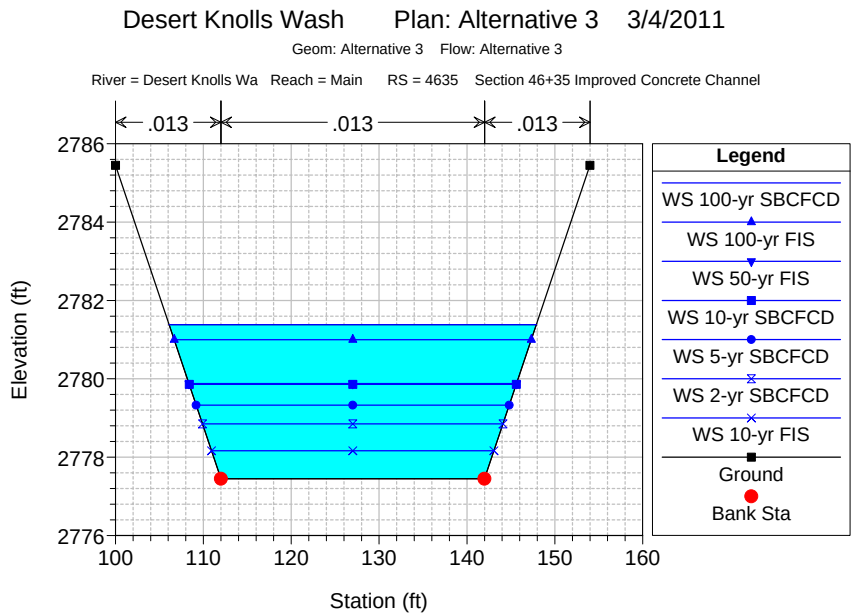


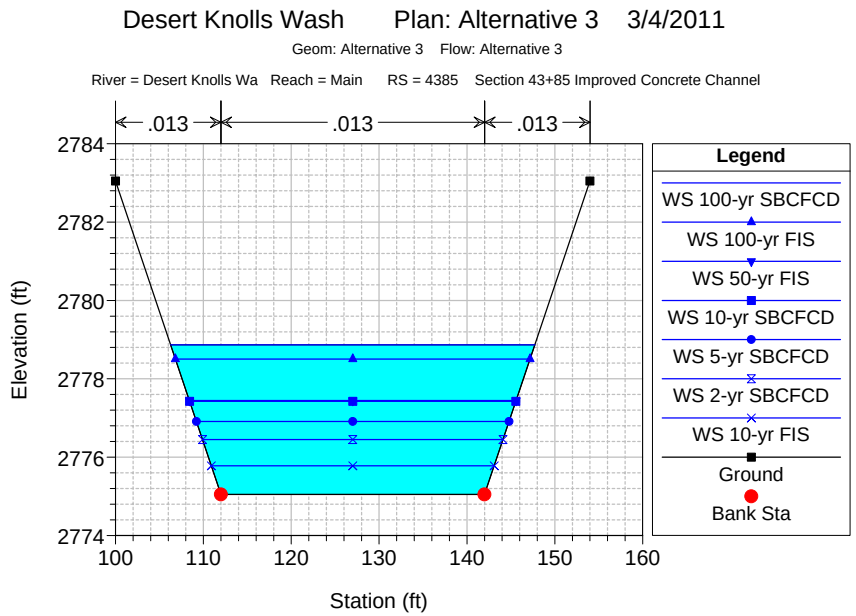
Desert Knolls Wash Plan: Alternative 3 3/4/2011

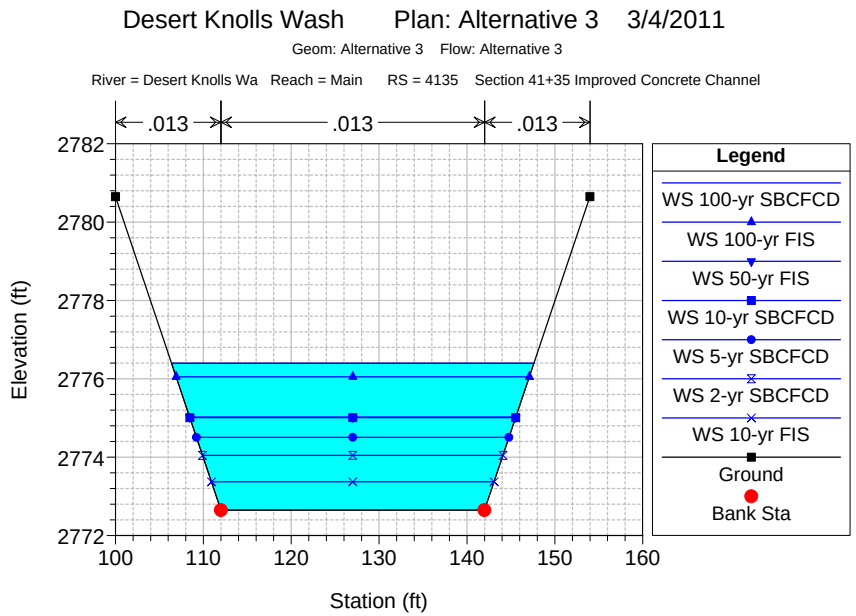
Geom: Alternative 3 Flow: Alternative 3

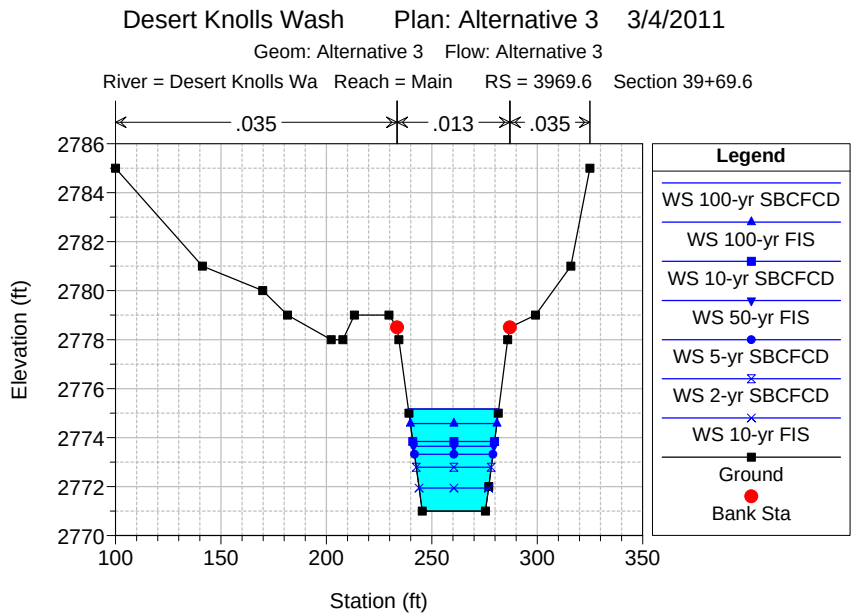
River = Desert Knolls Wa Reach = Main RS = 4875 Section 48+75 Improved Concrete Channel

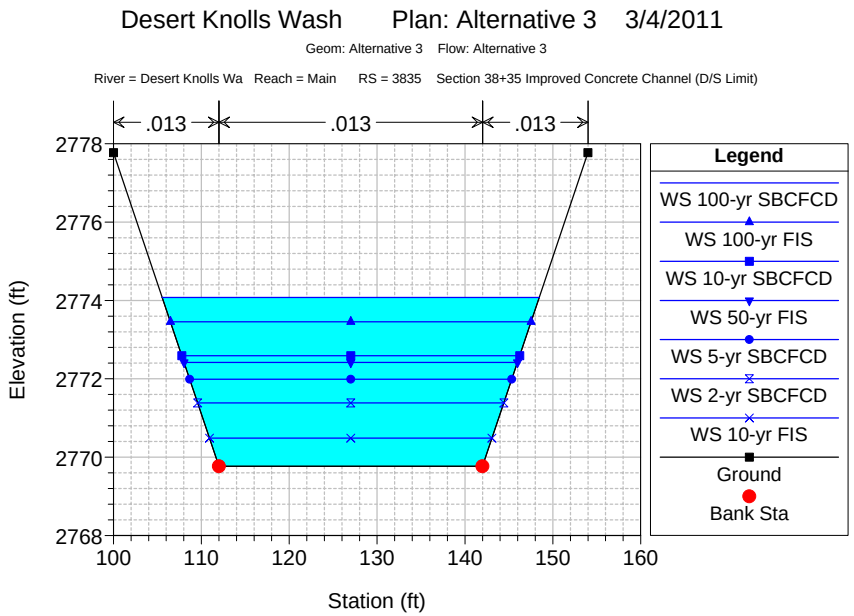


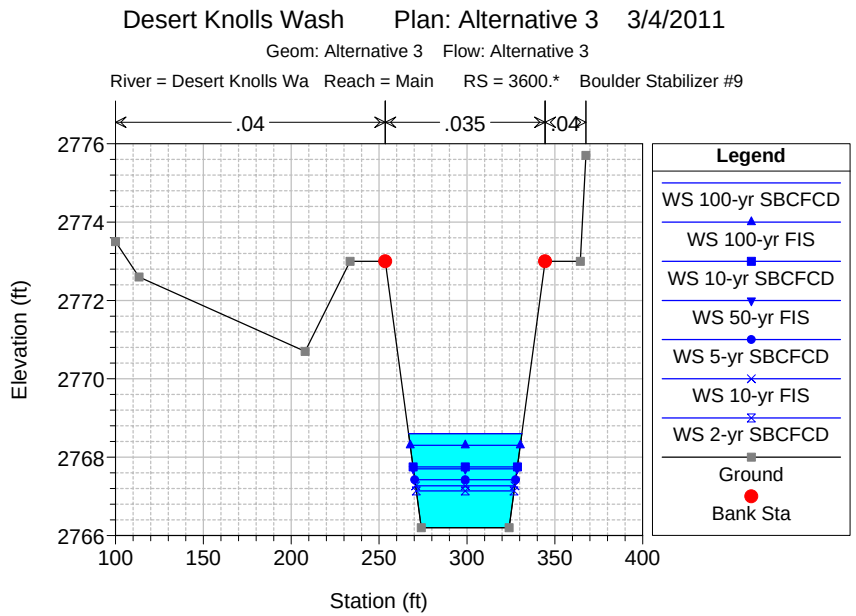

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 4635 Section 46+35 Improved Concrete Channel
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

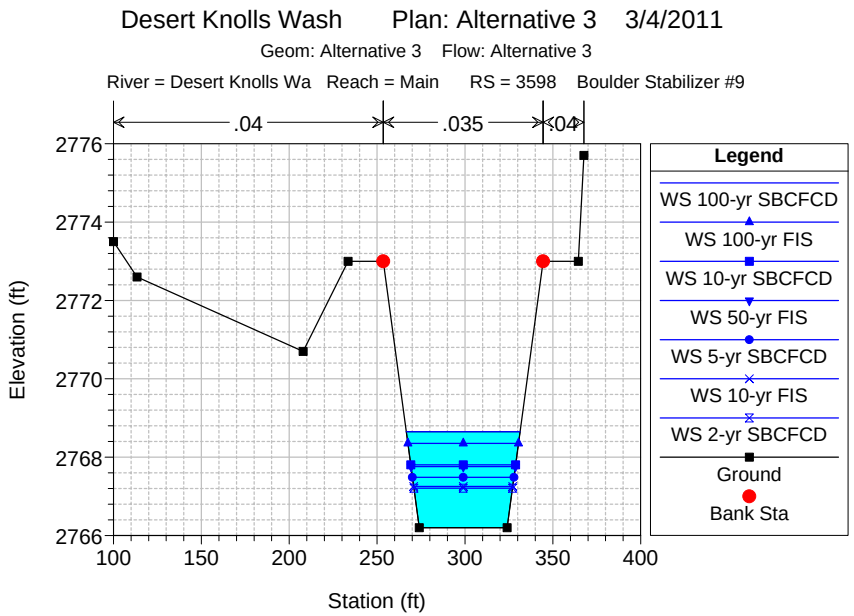

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 4385 Section 43+85 Improved Concrete Channel
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

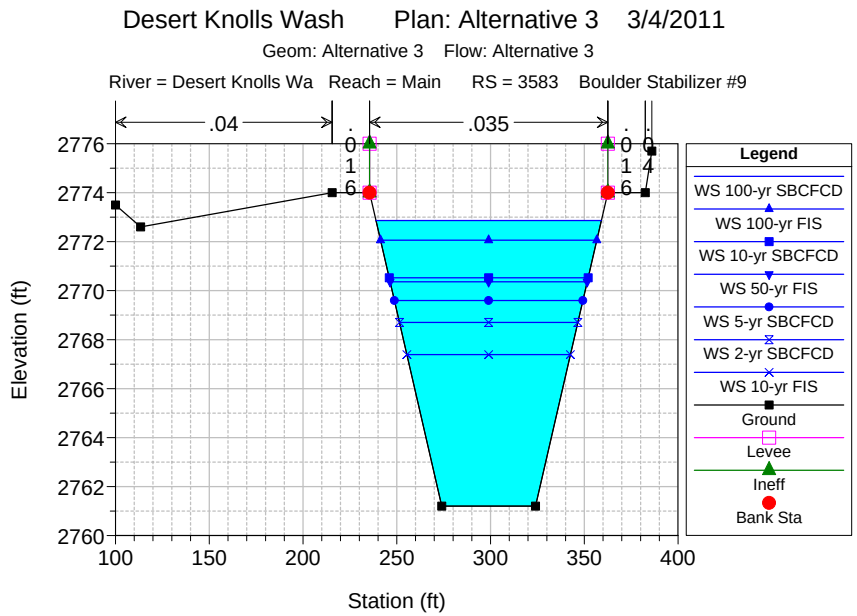

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 4135 Section 41+35 Improved Concrete Channel
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 50-yr FIS
WS 10-yr SBCFCD
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

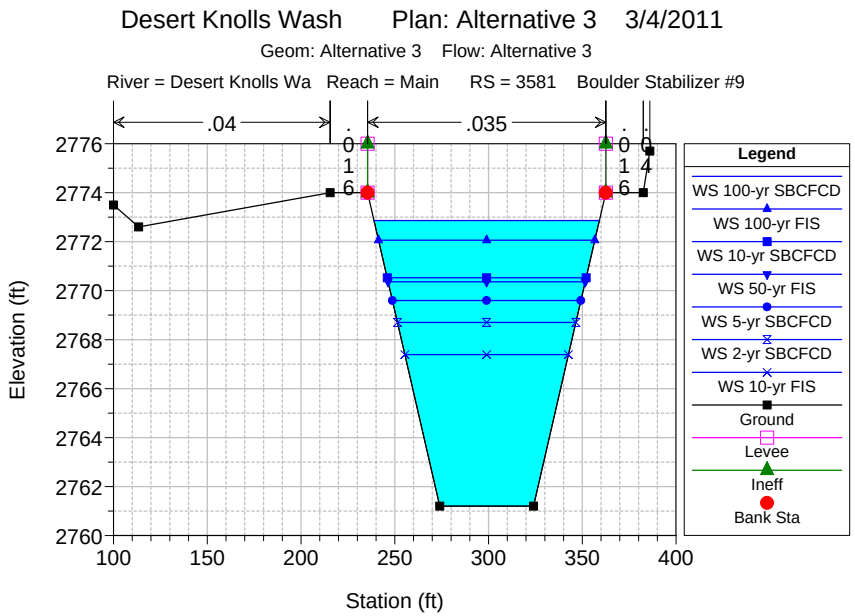

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3969.6 Section 39+69.6
.035
.013
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

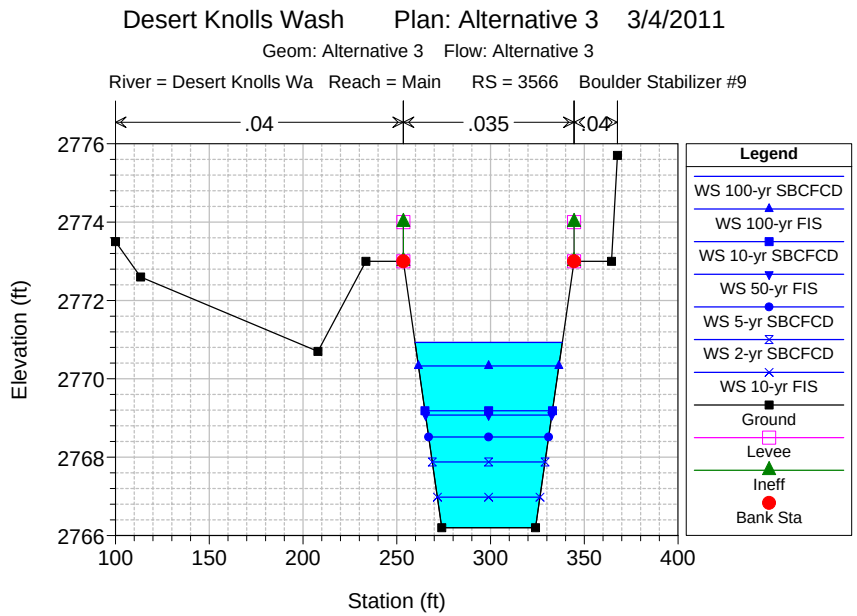

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3835 Section 38+35 Improved Concrete Channel (D/S Limit)
.013
.013
.013
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

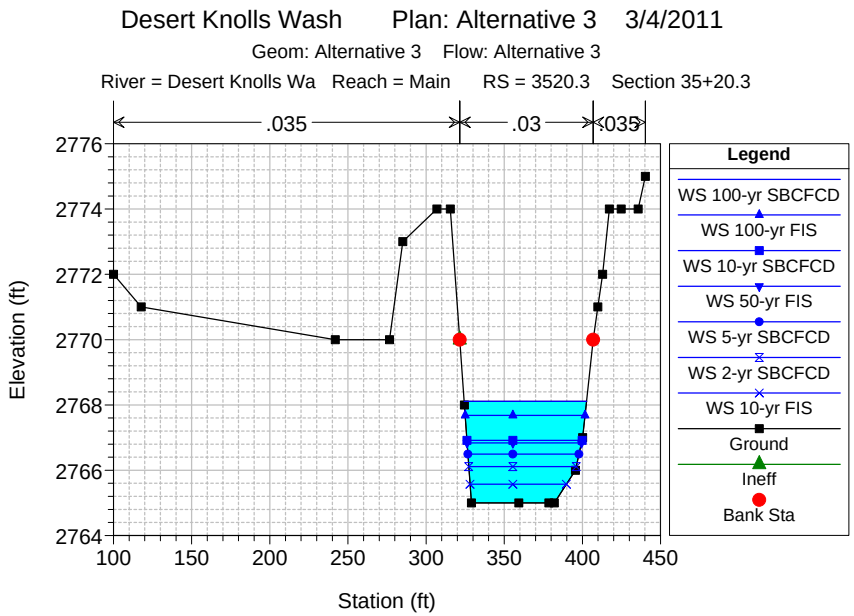

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3600.* Boulder Stabilizer #9
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 10-yr FIS
WS 2-yr SBCFCD
Ground
Bank Sta

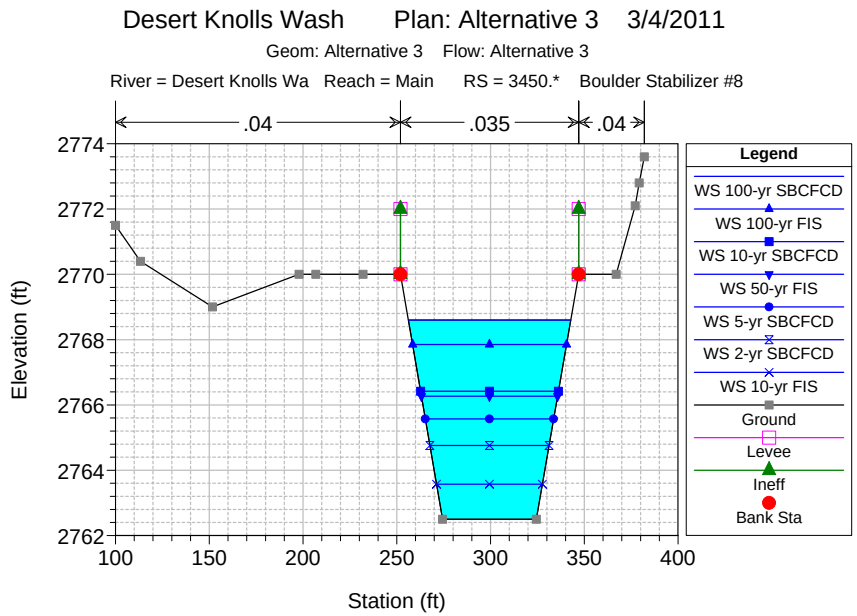

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3598 Boulder Stabilizer #9
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 10-yr FIS
WS 2-yr SBCFCD
Ground
Bank Sta

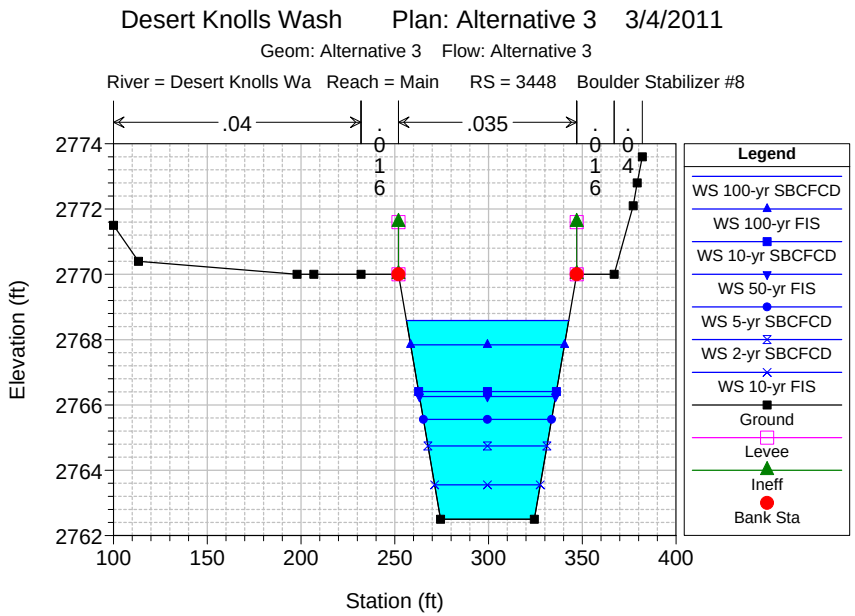

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3583 Boulder Stabilizer #9
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

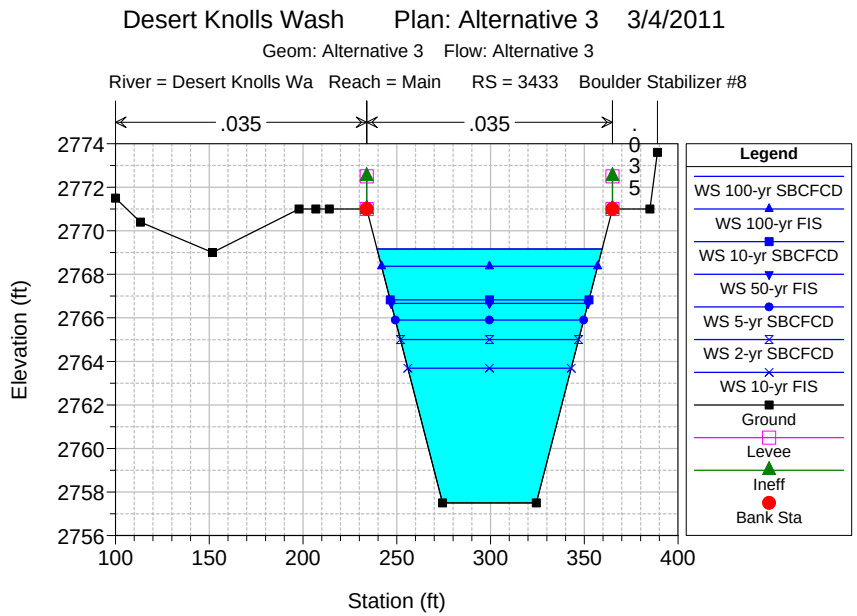

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3581 Boulder Stabilizer #9
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

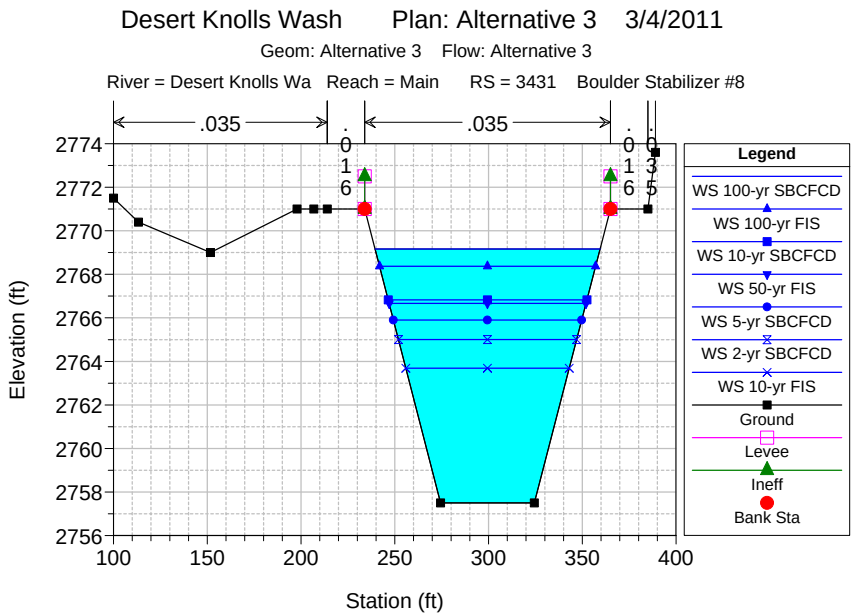

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3566 Boulder Stabilizer #9
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

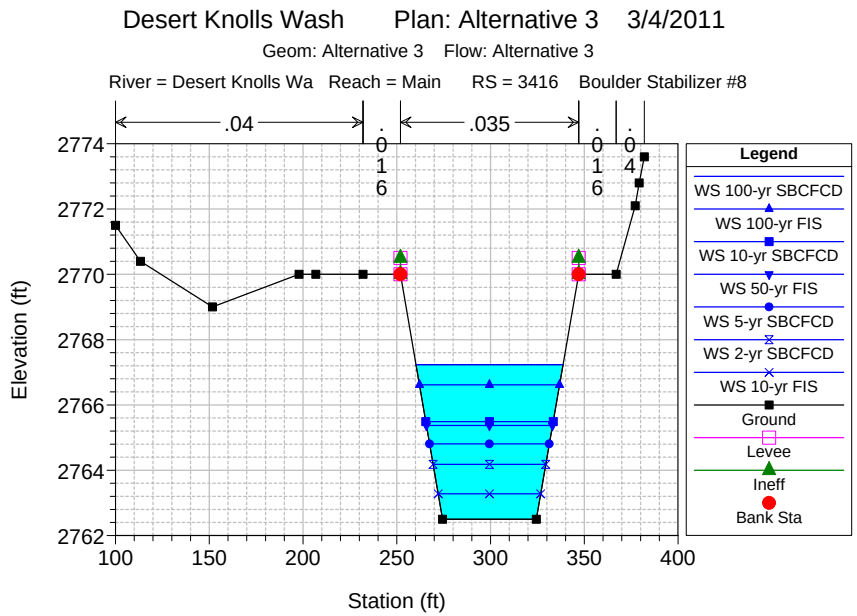

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3520.3 Section 35+20.3
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Ineff
Bank Sta

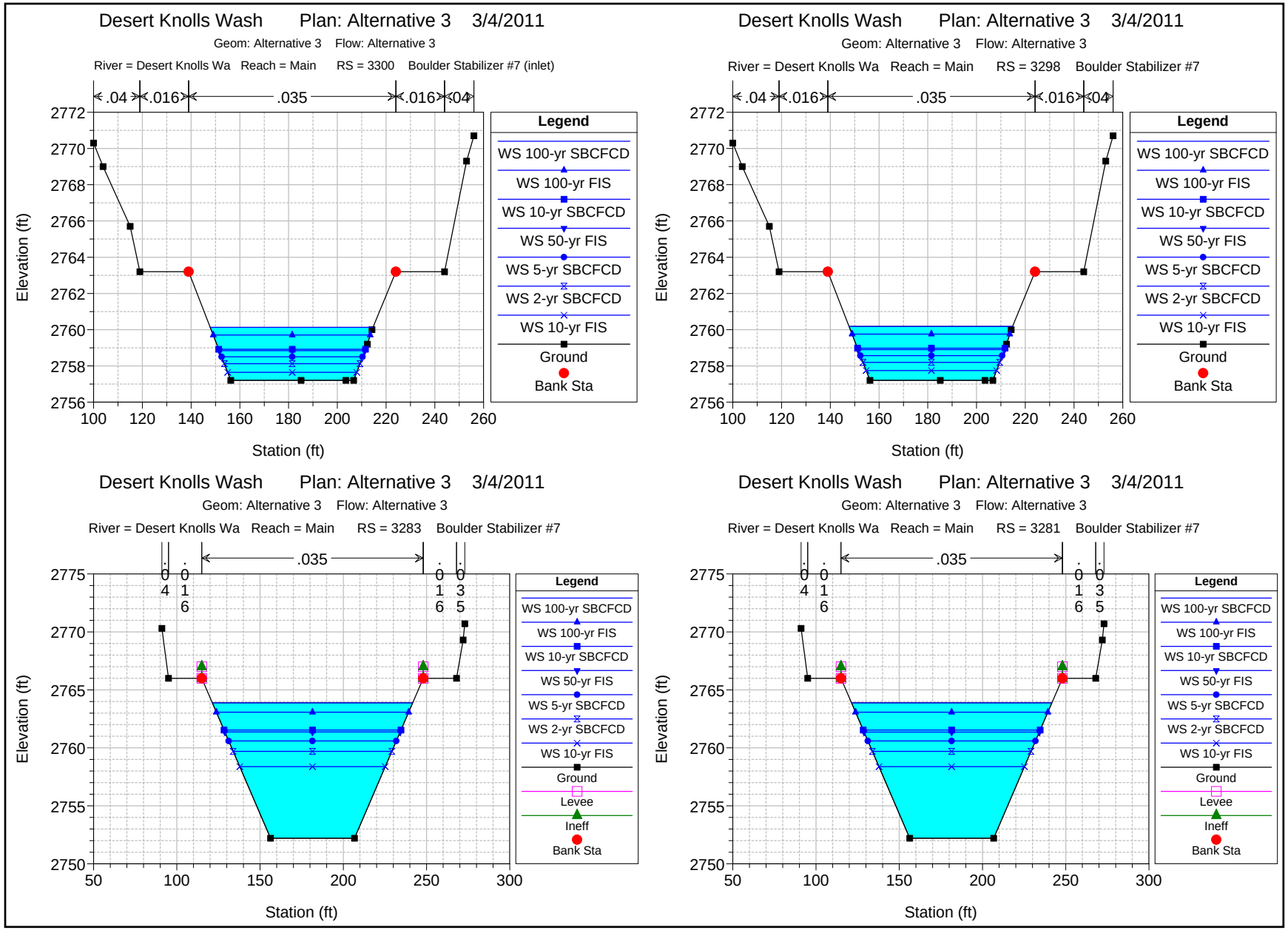

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3450.* Boulder Stabilizer #8
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

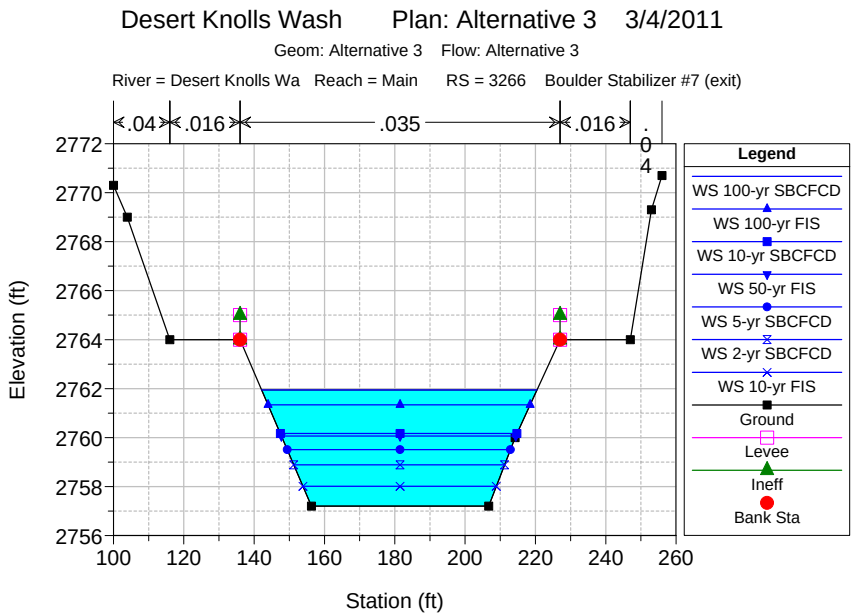

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3448 Boulder Stabilizer #8
.04
.016
.035
.016
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

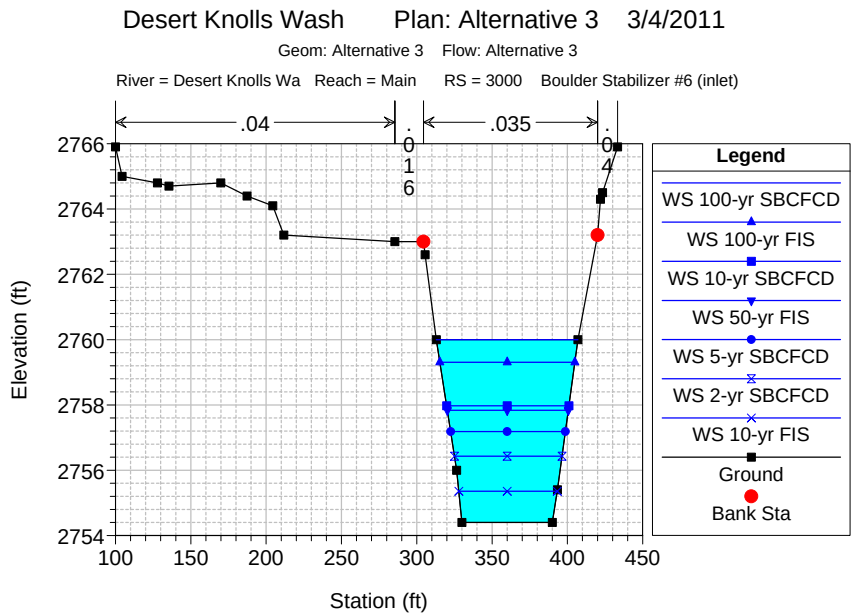

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3433 Boulder Stabilizer #8
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

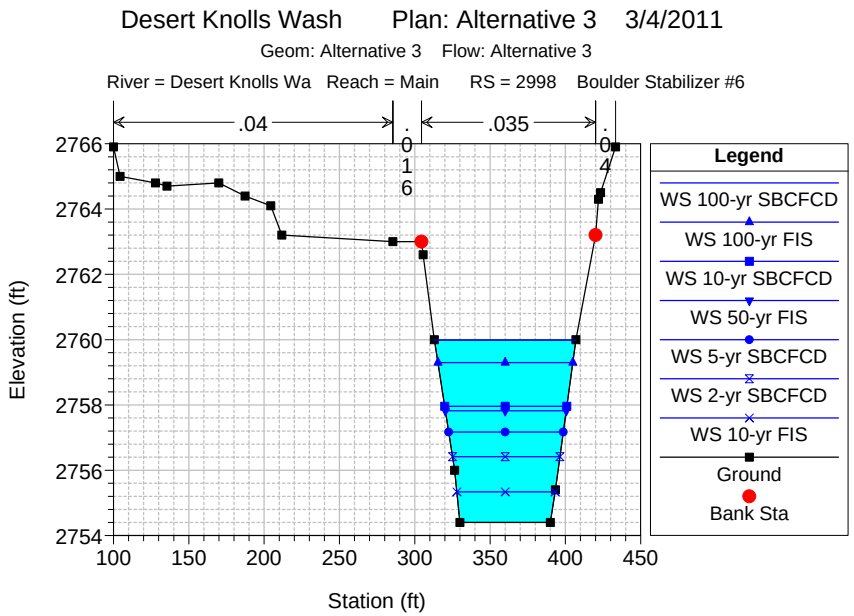

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3431 Boulder Stabilizer #8
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

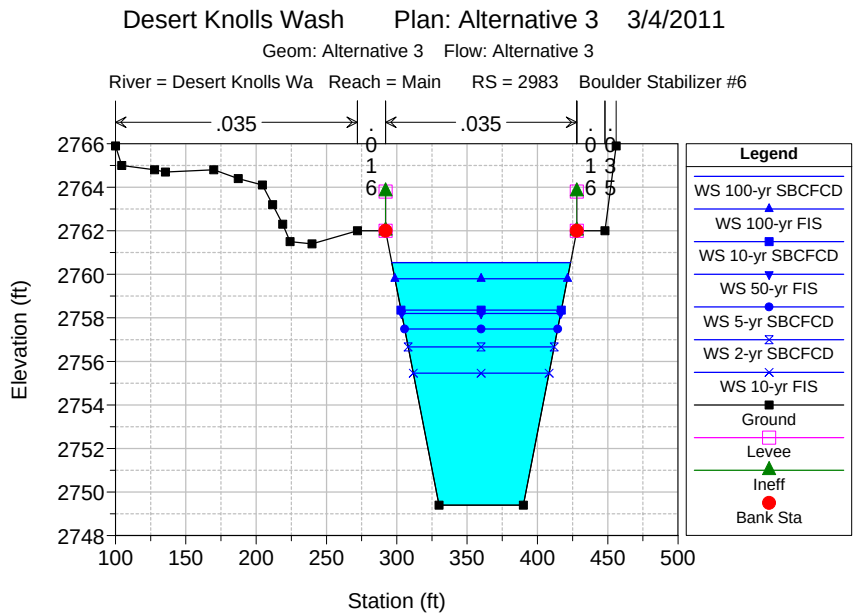

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3416 Boulder Stabilizer #8
.04
.016
.035
.016
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

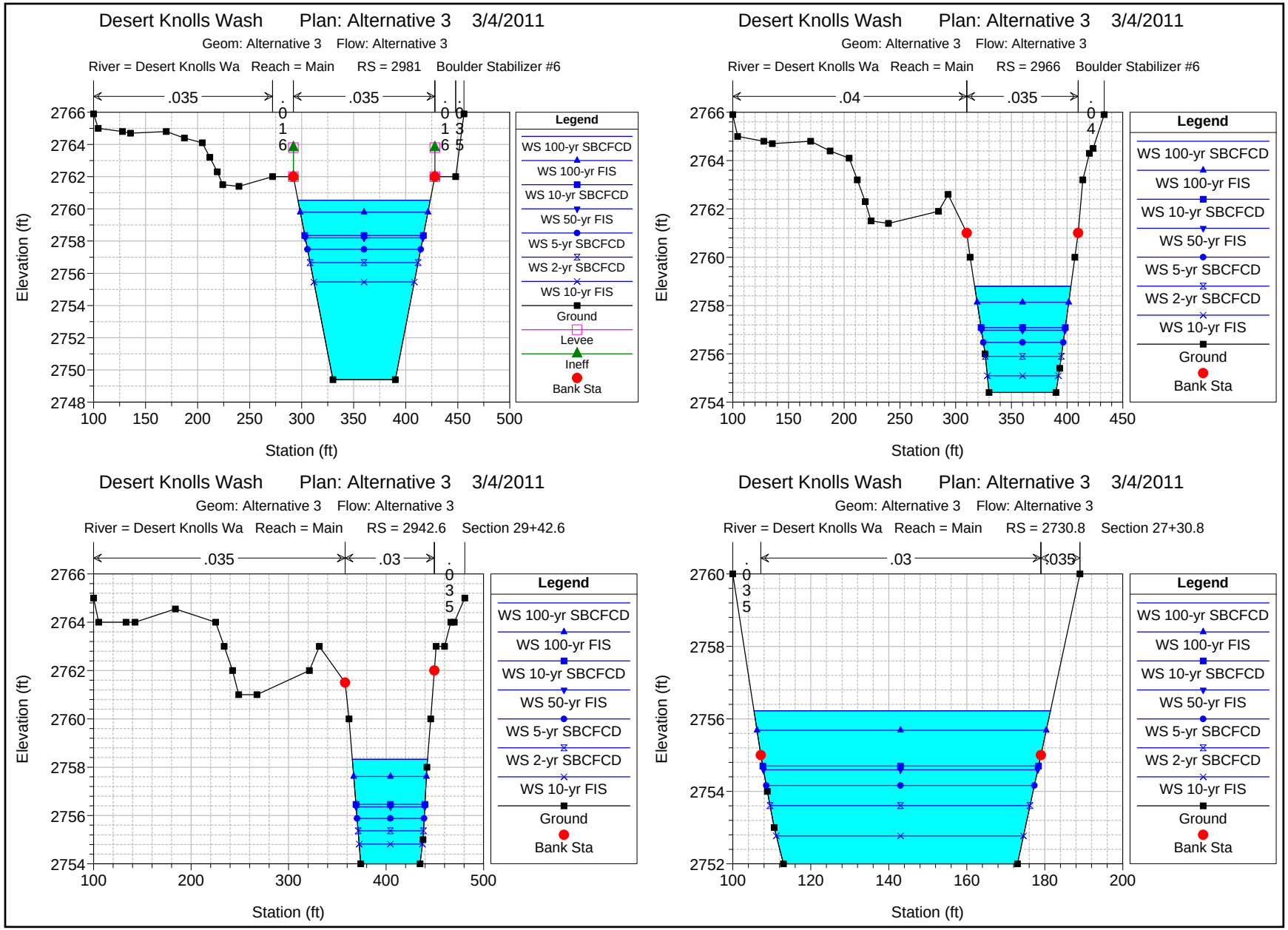

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3300 Boulder Stabilizer #7 (inlet)
.04 .016 .035 .016 .04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3298 Boulder Stabilizer #7
.04 .016 .035 .016 .04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3283 Boulder Stabilizer #7
.04 .016 .035 .016 .035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3281 Boulder Stabilizer #7
.04 .016 .035 .016 .035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

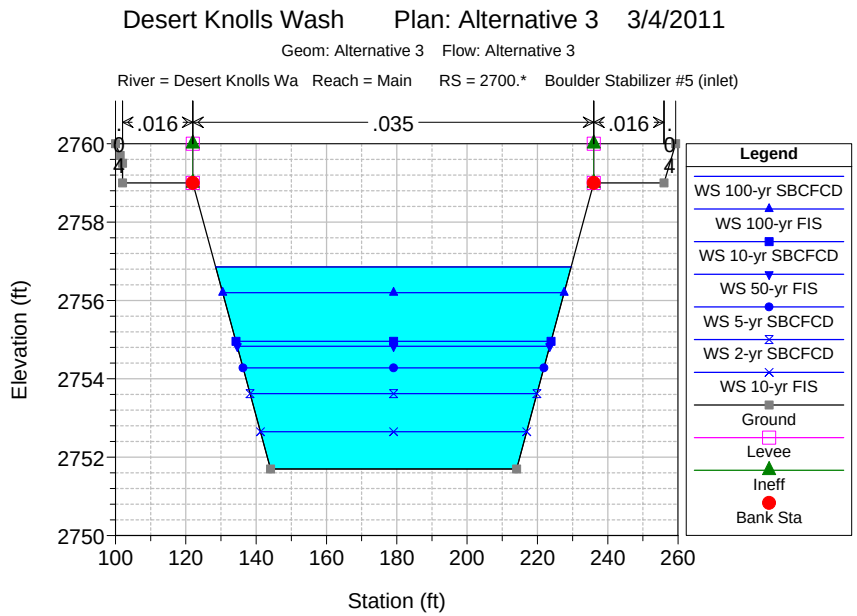

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3266 Boulder Stabilizer #7 (exit)
.04
.016
.035
.016
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

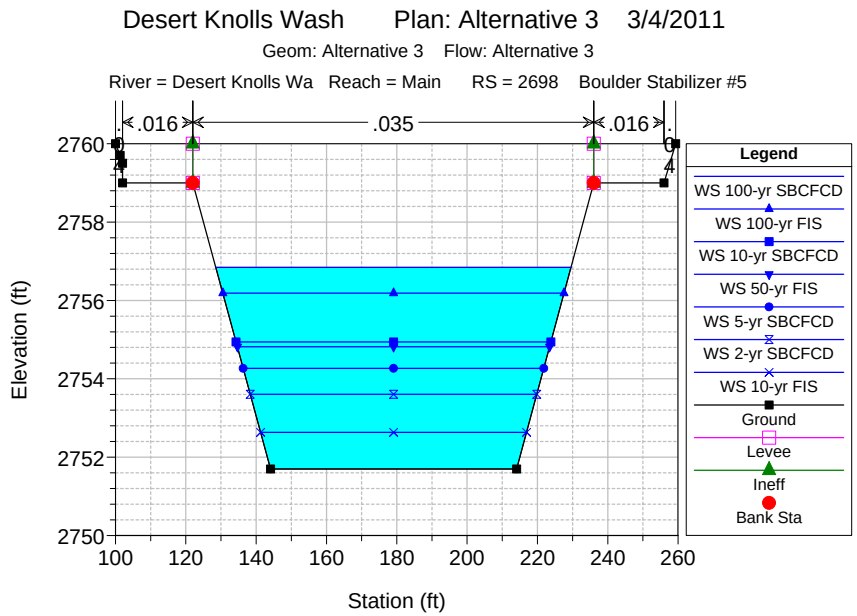

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 3000 Boulder Stabilizer #6 (inlet)
.04
.016
.035
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

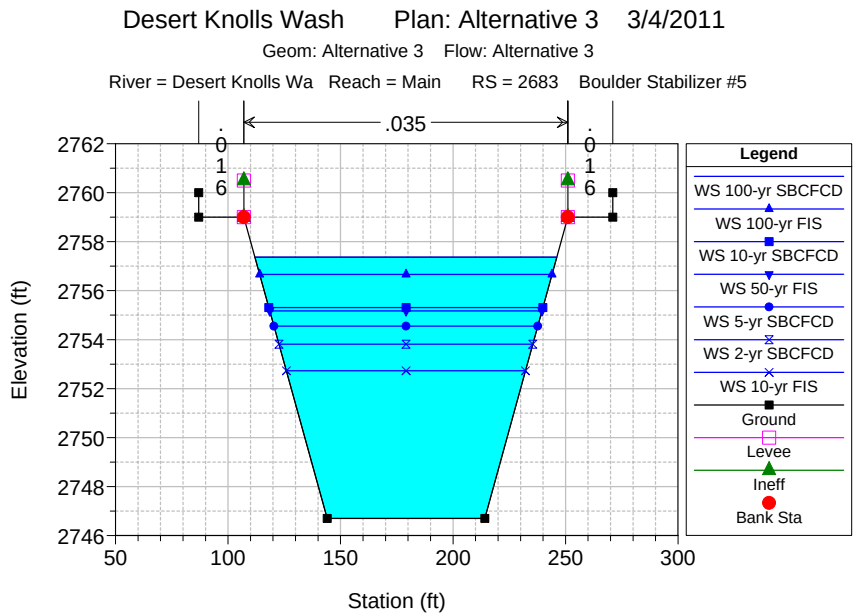

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2998 Boulder Stabilizer #6
.04
.016
.035
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

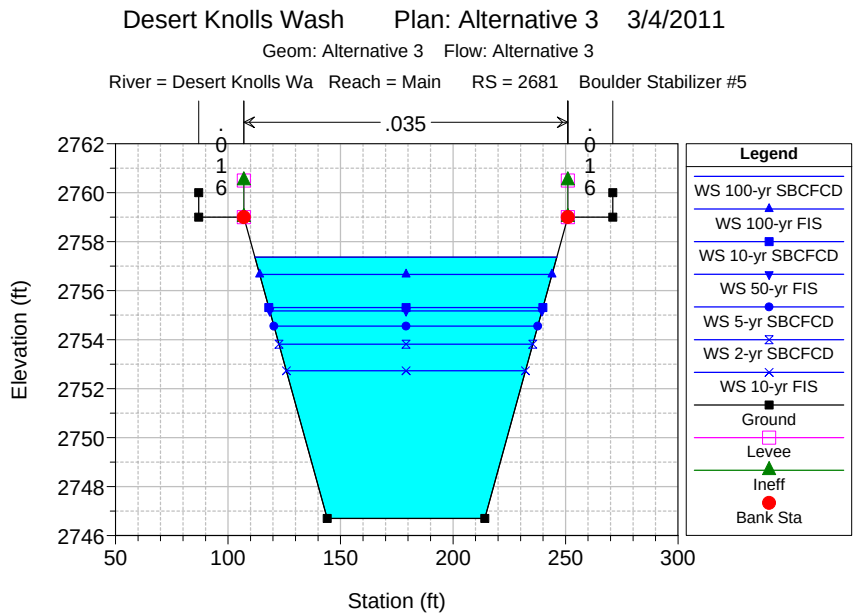

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2983 Boulder Stabilizer #6
.035
.016
.035
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

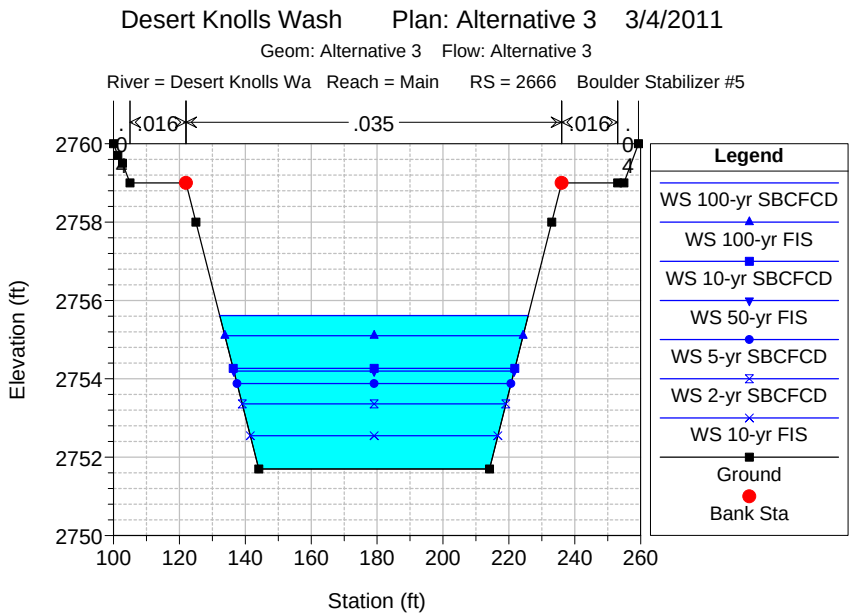

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2981 Boulder Stabilizer #6
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2966 Boulder Stabilizer #6
.04
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2942.6 Section 29+42.6
.035
.03
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2730.8 Section 27+30.8
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

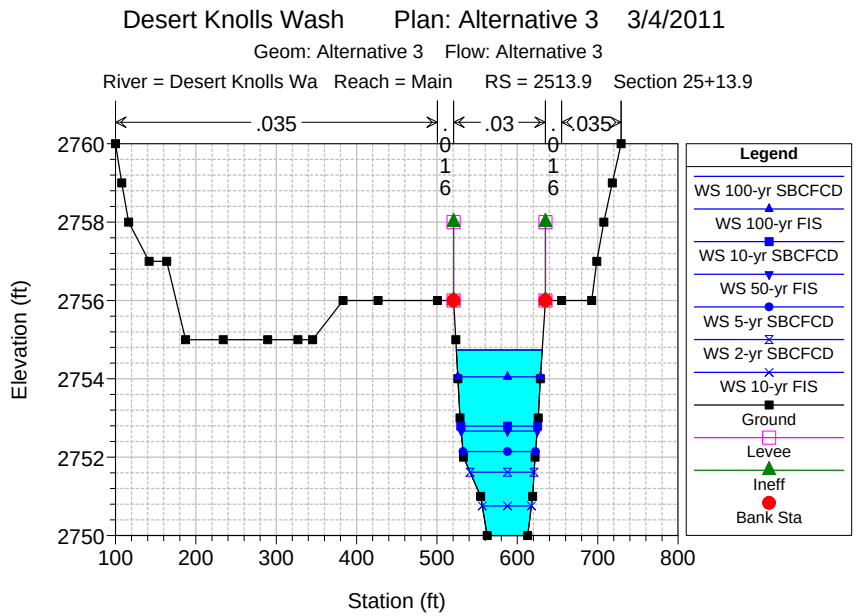

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2700.* Boulder Stabilizer #5 (inlet)
.016
.035
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

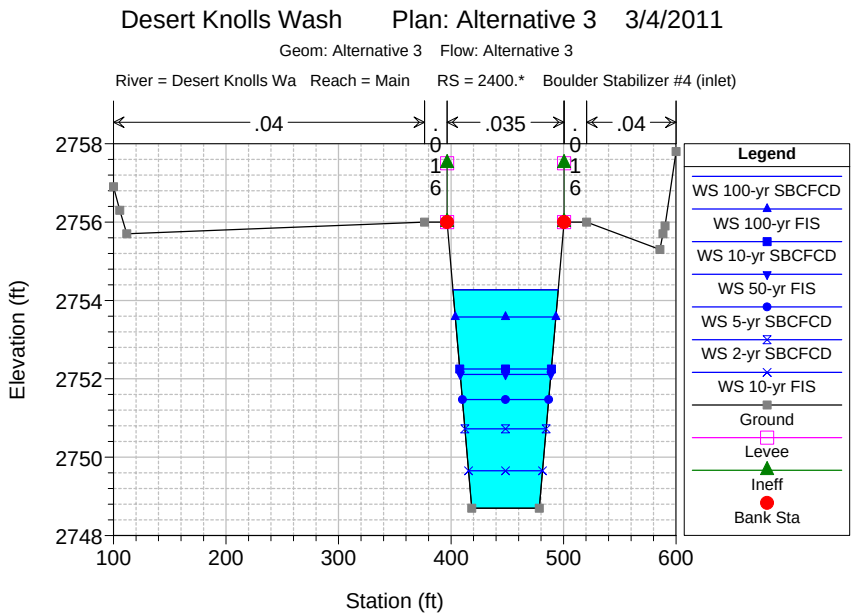

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2698 Boulder Stabilizer #5
.016
.035
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

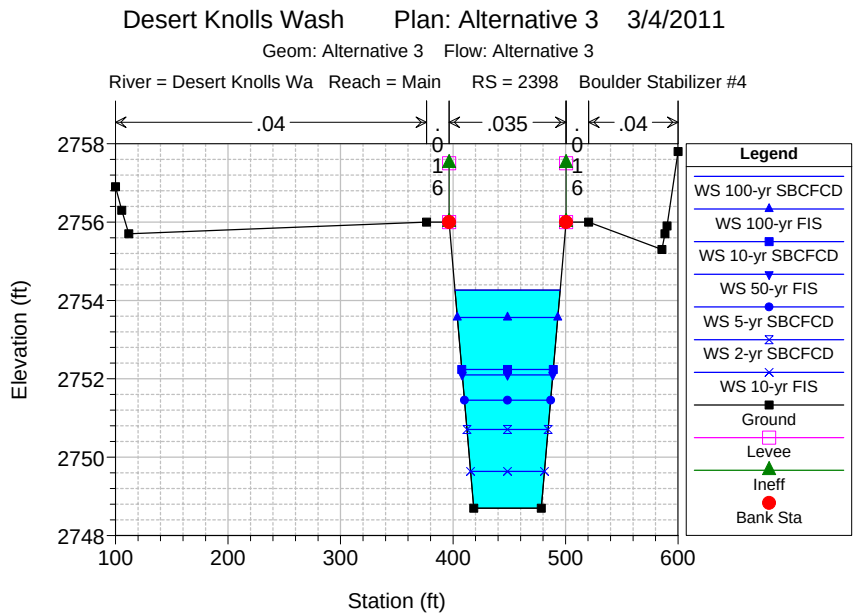

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2683 Boulder Stabilizer #5
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

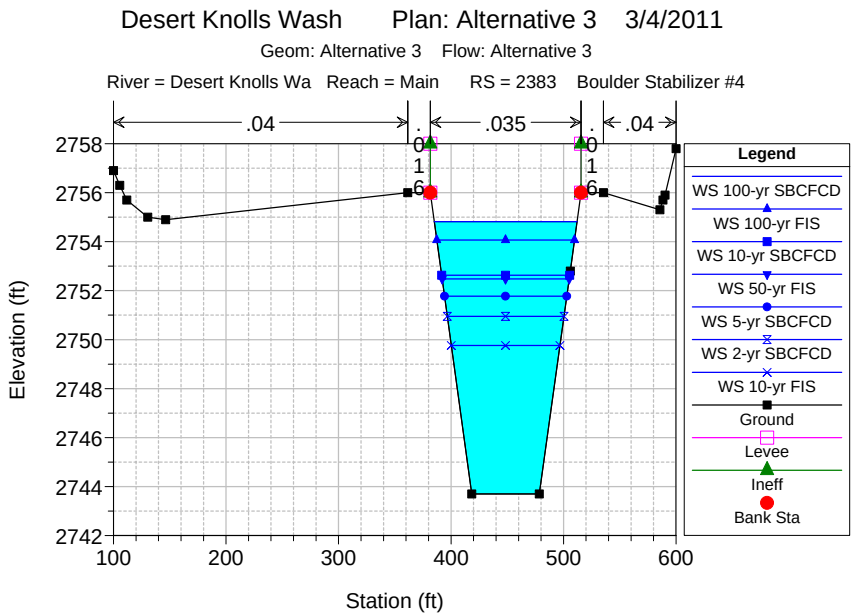

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2681 Boulder Stabilizer #5
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

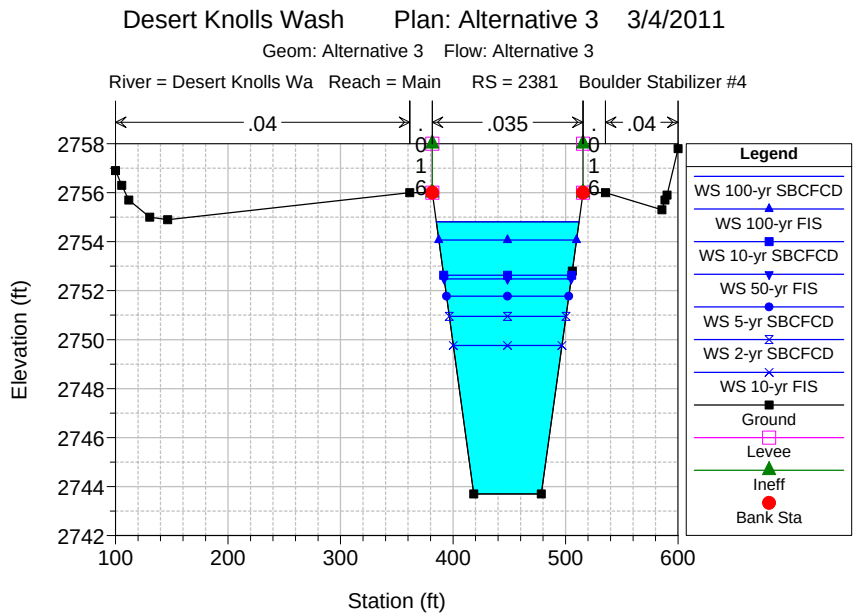

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2666 Boulder Stabilizer #5
.016
.035
.016
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

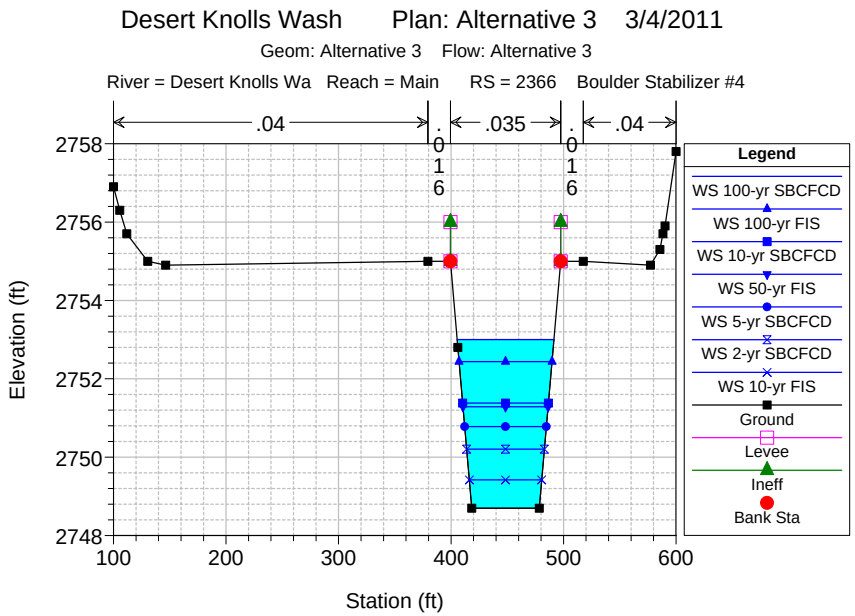

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2513.9 Section 25+13.9
.035
.016
.03
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

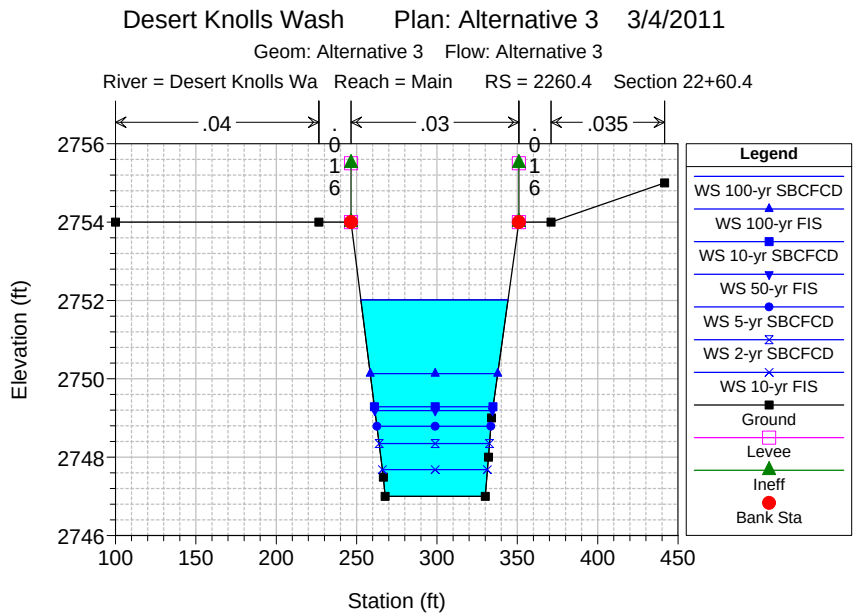

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2400.* Boulder Stabilizer #4 (inlet)
.04
.016
.035
.016
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

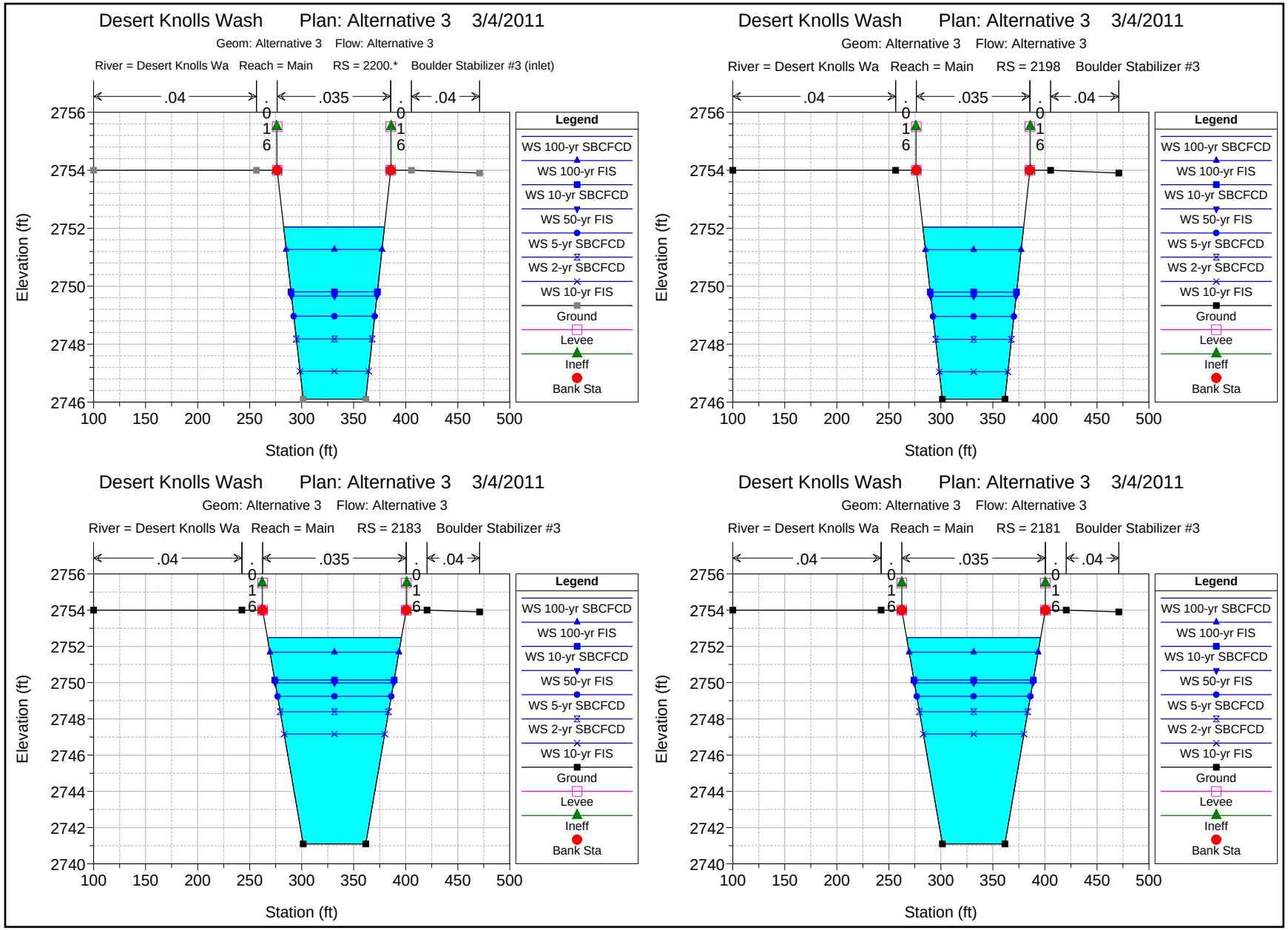

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2398 Boulder Stabilizer #4
.04
.016
.035
.016
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

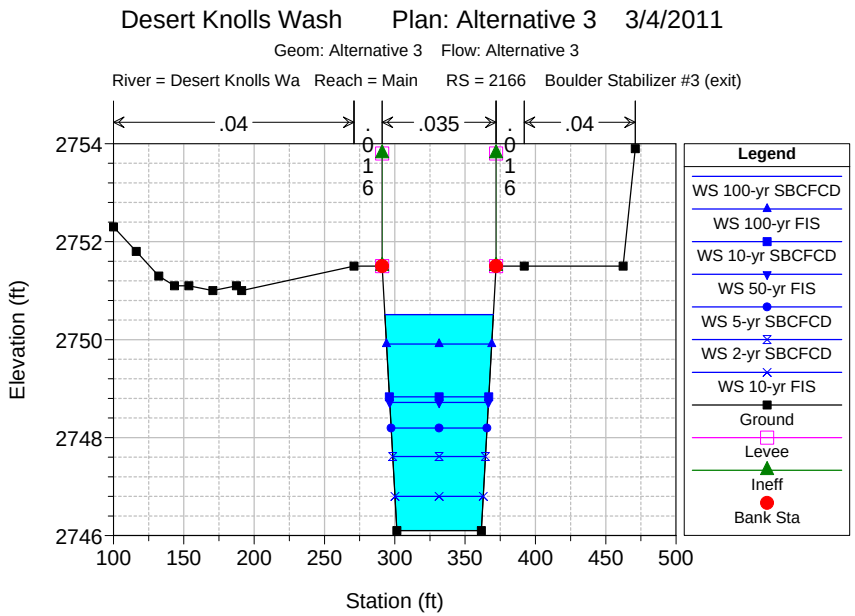

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2383 Boulder Stabilizer #4
.04
.016
.035
.016
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

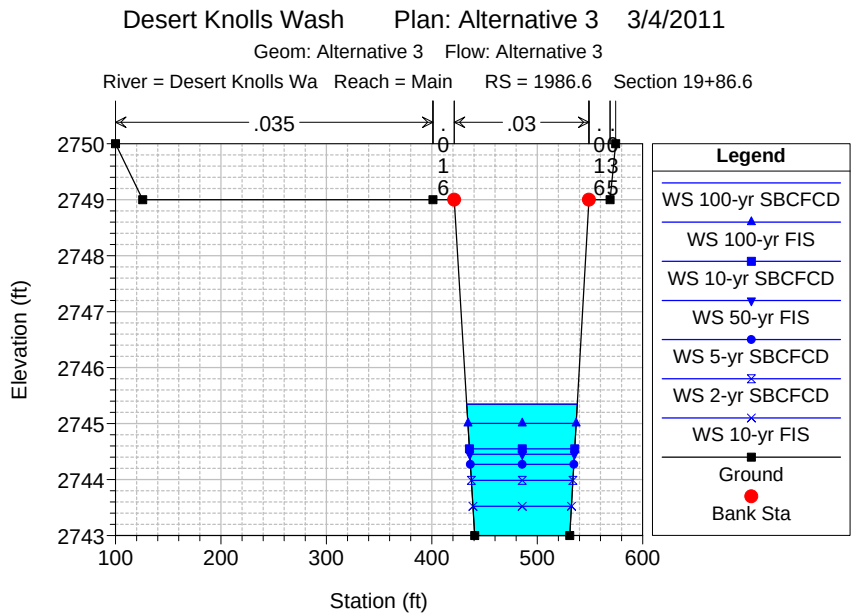

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2381 Boulder Stabilizer #4
.04
.016
.035
.016
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

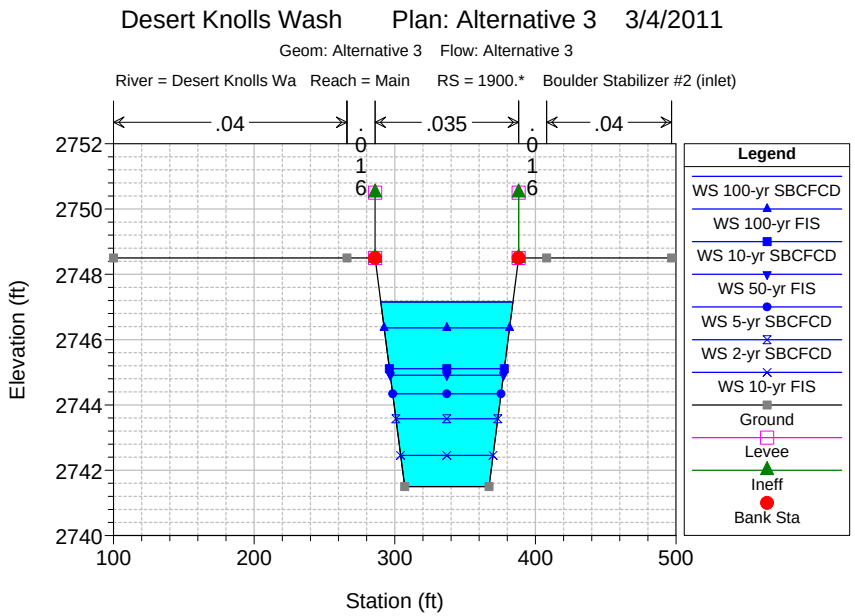

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2366 Boulder Stabilizer #4
.04
.016
.035
.016
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

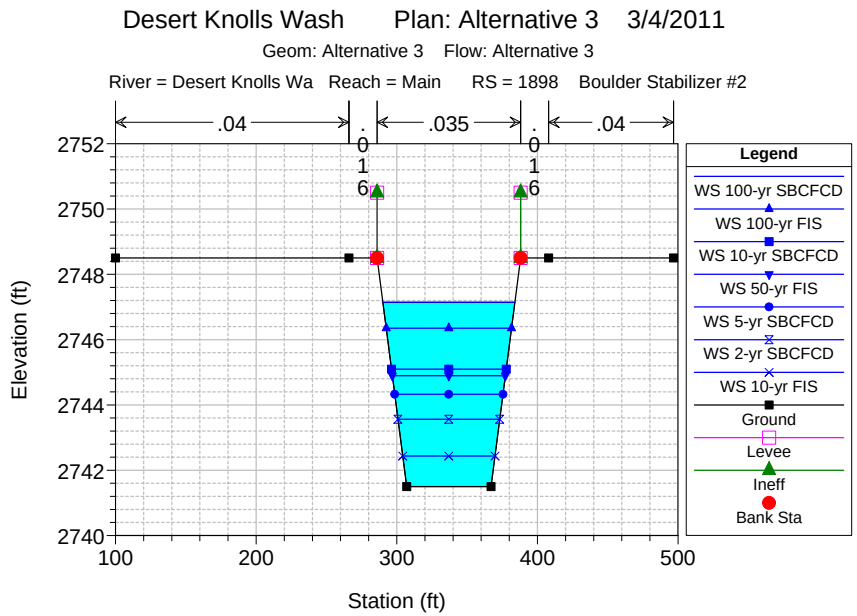

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2260.4 Section 22+60.4
.04
.016
.03
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

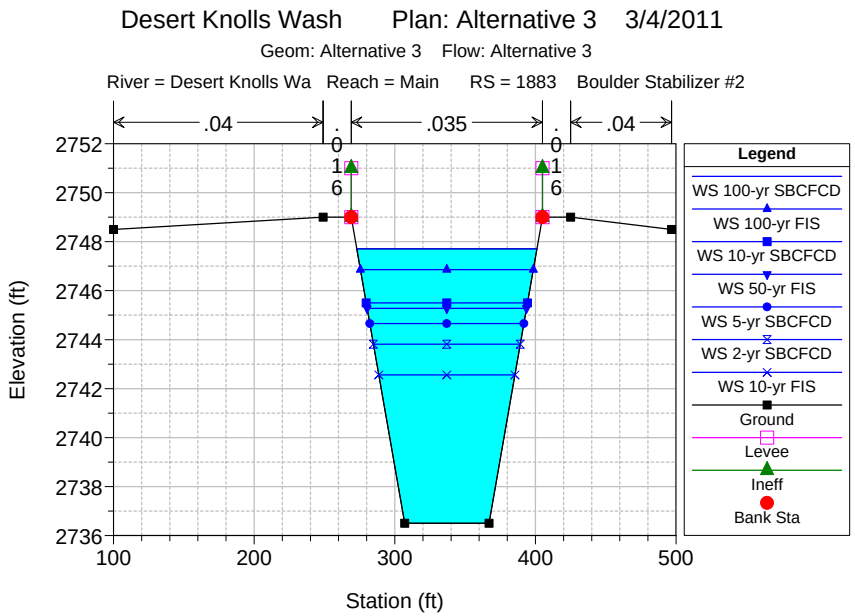

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2200.* Boulder Stabilizer #3 (inlet)
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2198 Boulder Stabilizer #3
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2183 Boulder Stabilizer #3
Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2181 Boulder Stabilizer #3
.04
.035
.04
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

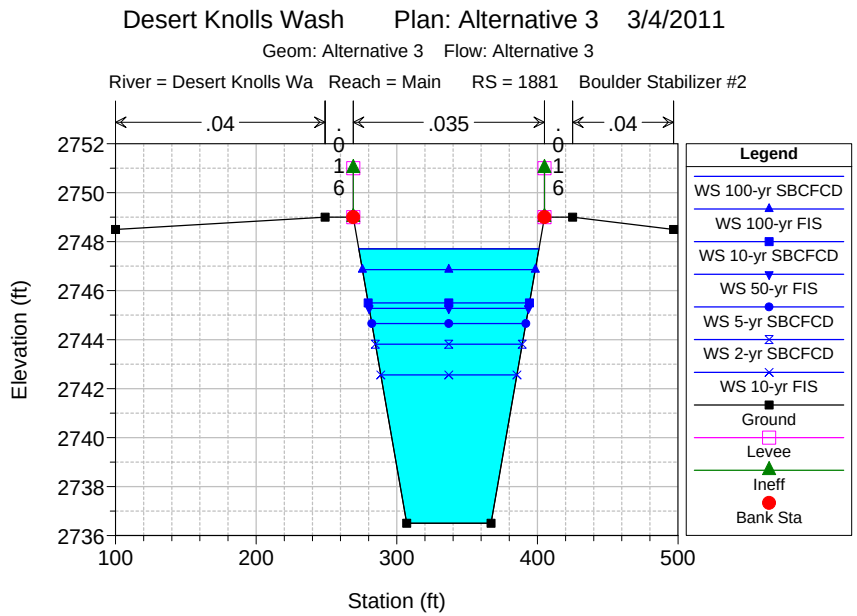

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 2166 Boulder Stabilizer #3 (exit)
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

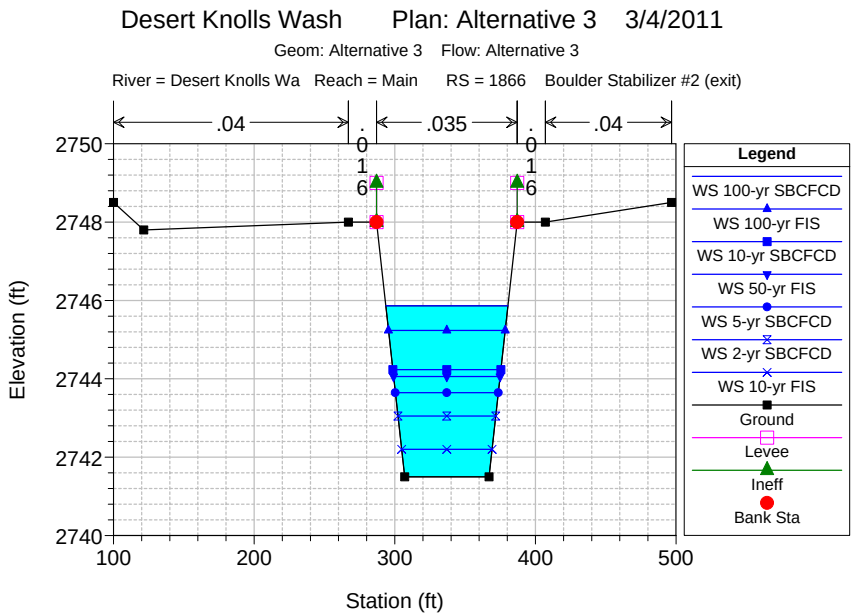

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 1986.6 Section 19+86.6
.035
.03
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Bank Sta

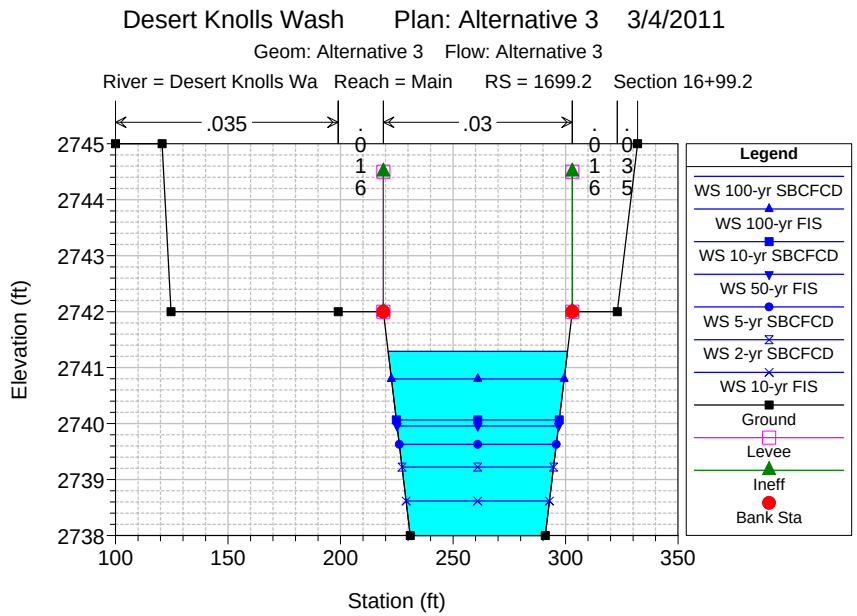

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 1900.* Boulder Stabilizer #2 (inlet)
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

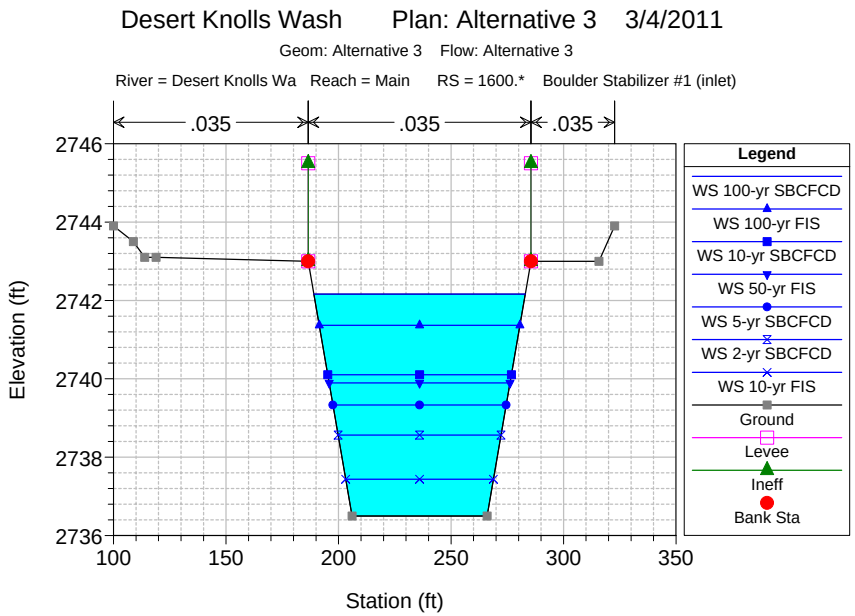

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 1898 Boulder Stabilizer #2
.04
.035
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

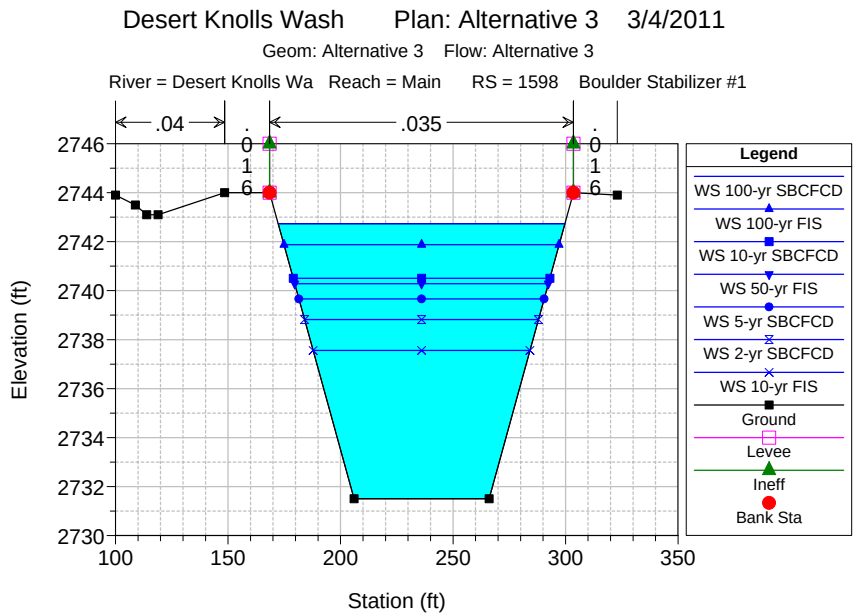

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 1883 Boulder Stabilizer #2
.04
.035
.04
.016
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

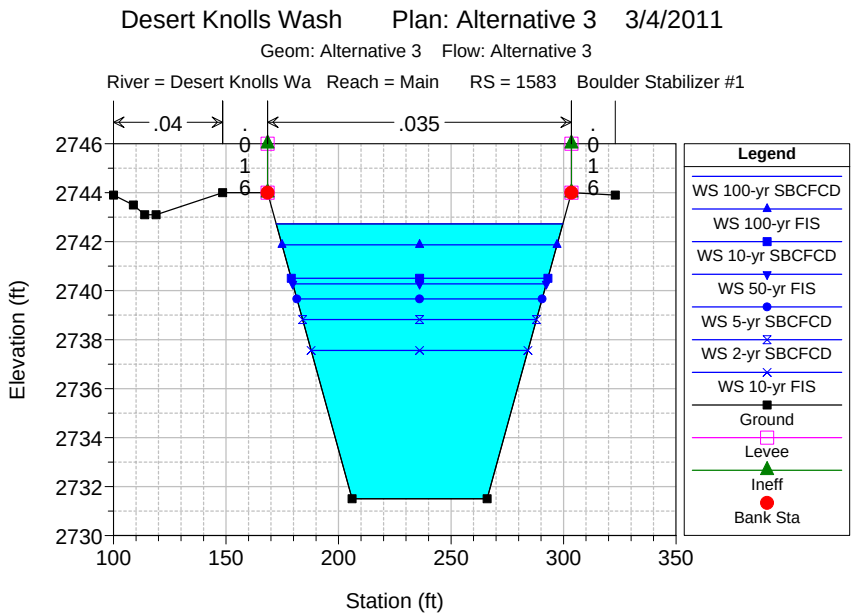

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 1881 Boulder Stabilizer #2
.04
.035
.04
.016
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

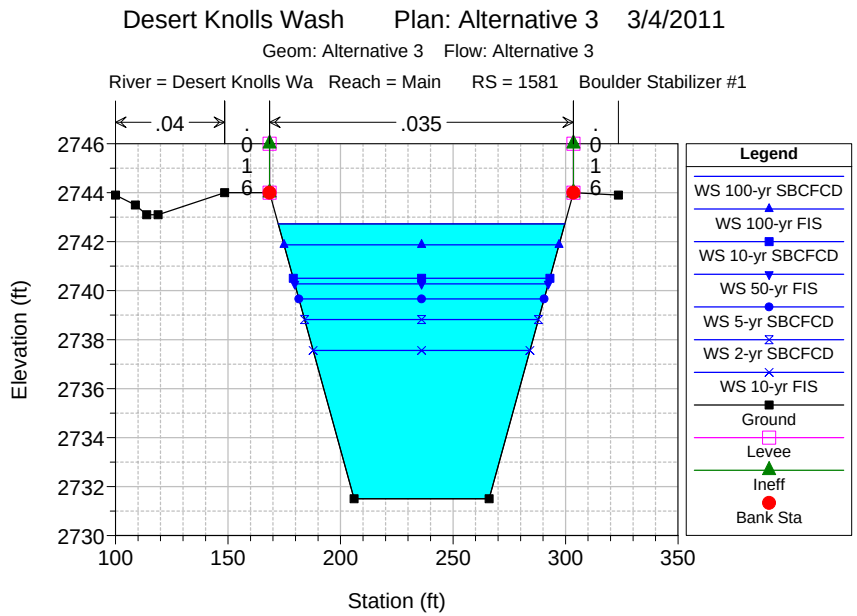

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 1866 Boulder Stabilizer #2 (exit)
.04
.035
.04
.016
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

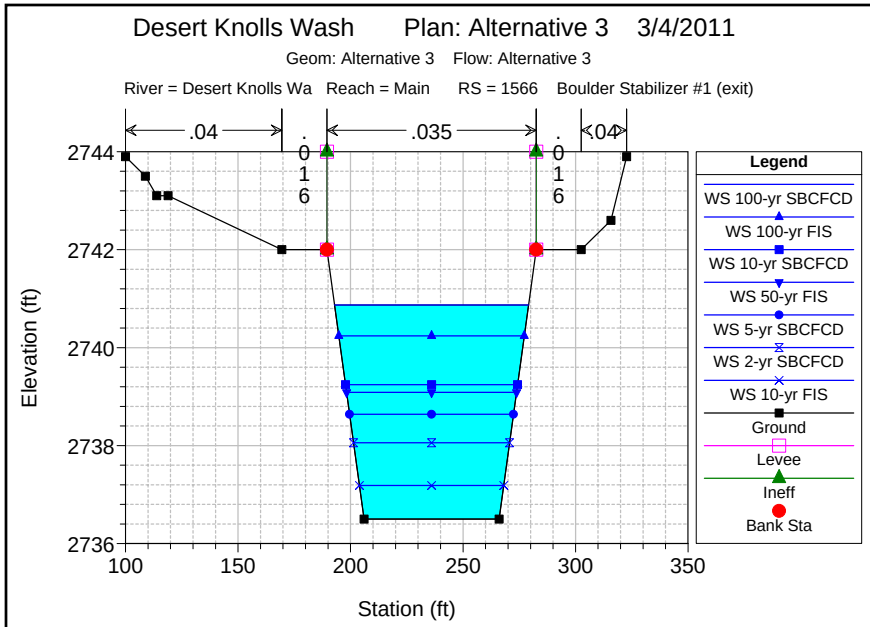

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 1699.2 Section 16+99.2
.035
.03
.016
.016
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

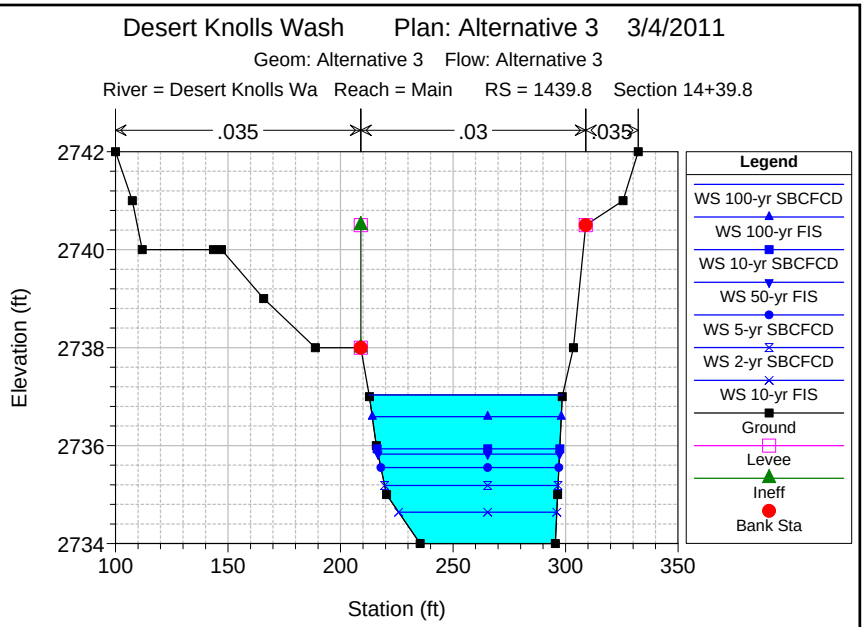

Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 1600.* Boulder Stabilizer #1 (inlet)
.035
.035
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 1598 Boulder Stabilizer #1
.04
.016
.035
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 1583 Boulder Stabilizer #1
.04
.016
.035
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 1581 Boulder Stabilizer #1
.04
.016
.035
.016
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 1566 Boulder Stabilizer #1 (exit)
.04
.016
.035
.016
.04
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta


Desert Knolls Wash Plan: Alternative 3 3/4/2011
Geom: Alternative 3 Flow: Alternative 3
River = Desert Knolls Wa Reach = Main RS = 1439.8 Section 14+39.8
.035
.03
.035
Elevation (ft)
Station (ft)
Legend
WS 100-yr SBCFCD
WS 100-yr FIS
WS 10-yr SBCFCD
WS 50-yr FIS
WS 5-yr SBCFCD
WS 2-yr SBCFCD
WS 10-yr FIS
Ground
Levee
Ineff
Bank Sta

```
                    HEC-RAS Version 4.1.0 Jan 2010
                     U.S. Army Corps of Engineers
                    Hydrologic Engineering Center
                          609 Second Street
                          Davis, California


          X     X  XXXXXX    XXXX        XXXX       XX      XXXX
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          X     X  X        X            X   X    X    X   X
          XXXXXXX  XXXX     X       XXX  XXXX     XXXXXX    XXXX
          X     X  X        X            X  X     X    X        X
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          X     X  XXXXXX    XXXX        X    X   X    X   XXXXX
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PROJECT DATA
Project Title: Desert Knolls Wash
Project File : DesertKnollsWash.prj
Run Date and Time: 3/28/2011 3:43:18 PM

Project in English units

Project Description:
Desert Knolls Wash Hydraulic and Sediment Transport Analysis (2010)
San
Bernardino County, California

Stations 41+65 - 102+28 (upstream limit) =
NGV29
Stations 9+57 --> 39+70 = NGVD29

PLAN DATA

Plan Title: Alternative 3
Plan File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.p05

Geometry Title: Alternative 3
Geometry File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.g06

Flow Title : Alternative 3
Flow File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.f03

Plan Summary Information:
Number of: Cross Sections = 126 Multiple Openings = 0
Culverts = 8 Inline Structures = 0
Bridges = 0 Lateral Structures = 0

Computational Information
Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options
Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance

Computational Flow Regime: Mixed Flow

FLOW DATA

Flow Title: Alternative 3
Flow File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.f03

Flow Data (cfs)

River	Reach	RS	100-yr SBCFCD	100-yr FIS	50-yr FIS	10-yr FIS	10-yr SBCFCD	5-yr SBCFCD	2-yr SBCFCD
Desert Knolls	WaMain	12028.1	1730	700	500	100	810	550	340
Desert Knolls	WaMain	11313.9	1960	1700	1000	150	920	620	380
Desert Knolls	WaMain	10613.9	2590	2700	1500	200	1220	820	500
Desert Knolls	WaMain	9515.2	2620	2700	1500	200	1230	830	510
Desert Knolls	WaMain	7738.6	2970	2700	1500	200	1400	930	570
Desert Knolls	WaMain	7231.3	3150	2700	1500	200	1480	990	610
Desert Knolls	WaMain	3969.6	3380	2700	1500	200	1600	1070	650
Desert Knolls	WaMain	1986.6	3480	2700	1500	200	1650	1120	680
Desert Knolls	WaMain	957.5	3480	2700	1500	200	1650	1120	680

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
Desert Knolls	WaMain	100-yr SBCFCD	Critical	Known WS = 2728
Desert Knolls	WaMain	100-yr FIS	Critical	Known WS = 2728
Desert Knolls	WaMain	50-yr FIS	Critical	Normal S = 0.015
Desert Knolls	WaMain	10-yr FIS	Critical	Normal S = 0.015
Desert Knolls	WaMain	10-yr SBCFCD	Critical	Normal S = 0.015
Desert Knolls	WaMain	5-yr SBCFCD	Critical	Normal S = 0.015
Desert Knolls	WaMain	2-yr SBCFCD	Critical	Normal S = 0.015

GEOMETRY DATA

Geometry Title: Alternative 3
Geometry File : C:\hec\ras\DesertKnollsWash\DesertKnollsWash.g06

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 12028.1

INPUT
Description: Section 120+28.1 (D/S face Tao Road)
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
-39	2861.3	-19	2861.3	-7	2858.5	269	2858.5	281	2861.3
301	2861.3	367.14	2861	402.82	2862	430.5	2862	454.73	2861

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
-39	.035	-19	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
-19	281	113.1	113.1	113.1	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
-39	-19	2868.6	T
281	454.73	2868.6	T

Left Levee Station= -19 Elevation= 2868.6
Right Levee Station= 281 Elevation= 2868.6

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2865.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2865.53	Reach Len. (ft)	113.10	113.10	113.10
Crit W.S. (ft)	2859.56	Flow Area (sq ft)		2076.14	
E.G. Slope (ft/ft)	0.000004	Area (sq ft)		2076.14	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	300.00	Top Width (ft)		300.00	
Vel Total (ft/s)	0.83	Avg. Vel. (ft/s)		0.83	
Max Chl Dpth (ft)	7.03	Hydr. Depth (ft)		6.92	
Conv. Total (cfs)	844769.3	Conv. (cfs)		844769.3	
Length Wtd. (ft)	113.10	Wetted Per. (ft)		309.11	
Min Ch El (ft)	2858.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	454.73	-19.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.54	76.14	0.38
C & E Loss (ft)	0.19	Cum SA (acres)	0.52	16.90	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2862.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2862.67	Reach Len. (ft)	113.10	113.10	113.10
Crit W.S. (ft)	2859.08	Flow Area (sq ft)		1216.13	
E.G. Slope (ft/ft)	0.000004	Area (sq ft)		1216.13	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	300.00	Top Width (ft)		300.00	
Vel Total (ft/s)	0.58	Avg. Vel. (ft/s)		0.58	
Max Chl Dpth (ft)	4.17	Hydr. Depth (ft)		4.05	
Conv. Total (cfs)	350777.2	Conv. (cfs)		350777.2	
Length Wtd. (ft)	113.10	Wetted Per. (ft)		303.38	
Min Ch El (ft)	2858.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	454.73	-19.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	68.66	0.31
C & E Loss (ft)	0.12	Cum SA (acres)	0.39	16.52	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2861.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.013	
W.S. Elev (ft)	2861.89	Reach Len. (ft)	113.10	113.10	113.10
Crit W.S. (ft)	2858.96	Flow Area (sq ft)		983.88	
E.G. Slope (ft/ft)	0.000004	Area (sq ft)		983.88	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	300.00	Top Width (ft)		300.00	
Vel Total (ft/s)	0.51	Avg. Vel. (ft/s)		0.51	
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)		3.28	
Conv. Total (cfs)	247238.3	Conv. (cfs)		247238.3	
Length Wtd. (ft)	113.10	Wetted Per. (ft)		301.83	
Min Ch El (ft)	2858.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	454.73	-19.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	45.66	0.15
C & E Loss (ft)	0.10	Cum SA (acres)	0.12	15.22	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2859.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.013	
W.S. Elev (ft)	2859.65	Reach Len. (ft)	113.10	113.10	113.10
Crit W.S. (ft)	2858.66	Flow Area (sq ft)		321.78	
E.G. Slope (ft/ft)	0.000006	Area (sq ft)		321.78	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	285.82	Top Width (ft)		285.82	
Vel Total (ft/s)	0.31	Avg. Vel. (ft/s)		0.31	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)		1.13	
Conv. Total (cfs)	39780.0	Conv. (cfs)		39780.0	
Length Wtd. (ft)	113.10	Wetted Per. (ft)		286.08	
Min Ch El (ft)	2858.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	454.73	-19.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	13.41	0.01
C & E Loss (ft)	0.04	Cum SA (acres)	0.03	12.94	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2863.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2863.05	Reach Len. (ft)	113.10	113.10	113.10
Crit W.S. (ft)	2859.13	Flow Area (sq ft)		1330.24	
E.G. Slope (ft/ft)	0.000004	Area (sq ft)		1330.24	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	300.00	Top Width (ft)		300.00	
Vel Total (ft/s)	0.61	Avg. Vel. (ft/s)		0.61	
Max Chl Dpth (ft)	4.55	Hydr. Depth (ft)		4.43	
Conv. Total (cfs)	406652.6	Conv. (cfs)		406652.6	
Length Wtd. (ft)	113.10	Wetted Per. (ft)		304.14	
Min Ch El (ft)	2858.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	454.73	-19.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	44.33	0.15
C & E Loss (ft)	0.13	Cum SA (acres)	0.14	15.11	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2862.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.013	
W.S. Elev (ft)	2862.10	Reach Len. (ft)	113.10	113.10	113.10
Crit W.S. (ft)	2858.99	Flow Area (sq ft)		1045.40	
E.G. Slope (ft/ft)	0.000004	Area (sq ft)		1045.40	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	300.00	Top Width (ft)		300.00	
Vel Total (ft/s)	0.53	Avg. Vel. (ft/s)		0.53	
Max Chl Dpth (ft)	3.60	Hydr. Depth (ft)		3.48	
Conv. Total (cfs)	273291.1	Conv. (cfs)		273291.1	
Length Wtd. (ft)	113.10	Wetted Per. (ft)		302.24	
Min Ch El (ft)	2858.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	454.73	-19.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.09	33.94	0.09
C & E Loss (ft)	0.11	Cum SA (acres)	0.09	14.47	0.09

```
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
         This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
```

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2861.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.013	
W.S. Elev (ft)	2861.16	Reach Len. (ft)	113.10	113.10	113.10
Crit W.S. (ft)	2858.86	Flow Area (sq ft)		763.51	
E.G. Slope (ft/ft)	0.000004	Area (sq ft)		763.51	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	298.77	Top Width (ft)		298.77	
Vel Total (ft/s)	0.45	Avg. Vel. (ft/s)		0.45	
Max Chl Dpth (ft)	2.66	Hydr. Depth (ft)		2.56	
Conv. Total (cfs)	162900.9	Conv. (cfs)		162900.9	
Length Wtd. (ft)	113.10	Wetted Per. (ft)		299.38	
Min Ch El (ft)	2858.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	454.73	-19.00	281.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.05	25.00	0.05
C & E Loss (ft)	0.08	Cum SA (acres)	0.07	13.85	0.07

```
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
         This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest, valid, energy was used.
```

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11915

INPUT
Description: Section 119+15: Stabilizer #4 (gabion mat inlet)
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
170.5	2866.74	187.5	2858.3	207.5	2858.3	224.5	2866.74	255.04	2866.74
286.05	2866.74	315.27	2866.74	325.57	2866.74				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
170.5	.035	170.5	.035	224.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
170.5	224.5	51	51	51	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2865.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.93	Wt. n-Val.		0.035	
W.S. Elev (ft)	2863.42	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2863.42	Flow Area (sq ft)		155.18	
E.G. Slope (ft/ft)	0.012467	Area (sq ft)		155.18	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	40.62	Top Width (ft)		40.62	
Vel Total (ft/s)	11.15	Avg. Vel. (ft/s)		11.15	
Max Chl Dpth (ft)	5.12	Hydr. Depth (ft)		3.82	
Conv. Total (cfs)	15493.8	Conv. (cfs)		15493.8	
Length Wtd. (ft)	51.00	Wetted Per. (ft)		43.03	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		2.81	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)	0.54	73.24	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.52	16.46	0.20

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2862.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.23	Wt. n-Val.		0.035	
W.S. Elev (ft)	2861.31	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2861.31	Flow Area (sq ft)		78.53	
E.G. Slope (ft/ft)	0.014185	Area (sq ft)		78.53	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	32.14	Top Width (ft)		32.14	
Vel Total (ft/s)	8.91	Avg. Vel. (ft/s)		8.91	
Max Chl Dpth (ft)	3.01	Hydr. Depth (ft)		2.44	
Conv. Total (cfs)	5877.4	Conv. (cfs)		5877.4	
Length Wtd. (ft)	51.00	Wetted Per. (ft)		33.55	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		2.07	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.72	Cum Volume (acre-ft)	0.37	66.98	0.31
C & E Loss (ft)	0.00	Cum SA (acres)	0.39	16.09	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2861.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2860.75	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2860.75	Flow Area (sq ft)		61.15	
E.G. Slope (ft/ft)	0.015009	Area (sq ft)		61.15	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	29.88	Top Width (ft)		29.88	
Vel Total (ft/s)	8.18	Avg. Vel. (ft/s)		8.18	
Max Chl Dpth (ft)	2.45	Hydr. Depth (ft)		2.05	
Conv. Total (cfs)	4081.3	Conv. (cfs)		4081.3	
Length Wtd. (ft)	51.00	Wetted Per. (ft)		31.03	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		1.85	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	0.15	44.31	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	14.79	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2859.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.035	
W.S. Elev (ft)	2859.19	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2859.19	Flow Area (sq ft)		19.35	

E.G. Slope (ft/ft)	0.019750	Area (sq ft)		19.35	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	23.58	Top Width (ft)		23.58	
Vel Total (ft/s)	5.17	Avg. Vel. (ft/s)		5.17	
Max Chl Dpth (ft)	0.89	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	711.6	Conv. (cfs)		711.6	
Length Wtd. (ft)	51.00	Wetted Per. (ft)		23.99	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.01	Cum Volume (acre-ft)	0.01	12.96	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	12.54	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2862.92				
Vel Head (ft)	1.33	Wt. n-Val.		0.035	
W.S. Elev (ft)	2861.59	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2861.59	Flow Area (sq ft)		87.46	
E.G. Slope (ft/ft)	0.013916	Area (sq ft)		87.46	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	33.24	Top Width (ft)		33.24	
Vel Total (ft/s)	9.26	Avg. Vel. (ft/s)		9.26	
Max Chl Dpth (ft)	3.29	Hydr. Depth (ft)		2.63	
Conv. Total (cfs)	6866.3	Conv. (cfs)		6866.3	
Length Wtd. (ft)	51.00	Wetted Per. (ft)		34.78	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		2.18	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	0.15	42.49	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	14.68	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

		Element	Left OB	Channel	Right OB
E.G. Elev (ft)	2861.99				
Vel Head (ft)	1.09	Wt. n-Val.		0.035	
W.S. Elev (ft)	2860.90	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2860.90	Flow Area (sq ft)		65.72	
E.G. Slope (ft/ft)	0.014707	Area (sq ft)		65.72	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	30.49	Top Width (ft)		30.49	
Vel Total (ft/s)	8.37	Avg. Vel. (ft/s)		8.37	
Max Chl Dpth (ft)	2.60	Hydr. Depth (ft)		2.16	
Conv. Total (cfs)	4535.2	Conv. (cfs)		4535.2	
Length Wtd. (ft)	51.00	Wetted Per. (ft)		31.71	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		1.90	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)	0.09	32.50	0.09
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	14.04	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

```
        need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
        water surface came back below critical depth.  This indicates that there is not a valid subcritical answer.  The program
        defaulted to critical depth.
```

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2861.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.035	
W.S. Elev (ft)	2860.24	Reach Len. (ft)	51.00	51.00	51.00
Crit W.S. (ft)	2860.24	Flow Area (sq ft)		46.25	
E.G. Slope (ft/ft)	0.015873	Area (sq ft)		46.25	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	27.80	Top Width (ft)		27.80	
Vel Total (ft/s)	7.35	Avg. Vel. (ft/s)		7.35	
Max Chl Dpth (ft)	1.94	Hydr. Depth (ft)		1.66	
Conv. Total (cfs)	2698.7	Conv. (cfs)		2698.7	
Length Wtd. (ft)	51.00	Wetted Per. (ft)		28.70	
Min Ch El (ft)	2858.30	Shear (lb/sq ft)		1.60	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.81	Cum Volume (acre-ft)	0.05	23.95	0.05
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	13.42	0.07

```
Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
```

CROSS SECTION

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 11864

INPUT
Description: Section 118+64: Stabilizer #4
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   170.5 2865.14   187.5  2856.7   207.5  2856.7   224.5 2865.14  255.04 2865.14
  286.05 2865.14  315.27 2865.14  325.57 2865.14

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
   170.5    .035   170.5    .035   224.5    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         170.5   224.5               23      23      23             .1       .3
```

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2864.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.48	Wt. n-Val.		0.035	
W.S. Elev (ft)	2860.79	Reach Len. (ft)	23.00	23.00	23.00
Crit W.S. (ft)	2861.82	Flow Area (sq ft)		115.62	
E.G. Slope (ft/ft)	0.028579	Area (sq ft)		115.62	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	36.49	Top Width (ft)		36.49	
Vel Total (ft/s)	14.96	Avg. Vel. (ft/s)		14.96	

Max Chl Dpth (ft)	4.09	Hydr. Depth (ft)		3.17	
Conv. Total (cfs)	10233.5	Conv. (cfs)		10233.5	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		38.41	
Min Ch El (ft)	2856.70	Shear (lb/sq ft)		5.37	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.92	Cum Volume (acre-ft)	0.54	73.08	0.38
C & E Loss (ft)	0.15	Cum SA (acres)	0.52	16.41	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2861.34	Element			
Vel Head (ft)	2.32	Wt. n-Val.		0.035	
W.S. Elev (ft)	2859.02	Reach Len. (ft)	23.00	23.00	23.00
Crit W.S. (ft)	2859.71	Flow Area (sq ft)		57.21	
E.G. Slope (ft/ft)	0.035787	Area (sq ft)		57.21	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	29.34	Top Width (ft)		29.34	
Vel Total (ft/s)	12.23	Avg. Vel. (ft/s)		12.23	
Max Chl Dpth (ft)	2.32	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	3700.3	Conv. (cfs)		3700.3	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		30.43	
Min Ch El (ft)	2856.70	Shear (lb/sq ft)		4.20	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.09	Cum Volume (acre-ft)	0.37	66.90	0.31
C & E Loss (ft)	0.11	Cum SA (acres)	0.39	16.05	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2860.54	Element			
Vel Head (ft)	1.97	Wt. n-Val.		0.035	
W.S. Elev (ft)	2858.57	Reach Len. (ft)	23.00	23.00	23.00
Crit W.S. (ft)	2859.15	Flow Area (sq ft)		44.45	
E.G. Slope (ft/ft)	0.038661	Area (sq ft)		44.45	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	27.53	Top Width (ft)		27.53	
Vel Total (ft/s)	11.25	Avg. Vel. (ft/s)		11.25	
Max Chl Dpth (ft)	1.87	Hydr. Depth (ft)		1.61	
Conv. Total (cfs)	2542.9	Conv. (cfs)		2542.9	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		28.41	
Min Ch El (ft)	2856.70	Shear (lb/sq ft)		3.78	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.16	Cum Volume (acre-ft)	0.15	44.25	0.15
C & E Loss (ft)	0.09	Cum SA (acres)	0.12	14.75	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2858.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.71	Wt. n-Val.		0.035	
W.S. Elev (ft)	2857.39	Reach Len. (ft)	23.00	23.00	23.00
Crit W.S. (ft)	2857.59	Flow Area (sq ft)		14.82	
E.G. Slope (ft/ft)	0.045705	Area (sq ft)		14.82	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	22.79	Top Width (ft)		22.79	
Vel Total (ft/s)	6.75	Avg. Vel. (ft/s)		6.75	
Max Chl Dpth (ft)	0.69	Hydr. Depth (ft)		0.65	
Conv. Total (cfs)	467.8	Conv. (cfs)		467.8	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		23.12	
Min Ch El (ft)	2856.70	Shear (lb/sq ft)		1.83	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.47	Cum Volume (acre-ft)	0.01	12.94	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	12.52	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2861.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.49	Wt. n-Val.		0.035	
W.S. Elev (ft)	2859.25	Reach Len. (ft)	23.00	23.00	23.00
Crit W.S. (ft)	2859.98	Flow Area (sq ft)		63.98	
E.G. Slope (ft/ft)	0.034499	Area (sq ft)		63.98	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	30.26	Top Width (ft)		30.26	
Vel Total (ft/s)	12.66	Avg. Vel. (ft/s)		12.66	
Max Chl Dpth (ft)	2.55	Hydr. Depth (ft)		2.11	
Conv. Total (cfs)	4361.0	Conv. (cfs)		4361.0	
Length Wtd. (ft)	23.00	Wetted Per. (ft)		31.45	
Min Ch El (ft)	2856.70	Shear (lb/sq ft)		4.38	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.06	Cum Volume (acre-ft)	0.15	42.40	0.15
C & E Loss (ft)	0.12	Cum SA (acres)	0.14	14.64	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

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         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT  Profile #5-yr SBCFCD

  E.G. Elev (ft)           2860.75    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               2.06    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2858.69    Reach Len. (ft)            23.00      23.00      23.00
  Crit W.S. (ft)           2859.30    Flow Area (sq ft)                     47.72
  E.G. Slope (ft/ft)      0.037831    Area (sq ft)                          47.72
  Q Total (cfs)             550.00    Flow (cfs)                           550.00
  Top Width (ft)             28.01    Top Width (ft)                        28.01
  Vel Total (ft/s)           11.53    Avg. Vel. (ft/s)                      11.53
  Max Chl Dpth (ft)           1.99    Hydr. Depth (ft)                       1.70
  Conv. Total (cfs)         2827.7    Conv. (cfs)                          2827.7
  Length Wtd. (ft)           23.00    Wetted Per. (ft)                      28.94
  Min Ch El (ft)           2856.70    Shear (lb/sq ft)                       3.89
  Alpha                       1.00    Stream Power (lb/ft s)    325.57       0.00       0.00
  Frctn Loss (ft)             1.14    Cum Volume (acre-ft)        0.09      32.43       0.09
  C & E Loss (ft)             0.10    Cum SA (acres)              0.09      14.01       0.09


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2859.76    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.60    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2858.16    Reach Len. (ft)            23.00      23.00      23.00
  Crit W.S. (ft)           2858.63    Flow Area (sq ft)                     33.51
  E.G. Slope (ft/ft)      0.041933    Area (sq ft)                          33.51
  Q Total (cfs)             340.00    Flow (cfs)                           340.00
  Top Width (ft)             25.88    Top Width (ft)                        25.88
  Vel Total (ft/s)           10.15    Avg. Vel. (ft/s)                      10.15
  Max Chl Dpth (ft)           1.46    Hydr. Depth (ft)                       1.29
  Conv. Total (cfs)         1660.4    Conv. (cfs)                          1660.4
  Length Wtd. (ft)           23.00    Wetted Per. (ft)                      26.57
  Min Ch El (ft)           2856.70    Shear (lb/sq ft)                       3.30
  Alpha                       1.00    Stream Power (lb/ft s)    325.57       0.00       0.00
  Frctn Loss (ft)             1.24    Cum Volume (acre-ft)        0.05      23.91       0.05
  C & E Loss (ft)             0.08    Cum SA (acres)              0.07      13.39       0.07


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.

CROSS SECTION


RIVER: Desert Knolls Wa
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REACH: Main RS: 11841

INPUT
Description: Section 118+41: Stabilizer #4
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2862.5	105.5	2861.5	163.5	2862.5	170.5	2858.94	187.5	2850.5
207.5	2850.5	224.5	2858.94	231.5	2862.5				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	163.5	.035	231.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
163.5	231.5	49	49	49	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2859.82	Element			
Vel Head (ft)	0.41	Wt. n-Val.		0.035	
W.S. Elev (ft)	2859.42	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2855.62	Flow Area (sq ft)		338.43	
E.G. Slope (ft/ft)	0.001446	Area (sq ft)		338.43	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	55.87	Top Width (ft)		55.87	
Vel Total (ft/s)	5.11	Avg. Vel. (ft/s)		5.11	
Max Chl Dpth (ft)	8.92	Hydr. Depth (ft)		6.06	
Conv. Total (cfs)	45497.6	Conv. (cfs)		45497.6	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		60.06	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.51	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.54	72.96	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.52	16.39	0.20

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2856.95	Element			
Vel Head (ft)	0.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.76	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2853.51	Flow Area (sq ft)		204.31	
E.G. Slope (ft/ft)	0.000949	Area (sq ft)		204.31	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	45.23	Top Width (ft)		45.23	
Vel Total (ft/s)	3.43	Avg. Vel. (ft/s)		3.43	
Max Chl Dpth (ft)	6.26	Hydr. Depth (ft)		4.52	
Conv. Total (cfs)	22727.0	Conv. (cfs)		22727.0	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		48.17	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.37	66.83	0.31
C & E Loss (ft)	0.00	Cum SA (acres)	0.39	16.03	0.17

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2856.16	Element			
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.03	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2852.95	Flow Area (sq ft)		172.21	
E.G. Slope (ft/ft)	0.000778	Area (sq ft)		172.21	

Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	42.28	Top Width (ft)		42.28	
Vel Total (ft/s)	2.90	Avg. Vel. (ft/s)		2.90	
Max Chl Dpth (ft)	5.53	Hydr. Depth (ft)		4.07	
Conv. Total (cfs)	17921.0	Conv. (cfs)		17921.0	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		44.87	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.15	44.19	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	14.74	0.12

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2853.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2853.87	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2851.39	Flow Area (sq ft)		90.32	
E.G. Slope (ft/ft)	0.000193	Area (sq ft)		90.32	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	33.58	Top Width (ft)		33.58	
Vel Total (ft/s)	1.11	Avg. Vel. (ft/s)		1.11	
Max Chl Dpth (ft)	3.37	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	7191.9	Conv. (cfs)		7191.9	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		35.16	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	12.92	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	12.50	0.03

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2857.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	2857.12	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2853.78	Flow Area (sq ft)		220.51	
E.G. Slope (ft/ft)	0.001028	Area (sq ft)		220.51	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	46.65	Top Width (ft)		46.65	
Vel Total (ft/s)	3.67	Avg. Vel. (ft/s)		3.67	
Max Chl Dpth (ft)	6.62	Hydr. Depth (ft)		4.73	
Conv. Total (cfs)	25257.4	Conv. (cfs)		25257.4	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		49.76	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.15	42.33	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	14.62	0.12

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2856.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.22	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2853.10	Flow Area (sq ft)		180.49	
E.G. Slope (ft/ft)	0.000826	Area (sq ft)		180.49	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	43.06	Top Width (ft)		43.06	

Vel Total (ft/s)	3.05	Avg. Vel. (ft/s)		3.05	
Max Chl Dpth (ft)	5.72	Hydr. Depth (ft)		4.19	
Conv. Total (cfs)	19133.0	Conv. (cfs)		19133.0	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		45.75	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.09	32.37	0.09
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	13.99	0.09

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2855.42	Element			
Vel Head (ft)	0.09	Wt. n-Val.		0.035	
W.S. Elev (ft)	2855.33	Reach Len. (ft)	49.00	49.00	49.00
Crit W.S. (ft)	2852.43	Flow Area (sq ft)		143.77	
E.G. Slope (ft/ft)	0.000597	Area (sq ft)		143.77	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	39.48	Top Width (ft)		39.48	
Vel Total (ft/s)	2.36	Avg. Vel. (ft/s)		2.36	
Max Chl Dpth (ft)	4.83	Hydr. Depth (ft)		3.64	
Conv. Total (cfs)	13919.7	Conv. (cfs)		13919.7	
Length Wtd. (ft)	49.00	Wetted Per. (ft)		41.74	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.05	23.86	0.05
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	13.37	0.07

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11792

INPUT
Description: Section 117+92: Stabilizer #4
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2862.5	105.5	2861.5	163.5	2862.4	170.5	2858.94	187.5	2850.5
207.5	2850.5	224.5	2858.94	231.5	2862.4				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	163.5	.035	231.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
163.5	231.5	4	4	4	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2859.75	Element			
Vel Head (ft)	0.42	Wt. n-Val.		0.035	
W.S. Elev (ft)	2859.33	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		333.71	
E.G. Slope (ft/ft)	0.001504	Area (sq ft)		333.71	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	55.58	Top Width (ft)		55.58	
Vel Total (ft/s)	5.18	Avg. Vel. (ft/s)		5.18	
Max Chl Dpth (ft)	8.83	Hydr. Depth (ft)		6.00	
Conv. Total (cfs)	44610.1	Conv. (cfs)		44610.1	

Length Wtd. (ft)	4.00	Wetted Per. (ft)		59.72	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.52	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.54	72.59	0.38
C & E Loss (ft)	0.11	Cum SA (acres)	0.52	16.33	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2856.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.71	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		201.97	
E.G. Slope (ft/ft)	0.000979	Area (sq ft)		201.97	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	45.03	Top Width (ft)		45.03	
Vel Total (ft/s)	3.47	Avg. Vel. (ft/s)		3.47	
Max Chl Dpth (ft)	6.21	Hydr. Depth (ft)		4.49	
Conv. Total (cfs)	22367.8	Conv. (cfs)		22367.8	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		47.94	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	66.60	0.31
C & E Loss (ft)	0.07	Cum SA (acres)	0.39	15.98	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2856.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2855.99	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		170.45	
E.G. Slope (ft/ft)	0.000801	Area (sq ft)		170.45	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	42.11	Top Width (ft)		42.11	
Vel Total (ft/s)	2.93	Avg. Vel. (ft/s)		2.93	
Max Chl Dpth (ft)	5.49	Hydr. Depth (ft)		4.05	
Conv. Total (cfs)	17665.8	Conv. (cfs)		17665.8	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		44.69	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	44.00	0.15
C & E Loss (ft)	0.06	Cum SA (acres)	0.12	14.69	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2853.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2853.86	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		89.99	
E.G. Slope (ft/ft)	0.000195	Area (sq ft)		89.99	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	33.54	Top Width (ft)		33.54	
Vel Total (ft/s)	1.11	Avg. Vel. (ft/s)		1.11	
Max Chl Dpth (ft)	3.36	Hydr. Depth (ft)		2.68	
Conv. Total (cfs)	7154.5	Conv. (cfs)		7154.5	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		35.12	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	12.82	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	12.46	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2857.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	2857.06	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		217.86	
E.G. Slope (ft/ft)	0.001063	Area (sq ft)		217.86	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	46.42	Top Width (ft)		46.42	
Vel Total (ft/s)	3.72	Avg. Vel. (ft/s)		3.72	
Max Chl Dpth (ft)	6.56	Hydr. Depth (ft)		4.69	
Conv. Total (cfs)	24839.2	Conv. (cfs)		24839.2	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		49.50	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	42.08	0.15
C & E Loss (ft)	0.08	Cum SA (acres)	0.14	14.57	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2856.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.18	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		178.58	
E.G. Slope (ft/ft)	0.000851	Area (sq ft)		178.58	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	42.88	Top Width (ft)		42.88	
Vel Total (ft/s)	3.08	Avg. Vel. (ft/s)		3.08	
Max Chl Dpth (ft)	5.68	Hydr. Depth (ft)		4.16	
Conv. Total (cfs)	18851.8	Conv. (cfs)		18851.8	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		45.55	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.21	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.09	32.17	0.09
C & E Loss (ft)	0.07	Cum SA (acres)	0.09	13.94	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2855.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.035	
W.S. Elev (ft)	2855.30	Reach Len. (ft)	4.00	4.00	4.00
Crit W.S. (ft)		Flow Area (sq ft)		142.53	
E.G. Slope (ft/ft)	0.000611	Area (sq ft)		142.53	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	39.35	Top Width (ft)		39.35	
Vel Total (ft/s)	2.39	Avg. Vel. (ft/s)		2.39	
Max Chl Dpth (ft)	4.80	Hydr. Depth (ft)		3.62	
Conv. Total (cfs)	13752.4	Conv. (cfs)		13752.4	
Length Wtd. (ft)	4.00	Wetted Per. (ft)		41.60	
Min Ch El (ft)	2850.50	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	231.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.05	23.70	0.05
C & E Loss (ft)	0.05	Cum SA (acres)	0.07	13.33	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11788

INPUT
Description: Section 117+88: Stabilizer #4
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2862.5	105.5	2861.5	169.5	2861.5	187.5	2852.5	207.5	2852.5
225.5	2861.5	255.04	2860.94	286.05	2860.94	315.27	2860.94	325.57	2860.94

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	169.5	.035	225.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
169.5	225.5	3	3	3	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2859.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.51	Wt. n-Val.		0.035	
W.S. Elev (ft)	2858.12	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2857.63	Flow Area (sq ft)		175.49	
E.G. Slope (ft/ft)	0.008816	Area (sq ft)		175.49	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	42.47	Top Width (ft)		42.47	
Vel Total (ft/s)	9.86	Avg. Vel. (ft/s)		9.86	
Max Chl Dpth (ft)	5.62	Hydr. Depth (ft)		4.13	
Conv. Total (cfs)	18424.9	Conv. (cfs)		18424.9	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		45.13	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		2.14	

Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.54	72.56	0.38
C & E Loss (ft)	0.04	Cum SA (acres)	0.52	16.32	0.20

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2856.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.92	Wt. n-Val.		0.035	
W.S. Elev (ft)	2855.90	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2855.51	Flow Area (sq ft)		91.06	
E.G. Slope (ft/ft)	0.009231	Area (sq ft)		91.06	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	33.59	Top Width (ft)		33.59	
Vel Total (ft/s)	7.69	Avg. Vel. (ft/s)		7.69	
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)		2.71	
Conv. Total (cfs)	7285.5	Conv. (cfs)		7285.5	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		35.20	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		1.49	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.37	66.59	0.31
C & E Loss (ft)	0.03	Cum SA (acres)	0.39	15.98	0.17

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2856.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.		0.035	
W.S. Elev (ft)	2855.29	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2854.96	Flow Area (sq ft)		71.26	
E.G. Slope (ft/ft)	0.009576	Area (sq ft)		71.26	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	31.15	Top Width (ft)		31.15	
Vel Total (ft/s)	7.02	Avg. Vel. (ft/s)		7.02	
Max Chl Dpth (ft)	2.79	Hydr. Depth (ft)		2.29	
Conv. Total (cfs)	5109.5	Conv. (cfs)		5109.5	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		32.46	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		1.31	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.15	43.98	0.15
C & E Loss (ft)	0.03	Cum SA (acres)	0.12	14.68	0.12

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2853.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.035	
W.S. Elev (ft)	2853.59	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)		Flow Area (sq ft)		24.06	
E.G. Slope (ft/ft)	0.010009	Area (sq ft)		24.06	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	24.34	Top Width (ft)		24.34	
Vel Total (ft/s)	4.16	Avg. Vel. (ft/s)		4.16	
Max Chl Dpth (ft)	1.09	Hydr. Depth (ft)		0.99	
Conv. Total (cfs)	999.6	Conv. (cfs)		999.6	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		24.85	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01	12.81	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	12.46	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2857.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2856.18	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2855.79	Flow Area (sq ft)		100.77	
E.G. Slope (ft/ft)	0.009246	Area (sq ft)		100.77	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	34.73	Top Width (ft)		34.73	
Vel Total (ft/s)	8.04	Avg. Vel. (ft/s)		8.04	
Max Chl Dpth (ft)	3.68	Hydr. Depth (ft)		2.90	
Conv. Total (cfs)	8424.0	Conv. (cfs)		8424.0	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		36.47	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		1.59	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.15	42.07	0.15
C & E Loss (ft)	0.03	Cum SA (acres)	0.14	14.57	0.12

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2856.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.81	Wt. n-Val.		0.035	
W.S. Elev (ft)	2855.44	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2855.10	Flow Area (sq ft)		76.21	
E.G. Slope (ft/ft)	0.009530	Area (sq ft)		76.21	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	31.78	Top Width (ft)		31.78	
Vel Total (ft/s)	7.22	Avg. Vel. (ft/s)		7.22	
Max Chl Dpth (ft)	2.94	Hydr. Depth (ft)		2.40	
Conv. Total (cfs)	5634.0	Conv. (cfs)		5634.0	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		33.17	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.09	32.16	0.09
C & E Loss (ft)	0.03	Cum SA (acres)	0.09	13.94	0.09

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2855.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.60	Wt. n-Val.		0.035	
W.S. Elev (ft)	2854.73	Reach Len. (ft)	3.00	3.00	3.00
Crit W.S. (ft)	2854.43	Flow Area (sq ft)		54.58	
E.G. Slope (ft/ft)	0.009684	Area (sq ft)		54.58	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	28.92	Top Width (ft)		28.92	
Vel Total (ft/s)	6.23	Avg. Vel. (ft/s)		6.23	
Max Chl Dpth (ft)	2.23	Hydr. Depth (ft)		1.89	
Conv. Total (cfs)	3455.0	Conv. (cfs)		3455.0	
Length Wtd. (ft)	3.00	Wetted Per. (ft)		29.98	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		1.10	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.05	23.69	0.05
C & E Loss (ft)	0.02	Cum SA (acres)	0.07	13.33	0.07

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11785

INPUT

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Description: Section 117+85: Stabilizer #4 (exit)
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2862.5   105.5  2861.5   170.5 2860.94   187.5  2852.5   207.5  2852.5
   224.5 2860.94  255.04 2860.94  286.05 2860.94  315.27 2860.94  325.57 2860.94

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035   170.5    .035   224.5    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         170.5   224.5            121.1   121.1   121.1             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2859.55    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.93    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2857.62    Reach Len. (ft)           121.10     121.10     121.10
  Crit W.S. (ft)           2857.62    Flow Area (sq ft)                    155.10
  E.G. Slope (ft/ft)      0.012485    Area (sq ft)                         155.10
  Q Total (cfs)            1730.00    Flow (cfs)                          1730.00
  Top Width (ft)             40.62    Top Width (ft)                        40.62
  Vel Total (ft/s)           11.15    Avg. Vel. (ft/s)                      11.15
  Max Chl Dpth (ft)           5.12    Hydr. Depth (ft)                       3.82
  Conv. Total (cfs)        15482.7    Conv. (cfs)                         15482.7
  Length Wtd. (ft)          121.10    Wetted Per. (ft)                      43.02
  Min Ch El (ft)           2852.50    Shear (lb/sq ft)                       2.81
  Alpha                       1.00    Stream Power (lb/ft s)    325.57       0.00       0.00
  Frctn Loss (ft)             1.29    Cum Volume (acre-ft)        0.54      72.55       0.38
  C & E Loss (ft)             0.03    Cum SA (acres)              0.52      16.32       0.20


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2856.75    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.23    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2855.51    Reach Len. (ft)           121.10     121.10     121.10
  Crit W.S. (ft)           2855.51    Flow Area (sq ft)                     78.50
  E.G. Slope (ft/ft)      0.014197    Area (sq ft)                          78.50
  Q Total (cfs)             700.00    Flow (cfs)                           700.00
  Top Width (ft)             32.13    Top Width (ft)                        32.13
  Vel Total (ft/s)            8.92    Avg. Vel. (ft/s)                       8.92
  Max Chl Dpth (ft)           3.01    Hydr. Depth (ft)                       2.44
  Conv. Total (cfs)         5874.8    Conv. (cfs)                          5874.8
  Length Wtd. (ft)          121.10    Wetted Per. (ft)                      33.55
  Min Ch El (ft)           2852.50    Shear (lb/sq ft)                       2.07
  Alpha                       1.00    Stream Power (lb/ft s)    325.57       0.00       0.00
  Frctn Loss (ft)             0.97    Cum Volume (acre-ft)        0.37      66.59       0.31
  C & E Loss (ft)             0.16    Cum SA (acres)              0.39      15.98       0.17


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
```

for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2855.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2854.96	Reach Len. (ft)	121.10	121.10	121.10
Crit W.S. (ft)	2854.96	Flow Area (sq ft)		61.40	
E.G. Slope (ft/ft)	0.014836	Area (sq ft)		61.40	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	29.91	Top Width (ft)		29.91	
Vel Total (ft/s)	8.14	Avg. Vel. (ft/s)		8.14	
Max Chl Dpth (ft)	2.46	Hydr. Depth (ft)		2.05	
Conv. Total (cfs)	4104.9	Conv. (cfs)		4104.9	
Length Wtd. (ft)	121.10	Wetted Per. (ft)		31.07	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		1.83	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.49	Cum Volume (acre-ft)	0.15	43.98	0.15
C & E Loss (ft)	0.04	Cum SA (acres)	0.12	14.68	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2853.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.035	
W.S. Elev (ft)	2853.39	Reach Len. (ft)	121.10	121.10	121.10
Crit W.S. (ft)	2853.39	Flow Area (sq ft)		19.35	
E.G. Slope (ft/ft)	0.019750	Area (sq ft)		19.35	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	23.58	Top Width (ft)		23.58	
Vel Total (ft/s)	5.17	Avg. Vel. (ft/s)		5.17	
Max Chl Dpth (ft)	0.89	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	711.6	Conv. (cfs)		711.6	
Length Wtd. (ft)	121.10	Wetted Per. (ft)		23.99	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.98	Cum Volume (acre-ft)	0.01	12.81	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	12.46	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2857.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.33	Wt. n-Val.		0.035	
W.S. Elev (ft)	2855.79	Reach Len. (ft)	121.10	121.10	121.10
Crit W.S. (ft)	2855.79	Flow Area (sq ft)		87.68	
E.G. Slope (ft/ft)	0.013813	Area (sq ft)		87.68	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	33.26	Top Width (ft)		33.26	
Vel Total (ft/s)	9.24	Avg. Vel. (ft/s)		9.24	
Max Chl Dpth (ft)	3.29	Hydr. Depth (ft)		2.64	
Conv. Total (cfs)	6892.0	Conv. (cfs)		6892.0	
Length Wtd. (ft)	121.10	Wetted Per. (ft)		34.81	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		2.17	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.44	Cum Volume (acre-ft)	0.15	42.06	0.15
C & E Loss (ft)	0.02	Cum SA (acres)	0.14	14.56	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2856.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.		0.035	
W.S. Elev (ft)	2855.11	Reach Len. (ft)	121.10	121.10	121.10
Crit W.S. (ft)	2855.11	Flow Area (sq ft)		65.81	
E.G. Slope (ft/ft)	0.014649	Area (sq ft)		65.81	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	30.50	Top Width (ft)		30.50	
Vel Total (ft/s)	8.36	Avg. Vel. (ft/s)		8.36	
Max Chl Dpth (ft)	2.61	Hydr. Depth (ft)		2.16	
Conv. Total (cfs)	4544.2	Conv. (cfs)		4544.2	
Length Wtd. (ft)	121.10	Wetted Per. (ft)		31.72	
Min Ch El (ft)	2852.50	Shear (lb/sq ft)		1.90	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	1.53	Cum Volume (acre-ft)	0.09	32.16	0.09
C & E Loss (ft)	0.02	Cum SA (acres)	0.09	13.94	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.

```
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2855.27    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.84    Wt. n-Val.                           0.035
  W.S. Elev (ft)           2854.44    Reach Len. (ft)           121.10     121.10     121.10
  Crit W.S. (ft)           2854.44    Flow Area (sq ft)                     46.30
  E.G. Slope (ft/ft)      0.015817    Area (sq ft)                          46.30
  Q Total (cfs)             340.00    Flow (cfs)                           340.00
  Top Width (ft)             27.80    Top Width (ft)                        27.80
  Vel Total (ft/s)            7.34    Avg. Vel. (ft/s)                       7.34
  Max Chl Dpth (ft)           1.94    Hydr. Depth (ft)                       1.67
  Conv. Total (cfs)         2703.4    Conv. (cfs)                          2703.4
  Length Wtd. (ft)          121.10    Wetted Per. (ft)                      28.71
  Min Ch El (ft)           2852.50    Shear (lb/sq ft)                       1.59
  Alpha                       1.00    Stream Power (lb/ft s)    325.57       0.00       0.00
  Frctn Loss (ft)             1.65    Cum Volume (acre-ft)        0.05      23.68       0.05
  C & E Loss (ft)             0.02    Cum SA (acres)              0.07      13.32       0.07


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 11663.9

INPUT
Description: Section 116+63.9
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2865   105.5    2864   110.8    2863  116.62    2862  123.73    2861
  131.28    2860  136.36    2859     146    2858     170    2857     185  2849.7
     210  2849.7   223.5  2856.5  255.04    2857  286.05    2858  315.27    2859
  325.57    2860

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     170     .03   223.5    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           170   223.5              350     350     350             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2857.13    Element                   Left OB    Channel   Right OB
```

Vel Head (ft)	4.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	2853.06	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2854.33	Flow Area (sq ft)		106.87	
E.G. Slope (ft/ft)	0.028964	Area (sq ft)		106.87	
Q Total (cfs)	1730.00	Flow (cfs)		1730.00	
Top Width (ft)	38.58	Top Width (ft)		38.58	
Vel Total (ft/s)	16.19	Avg. Vel. (ft/s)		16.19	
Max Chl Dpth (ft)	3.36	Hydr. Depth (ft)		2.77	
Conv. Total (cfs)	10165.3	Conv. (cfs)		10165.3	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		40.15	
Min Ch El (ft)	2849.70	Shear (lb/sq ft)		4.81	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	2.20	Cum Volume (acre-ft)	0.54	72.19	0.38
C & E Loss (ft)	0.21	Cum SA (acres)	0.52	16.21	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2854.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.48	Wt. n-Val.		0.030	
W.S. Elev (ft)	2851.62	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2852.38	Flow Area (sq ft)		55.40	
E.G. Slope (ft/ft)	0.033482	Area (sq ft)		55.40	
Q Total (cfs)	700.00	Flow (cfs)		700.00	
Top Width (ft)	32.75	Top Width (ft)		32.75	
Vel Total (ft/s)	12.64	Avg. Vel. (ft/s)		12.64	
Max Chl Dpth (ft)	1.92	Hydr. Depth (ft)		1.69	
Conv. Total (cfs)	3825.6	Conv. (cfs)		3825.6	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		33.65	
Min Ch El (ft)	2849.70	Shear (lb/sq ft)		3.44	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	2.52	Cum Volume (acre-ft)	0.37	66.40	0.31
C & E Loss (ft)	0.12	Cum SA (acres)	0.39	15.89	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2853.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.00	Wt. n-Val.		0.030	
W.S. Elev (ft)	2851.27	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2851.87	Flow Area (sq ft)		44.07	
E.G. Slope (ft/ft)	0.034320	Area (sq ft)		44.07	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	31.32	Top Width (ft)		31.32	
Vel Total (ft/s)	11.35	Avg. Vel. (ft/s)		11.35	

Max Chl Dpth (ft)	1.56	Hydr. Depth (ft)		1.41	
Conv. Total (cfs)	2698.9	Conv. (cfs)		2698.9	
Length Wtd. (ft)		Wetted Per. (ft)		32.05	
Min Ch El (ft)	2849.70	Shear (lb/sq ft)		2.95	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	2.63	Cum Volume (acre-ft)	0.15	43.83	0.15
C & E Loss (ft)	0.10	Cum SA (acres)	0.12	14.60	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2850.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.030	
W.S. Elev (ft)	2850.33	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2850.47	Flow Area (sq ft)		16.61	
E.G. Slope (ft/ft)	0.029435	Area (sq ft)		16.61	
Q Total (cfs)	100.00	Flow (cfs)		100.00	
Top Width (ft)	27.55	Top Width (ft)		27.55	
Vel Total (ft/s)	6.02	Avg. Vel. (ft/s)		6.02	
Max Chl Dpth (ft)	0.63	Hydr. Depth (ft)		0.60	
Conv. Total (cfs)	582.9	Conv. (cfs)		582.9	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		27.85	
Min Ch El (ft)	2849.70	Shear (lb/sq ft)		1.10	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	2.89	Cum Volume (acre-ft)	0.01	12.76	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	12.39	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2854.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.70	Wt. n-Val.		0.030	
W.S. Elev (ft)	2851.80	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2852.63	Flow Area (sq ft)		61.39	
E.G. Slope (ft/ft)	0.032869	Area (sq ft)		61.39	
Q Total (cfs)	810.00	Flow (cfs)		810.00	
Top Width (ft)	33.48	Top Width (ft)		33.48	
Vel Total (ft/s)	13.19	Avg. Vel. (ft/s)		13.19	
Max Chl Dpth (ft)	2.10	Hydr. Depth (ft)		1.83	
Conv. Total (cfs)	4467.8	Conv. (cfs)		4467.8	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		34.46	
Min Ch El (ft)	2849.70	Shear (lb/sq ft)		3.66	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	2.48	Cum Volume (acre-ft)	0.15	41.85	0.15
C & E Loss (ft)	0.14	Cum SA (acres)	0.14	14.47	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2853.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.13	Wt. n-Val.		0.030	
W.S. Elev (ft)	2851.36	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2852.01	Flow Area (sq ft)		46.99	
E.G. Slope (ft/ft)	0.034109	Area (sq ft)		46.99	
Q Total (cfs)	550.00	Flow (cfs)		550.00	
Top Width (ft)	31.70	Top Width (ft)		31.70	
Vel Total (ft/s)	11.70	Avg. Vel. (ft/s)		11.70	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		1.48	
Conv. Total (cfs)	2978.0	Conv. (cfs)		2978.0	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		32.47	
Min Ch El (ft)	2849.70	Shear (lb/sq ft)		3.08	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	2.60	Cum Volume (acre-ft)	0.09	32.00	0.09
C & E Loss (ft)	0.10	Cum SA (acres)	0.09	13.85	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2852.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.030	
W.S. Elev (ft)	2850.95	Reach Len. (ft)	350.00	350.00	350.00
Crit W.S. (ft)	2851.40	Flow Area (sq ft)		34.32	
E.G. Slope (ft/ft)	0.034369	Area (sq ft)		34.32	
Q Total (cfs)	340.00	Flow (cfs)		340.00	
Top Width (ft)	30.04	Top Width (ft)		30.04	
Vel Total (ft/s)	9.91	Avg. Vel. (ft/s)		9.91	
Max Chl Dpth (ft)	1.25	Hydr. Depth (ft)		1.14	
Conv. Total (cfs)	1834.0	Conv. (cfs)		1834.0	
Length Wtd. (ft)	350.00	Wetted Per. (ft)		30.62	
Min Ch El (ft)	2849.70	Shear (lb/sq ft)		2.40	
Alpha	1.00	Stream Power (lb/ft s)	325.57	0.00	0.00
Frctn Loss (ft)	2.73	Cum Volume (acre-ft)	0.05	23.57	0.05
C & E Loss (ft)	0.07	Cum SA (acres)	0.07	13.24	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11313.9

INPUT
Description: Section 113+13.9
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2856	122.14	2855	142.46	2854	163	2853	180	2844.5
205	2844.5	222	2853	248.03	2854	334.67	2855	397.56	2856
458.56	2857	502.61	2858						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	163	.03	222	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
163	222	143.9	143.9	143.9	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2851.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.97	Wt. n-Val.		0.030	
W.S. Elev (ft)	2849.48	Reach Len. (ft)	143.90	143.90	143.90
Crit W.S. (ft)	2849.48	Flow Area (sq ft)		173.86	
E.G. Slope (ft/ft)	0.009119	Area (sq ft)		173.86	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	44.90	Top Width (ft)		44.90	
Vel Total (ft/s)	11.27	Avg. Vel. (ft/s)		11.27	
Max Chl Dpth (ft)	4.97	Hydr. Depth (ft)		3.87	
Conv. Total (cfs)	20525.1	Conv. (cfs)		20525.1	
Length Wtd. (ft)	143.90	Wetted Per. (ft)		47.25	
Min Ch El (ft)	2844.50	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)	502.61	0.00	0.00
Frctn Loss (ft)	5.06	Cum Volume (acre-ft)	0.54	71.06	0.38
C & E Loss (ft)	0.63	Cum SA (acres)	0.52	15.87	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2850.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.82	Wt. n-Val.		0.030	
W.S. Elev (ft)	2849.09	Reach Len. (ft)	143.90	143.90	143.90
Crit W.S. (ft)	2849.10	Flow Area (sq ft)		156.88	
E.G. Slope (ft/ft)	0.009196	Area (sq ft)		156.88	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	43.36	Top Width (ft)		43.36	
Vel Total (ft/s)	10.84	Avg. Vel. (ft/s)		10.84	
Max Chl Dpth (ft)	4.59	Hydr. Depth (ft)		3.62	
Conv. Total (cfs)	17727.3	Conv. (cfs)		17727.3	
Length Wtd. (ft)	143.90	Wetted Per. (ft)		45.53	
Min Ch El (ft)	2844.50	Shear (lb/sq ft)		1.98	
Alpha	1.00	Stream Power (lb/ft s)	502.61	0.00	0.00

Frctn Loss (ft)	0.95	Cum Volume (acre-ft)	0.37	65.55	0.31
C & E Loss (ft)	0.30	Cum SA (acres)	0.39	15.58	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2849.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.40	Wt. n-Val.		0.030	
W.S. Elev (ft)	2847.83	Reach Len. (ft)	143.90	143.90	143.90
Crit W.S. (ft)	2847.83	Flow Area (sq ft)		105.44	
E.G. Slope (ft/ft)	0.010033	Area (sq ft)		105.44	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	38.32	Top Width (ft)		38.32	
Vel Total (ft/s)	9.48	Avg. Vel. (ft/s)		9.48	
Max Chl Dpth (ft)	3.33	Hydr. Depth (ft)		2.75	
Conv. Total (cfs)	9983.5	Conv. (cfs)		9983.5	
Length Wtd. (ft)	143.90	Wetted Per. (ft)		39.89	
Min Ch El (ft)	2844.50	Shear (lb/sq ft)		1.66	
Alpha	1.00	Stream Power (lb/ft s)	502.61	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	43.23	0.15
C & E Loss (ft)		Cum SA (acres)	0.12	14.32	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2845.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.030	
W.S. Elev (ft)	2845.51	Reach Len. (ft)	143.90	143.90	143.90
Crit W.S. (ft)	2845.51	Flow Area (sq ft)		27.16	
E.G. Slope (ft/ft)	0.013886	Area (sq ft)		27.16	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	29.02	Top Width (ft)		29.02	
Vel Total (ft/s)	5.52	Avg. Vel. (ft/s)		5.52	
Max Chl Dpth (ft)	1.01	Hydr. Depth (ft)		0.94	
Conv. Total (cfs)	1272.9	Conv. (cfs)		1272.9	
Length Wtd. (ft)	143.90	Wetted Per. (ft)		29.50	
Min Ch El (ft)	2844.50	Shear (lb/sq ft)		0.80	
Alpha	1.00	Stream Power (lb/ft s)	502.61	0.00	0.00
Frctn Loss (ft)	1.34	Cum Volume (acre-ft)	0.01	12.58	0.01

C & E Loss (ft)	0.07	Cum SA (acres)	0.03	12.16	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2849.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.33	Wt. n-Val.		0.030	
W.S. Elev (ft)	2847.67	Reach Len. (ft)	143.90	143.90	143.90
Crit W.S. (ft)	2847.67	Flow Area (sq ft)		99.28	
E.G. Slope (ft/ft)	0.010128	Area (sq ft)		99.28	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	37.67	Top Width (ft)		37.67	
Vel Total (ft/s)	9.27	Avg. Vel. (ft/s)		9.27	
Max Chl Dpth (ft)	3.17	Hydr. Depth (ft)		2.64	
Conv. Total (cfs)	9141.6	Conv. (cfs)		9141.6	
Length Wtd. (ft)	143.90	Wetted Per. (ft)		39.17	
Min Ch El (ft)	2844.50	Shear (lb/sq ft)		1.60	
Alpha	1.00	Stream Power (lb/ft s)	502.61	0.00	0.00
Frctn Loss (ft)	1.03	Cum Volume (acre-ft)	0.15	41.21	0.15
C & E Loss (ft)	0.21	Cum SA (acres)	0.14	14.18	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2848.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.		0.030	
W.S. Elev (ft)	2846.98	Reach Len. (ft)	143.90	143.90	143.90
Crit W.S. (ft)	2846.98	Flow Area (sq ft)		74.35	
E.G. Slope (ft/ft)	0.010815	Area (sq ft)		74.35	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	34.93	Top Width (ft)		34.93	
Vel Total (ft/s)	8.34	Avg. Vel. (ft/s)		8.34	
Max Chl Dpth (ft)	2.48	Hydr. Depth (ft)		2.13	
Conv. Total (cfs)	5961.7	Conv. (cfs)		5961.7	
Length Wtd. (ft)	143.90	Wetted Per. (ft)		36.10	
Min Ch El (ft)	2844.50	Shear (lb/sq ft)		1.39	

Alpha	1.00	Stream Power (lb/ft s)	502.61	0.00	0.00
Frctn Loss (ft)	1.08	Cum Volume (acre-ft)	0.09	31.51	0.09
C & E Loss (ft)	0.17	Cum SA (acres)	0.09	13.58	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2847.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.82	Wt. n-Val.		0.030	
W.S. Elev (ft)	2846.32	Reach Len. (ft)	143.90	143.90	143.90
Crit W.S. (ft)	2846.33	Flow Area (sq ft)		52.26	
E.G. Slope (ft/ft)	0.011749	Area (sq ft)		52.26	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	32.30	Top Width (ft)		32.30	
Vel Total (ft/s)	7.27	Avg. Vel. (ft/s)		7.27	
Max Chl Dpth (ft)	1.82	Hydr. Depth (ft)		1.62	
Conv. Total (cfs)	3505.7	Conv. (cfs)		3505.7	
Length Wtd. (ft)	143.90	Wetted Per. (ft)		33.16	
Min Ch El (ft)	2844.50	Shear (lb/sq ft)		1.16	
Alpha	1.00	Stream Power (lb/ft s)	502.61	0.00	0.00
Frctn Loss (ft)	1.16	Cum Volume (acre-ft)	0.05	23.22	0.05
C & E Loss (ft)	0.13	Cum SA (acres)	0.07	12.99	0.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11170.*

INPUT
Description: Boulder Stabilizer #12 (inlet)
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2854.8	117.5	2854	133.6	2853.3	145.7	2852.6	176.3	2842.4
201.3	2842.4	231.9	2852.6	244.9	2853.2	302	2853.9	343.5	2854.6
383.7	2855.3	412.7	2855.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	145.7	.035	231.9	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
145.7	231.9	2	2	2	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2849.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.		0.035	
W.S. Elev (ft)	2848.40	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2847.12	Flow Area (sq ft)		257.97	
E.G. Slope (ft/ft)	0.004883	Area (sq ft)		257.97	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	61.00	Top Width (ft)		61.00	
Vel Total (ft/s)	7.60	Avg. Vel. (ft/s)		7.60	
Max Chl Dpth (ft)	6.00	Hydr. Depth (ft)		4.23	
Conv. Total (cfs)	28048.1	Conv. (cfs)		28048.1	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		62.94	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		1.25	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.54	70.35	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.52	15.70	0.20

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2848.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.035	
W.S. Elev (ft)	2847.96	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2846.75	Flow Area (sq ft)		231.53	
E.G. Slope (ft/ft)	0.004957	Area (sq ft)		231.53	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	58.34	Top Width (ft)		58.34	
Vel Total (ft/s)	7.34	Avg. Vel. (ft/s)		7.34	
Max Chl Dpth (ft)	5.56	Hydr. Depth (ft)		3.97	
Conv. Total (cfs)	24144.7	Conv. (cfs)		24144.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		60.14	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		1.19	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	64.90	0.31
C & E Loss (ft)	0.00	Cum SA (acres)	0.39	15.41	0.17

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2847.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.035	
W.S. Elev (ft)	2846.55	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2845.60	Flow Area (sq ft)		155.35	
E.G. Slope (ft/ft)	0.005239	Area (sq ft)		155.35	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	49.89	Top Width (ft)		49.89	
Vel Total (ft/s)	6.44	Avg. Vel. (ft/s)		6.44	
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)		3.11	
Conv. Total (cfs)	13816.2	Conv. (cfs)		13816.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		51.24	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	42.80	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	14.17	0.12

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2843.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.035	
W.S. Elev (ft)	2843.75	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2843.40	Flow Area (sq ft)		39.06	
E.G. Slope (ft/ft)	0.006670	Area (sq ft)		39.06	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	33.07	Top Width (ft)		33.07	
Vel Total (ft/s)	3.84	Avg. Vel. (ft/s)		3.84	
Max Chl Dpth (ft)	1.35	Hydr. Depth (ft)		1.18	
Conv. Total (cfs)	1836.7	Conv. (cfs)		1836.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		33.51	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	12.47	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	12.06	0.03

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2846.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.		0.035	
W.S. Elev (ft)	2846.36	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2845.45	Flow Area (sq ft)		145.97	
E.G. Slope (ft/ft)	0.005287	Area (sq ft)		145.97	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	48.75	Top Width (ft)		48.75	
Vel Total (ft/s)	6.30	Avg. Vel. (ft/s)		6.30	
Max Chl Dpth (ft)	3.96	Hydr. Depth (ft)		2.99	
Conv. Total (cfs)	12652.8	Conv. (cfs)		12652.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		50.04	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	40.80	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	14.04	0.12

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2846.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	2845.56	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2844.81	Flow Area (sq ft)		108.78	
E.G. Slope (ft/ft)	0.005549	Area (sq ft)		108.78	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	43.94	Top Width (ft)		43.94	
Vel Total (ft/s)	5.70	Avg. Vel. (ft/s)		5.70	
Max Chl Dpth (ft)	3.16	Hydr. Depth (ft)		2.48	
Conv. Total (cfs)	8323.3	Conv. (cfs)		8323.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		44.96	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		0.84	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.09	31.21	0.09
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	13.45	0.09

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2845.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.035	
W.S. Elev (ft)	2844.77	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2844.19	Flow Area (sq ft)		76.02	
E.G. Slope (ft/ft)	0.005884	Area (sq ft)		76.02	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	39.21	Top Width (ft)		39.21	
Vel Total (ft/s)	5.00	Avg. Vel. (ft/s)		5.00	
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)		1.94	
Conv. Total (cfs)	4953.7	Conv. (cfs)		4953.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		39.98	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.05	23.01	0.05
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	12.88	0.07

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11168

INPUT
Description: Boulder Stabilizer #12
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2854.8	117.5	2854	133.6	2853.3	145.7	2852.6	176.3	2842.4
201.3	2842.4	231.9	2852.6	244.9	2853.2	302	2853.9	343.5	2854.6
383.7	2855.3	412.7	2855.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	145.7	.035	231.9	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
145.7	231.9	15	15	15	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2849.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.		0.035	
W.S. Elev (ft)	2848.39	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		257.31	
E.G. Slope (ft/ft)	0.004918	Area (sq ft)		257.31	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	60.93	Top Width (ft)		60.93	
Vel Total (ft/s)	7.62	Avg. Vel. (ft/s)		7.62	
Max Chl Dpth (ft)	5.99	Hydr. Depth (ft)		4.22	
Conv. Total (cfs)	27949.6	Conv. (cfs)		27949.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		62.88	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		1.26	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.54	70.33	0.38
C & E Loss (ft)	0.23	Cum SA (acres)	0.52	15.70	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2848.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.035	
W.S. Elev (ft)	2847.95	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		230.92	
E.G. Slope (ft/ft)	0.004994	Area (sq ft)		230.92	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	58.27	Top Width (ft)		58.27	
Vel Total (ft/s)	7.36	Avg. Vel. (ft/s)		7.36	
Max Chl Dpth (ft)	5.55	Hydr. Depth (ft)		3.96	
Conv. Total (cfs)	24056.1	Conv. (cfs)		24056.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		60.07	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		1.20	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	64.89	0.31
C & E Loss (ft)	0.22	Cum SA (acres)	0.39	15.41	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2847.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.035	
W.S. Elev (ft)	2846.53	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		154.63	
E.G. Slope (ft/ft)	0.005308	Area (sq ft)		154.63	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	49.81	Top Width (ft)		49.81	
Vel Total (ft/s)	6.47	Avg. Vel. (ft/s)		6.47	
Max Chl Dpth (ft)	4.13	Hydr. Depth (ft)		3.10	
Conv. Total (cfs)	13726.2	Conv. (cfs)		13726.2	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		51.15	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		1.00	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	42.79	0.15
C & E Loss (ft)	0.18	Cum SA (acres)	0.12	14.17	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2843.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.035	
W.S. Elev (ft)	2843.73	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		38.46	
E.G. Slope (ft/ft)	0.006989	Area (sq ft)		38.46	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	32.96	Top Width (ft)		32.96	
Vel Total (ft/s)	3.90	Avg. Vel. (ft/s)		3.90	
Max Chl Dpth (ft)	1.33	Hydr. Depth (ft)		1.17	

Conv. Total (cfs)	1794.3	Conv. (cfs)		1794.3	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		33.39	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	12.47	0.01
C & E Loss (ft)	0.07	Cum SA (acres)	0.03	12.06	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2846.97	Element			
Vel Head (ft)	0.62	Wt. n-Val.		0.035	
W.S. Elev (ft)	2846.34	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		145.27	
E.G. Slope (ft/ft)	0.005360	Area (sq ft)		145.27	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	48.66	Top Width (ft)		48.66	
Vel Total (ft/s)	6.33	Avg. Vel. (ft/s)		6.33	
Max Chl Dpth (ft)	3.94	Hydr. Depth (ft)		2.99	
Conv. Total (cfs)	12566.8	Conv. (cfs)		12566.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		49.94	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	40.79	0.15
C & E Loss (ft)	0.17	Cum SA (acres)	0.14	14.04	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2846.05	Element			
Vel Head (ft)	0.51	Wt. n-Val.		0.035	
W.S. Elev (ft)	2845.54	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		108.12	
E.G. Slope (ft/ft)	0.005647	Area (sq ft)		108.12	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	43.84	Top Width (ft)		43.84	
Vel Total (ft/s)	5.73	Avg. Vel. (ft/s)		5.73	
Max Chl Dpth (ft)	3.14	Hydr. Depth (ft)		2.47	
Conv. Total (cfs)	8250.5	Conv. (cfs)		8250.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		44.86	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		0.85	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.09	31.20	0.09
C & E Loss (ft)	0.14	Cum SA (acres)	0.09	13.45	0.09

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2845.15	Element			
Vel Head (ft)	0.39	Wt. n-Val.		0.035	
W.S. Elev (ft)	2844.75	Reach Len. (ft)	15.00	15.00	15.00

Crit W.S. (ft)		Flow Area (sq ft)		75.41	
E.G. Slope (ft/ft)	0.006025	Area (sq ft)		75.41	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	39.11	Top Width (ft)		39.11	
Vel Total (ft/s)	5.04	Avg. Vel. (ft/s)		5.04	
Max Chl Dpth (ft)	2.35	Hydr. Depth (ft)		1.93	
Conv. Total (cfs)	4895.5	Conv. (cfs)		4895.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		39.88	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		0.71	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.05	23.01	0.05
C & E Loss (ft)	0.11	Cum SA (acres)	0.07	12.87	0.07

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11153

INPUT
Description: Boulder Stabilizer #12
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2854.8	117.5	2854	128.5	2853.3	130.7	2852.6	176.3	2837.4
201.3	2837.4	246.9	2852.6	249	2853.2	302	2853.9	343.5	2854.6
383.7	2855.3	412.7	2855.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	130.7	.035	246.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
130.7	246.9	2	2	2	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2849.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2848.92	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		685.90	
E.G. Slope (ft/ft)	0.000338	Area (sq ft)		685.90	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	94.10	Top Width (ft)		94.10	
Vel Total (ft/s)	2.86	Avg. Vel. (ft/s)		2.86	
Max Chl Dpth (ft)	11.52	Hydr. Depth (ft)		7.29	
Conv. Total (cfs)	106661.5	Conv. (cfs)		106661.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		97.84	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.54	70.17	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.52	15.67	0.20

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2848.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	2848.45	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		642.22	
E.G. Slope (ft/ft)	0.000304	Area (sq ft)		642.22	

Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	91.28	Top Width (ft)		91.28	
Vel Total (ft/s)	2.65	Avg. Vel. (ft/s)		2.65	
Max Chl Dpth (ft)	11.05	Hydr. Depth (ft)		7.04	
Conv. Total (cfs)	97575.3	Conv. (cfs)		97575.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		94.86	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	64.74	0.31
C & E Loss (ft)	0.00	Cum SA (acres)	0.39	15.38	0.17

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2847.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2846.94	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		511.31	
E.G. Slope (ft/ft)	0.000195	Area (sq ft)		511.31	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	82.22	Top Width (ft)		82.22	
Vel Total (ft/s)	1.96	Avg. Vel. (ft/s)		1.96	
Max Chl Dpth (ft)	9.54	Hydr. Depth (ft)		6.22	
Conv. Total (cfs)	71621.4	Conv. (cfs)		71621.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		85.32	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	42.68	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	14.15	0.12

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2843.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2843.89	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		288.42	
E.G. Slope (ft/ft)	0.000021	Area (sq ft)		288.42	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	63.92	Top Width (ft)		63.92	
Vel Total (ft/s)	0.52	Avg. Vel. (ft/s)		0.52	
Max Chl Dpth (ft)	6.49	Hydr. Depth (ft)		4.51	
Conv. Total (cfs)	32720.7	Conv. (cfs)		32720.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		66.03	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	12.42	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	12.04	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2846.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.035	
W.S. Elev (ft)	2846.73	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		494.60	
E.G. Slope (ft/ft)	0.000181	Area (sq ft)		494.60	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	80.99	Top Width (ft)		80.99	
Vel Total (ft/s)	1.86	Avg. Vel. (ft/s)		1.86	
Max Chl Dpth (ft)	9.33	Hydr. Depth (ft)		6.11	
Conv. Total (cfs)	68456.3	Conv. (cfs)		68456.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		84.02	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00

Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	40.68	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	14.02	0.12

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2845.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2845.87	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		426.89	
E.G. Slope (ft/ft)	0.000123	Area (sq ft)		426.89	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	75.81	Top Width (ft)		75.81	
Vel Total (ft/s)	1.45	Avg. Vel. (ft/s)		1.45	
Max Chl Dpth (ft)	8.47	Hydr. Depth (ft)		5.63	
Conv. Total (cfs)	56016.8	Conv. (cfs)		56016.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		78.56	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.09	31.11	0.09
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	13.43	0.09

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2845.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2845.01	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		364.03	
E.G. Slope (ft/ft)	0.000071	Area (sq ft)		364.03	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	70.66	Top Width (ft)		70.66	
Vel Total (ft/s)	1.04	Avg. Vel. (ft/s)		1.04	
Max Chl Dpth (ft)	7.61	Hydr. Depth (ft)		5.15	
Conv. Total (cfs)	45054.6	Conv. (cfs)		45054.6	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		73.13	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.05	22.93	0.05
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	12.85	0.07

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11151

INPUT
Description: Boulder Stabilizer #12
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2854.8	117.5	2854	128.5	2853.3	130.7	2852.6	176.3	2837.4
201.3	2837.4	246.9	2852.6	249	2853.2	302	2853.9	343.5	2854.6
383.7	2855.3	412.7	2855.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	130.7	.035	246.9	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
130.7	246.9	15	15	15	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2849.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2848.92	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		685.83	
E.G. Slope (ft/ft)	0.000338	Area (sq ft)		685.83	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	94.10	Top Width (ft)		94.10	
Vel Total (ft/s)	2.86	Avg. Vel. (ft/s)		2.86	
Max Chl Dpth (ft)	11.52	Hydr. Depth (ft)		7.29	
Conv. Total (cfs)	106646.9	Conv. (cfs)		106646.9	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		97.84	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.54	70.14	0.38
C & E Loss (ft)	0.16	Cum SA (acres)	0.52	15.67	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2848.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	2848.45	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		642.18	
E.G. Slope (ft/ft)	0.000304	Area (sq ft)		642.18	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	91.27	Top Width (ft)		91.27	
Vel Total (ft/s)	2.65	Avg. Vel. (ft/s)		2.65	
Max Chl Dpth (ft)	11.05	Hydr. Depth (ft)		7.04	
Conv. Total (cfs)	97566.1	Conv. (cfs)		97566.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		94.86	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	64.71	0.31
C & E Loss (ft)	0.15	Cum SA (acres)	0.39	15.38	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2847.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2846.94	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		511.27	
E.G. Slope (ft/ft)	0.000195	Area (sq ft)		511.27	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	82.22	Top Width (ft)		82.22	
Vel Total (ft/s)	1.96	Avg. Vel. (ft/s)		1.96	
Max Chl Dpth (ft)	9.54	Hydr. Depth (ft)		6.22	
Conv. Total (cfs)	71613.8	Conv. (cfs)		71613.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		85.32	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	42.66	0.15
C & E Loss (ft)	0.12	Cum SA (acres)	0.12	14.14	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2843.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2843.89	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		288.42	
E.G. Slope (ft/ft)	0.000021	Area (sq ft)		288.42	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	63.92	Top Width (ft)		63.92	
Vel Total (ft/s)	0.52	Avg. Vel. (ft/s)		0.52	
Max Chl Dpth (ft)	6.49	Hydr. Depth (ft)		4.51	
Conv. Total (cfs)	32720.7	Conv. (cfs)		32720.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		66.03	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	12.40	0.01
C & E Loss (ft)	0.04	Cum SA (acres)	0.03	12.04	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2846.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.035	
W.S. Elev (ft)	2846.73	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		494.58	
E.G. Slope (ft/ft)	0.000181	Area (sq ft)		494.58	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	80.99	Top Width (ft)		80.99	
Vel Total (ft/s)	1.86	Avg. Vel. (ft/s)		1.86	
Max Chl Dpth (ft)	9.33	Hydr. Depth (ft)		6.11	
Conv. Total (cfs)	68452.6	Conv. (cfs)		68452.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		84.02	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	40.66	0.15
C & E Loss (ft)	0.12	Cum SA (acres)	0.14	14.01	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2845.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2845.87	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		426.88	
E.G. Slope (ft/ft)	0.000123	Area (sq ft)		426.88	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	75.81	Top Width (ft)		75.81	

Vel Total (ft/s)	1.45	Avg. Vel. (ft/s)		1.45	
Max Chl Dpth (ft)	8.47	Hydr. Depth (ft)		5.63	
Conv. Total (cfs)	56013.5	Conv. (cfs)		56013.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		78.56	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.09	31.09	0.09
C & E Loss (ft)	0.10	Cum SA (acres)	0.09	13.43	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2845.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2845.01	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		364.01	
E.G. Slope (ft/ft)	0.000071	Area (sq ft)		364.01	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	70.66	Top Width (ft)		70.66	
Vel Total (ft/s)	1.04	Avg. Vel. (ft/s)		1.04	
Max Chl Dpth (ft)	7.61	Hydr. Depth (ft)		5.15	
Conv. Total (cfs)	45051.6	Conv. (cfs)		45051.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		73.13	
Min Ch El (ft)	2837.40	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.05	22.92	0.05
C & E Loss (ft)	0.07	Cum SA (acres)	0.07	12.85	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 11136

INPUT
Description: Boulder Stabilizer #12 (exit)
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2854.8	117.5	2854	133.6	2853.3	145.7	2852.6	176.3	2842.4
201.3	2842.4	231.9	2852.6	244.9	2853.2	302	2853.9	343.5	2854.6
383.7	2855.3	412.7	2855.9						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	145.7	.035	231.9	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
145.7	231.9	172.1	172.1	172.1	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2848.87	Element	Left OB	Channel	Right OB

Vel Head (ft)	1.75	Wt. n-Val.		0.035	
W.S. Elev (ft)	2847.12	Reach Len. (ft)	172.10	172.10	172.10
Crit W.S. (ft)	2847.12	Flow Area (sq ft)		184.55	
E.G. Slope (ft/ft)	0.012403	Area (sq ft)		184.55	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	53.29	Top Width (ft)		53.29	
Vel Total (ft/s)	10.62	Avg. Vel. (ft/s)		10.62	
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)		3.46	
Conv. Total (cfs)	17599.1	Conv. (cfs)		17599.1	
Length Wtd. (ft)	172.10	Wetted Per. (ft)		54.82	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		2.61	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	1.80	Cum Volume (acre-ft)	0.54	69.99	0.38
C & E Loss (ft)	0.01	Cum SA (acres)	0.52	15.64	0.20

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2848.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.64	Wt. n-Val.		0.035	
W.S. Elev (ft)	2846.75	Reach Len. (ft)	172.10	172.10	172.10
Crit W.S. (ft)	2846.75	Flow Area (sq ft)		165.47	
E.G. Slope (ft/ft)	0.012674	Area (sq ft)		165.47	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	51.09	Top Width (ft)		51.09	
Vel Total (ft/s)	10.27	Avg. Vel. (ft/s)		10.27	
Max Chl Dpth (ft)	4.35	Hydr. Depth (ft)		3.24	
Conv. Total (cfs)	15100.6	Conv. (cfs)		15100.6	
Length Wtd. (ft)	172.10	Wetted Per. (ft)		52.51	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		2.49	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	1.86	Cum Volume (acre-ft)	0.37	64.58	0.31
C & E Loss (ft)	0.01	Cum SA (acres)	0.39	15.35	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2846.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.		0.035	
W.S. Elev (ft)	2845.60	Reach Len. (ft)	172.10	172.10	172.10
Crit W.S. (ft)	2845.60	Flow Area (sq ft)		110.88	

E.G. Slope (ft/ft)	0.013665	Area (sq ft)		110.88	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	44.22	Top Width (ft)		44.22	
Vel Total (ft/s)	9.02	Avg. Vel. (ft/s)		9.02	
Max Chl Dpth (ft)	3.20	Hydr. Depth (ft)		2.51	
Conv. Total (cfs)	8554.5	Conv. (cfs)		8554.5	
Length Wtd. (ft)	172.10	Wetted Per. (ft)		45.26	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	2.01	Cum Volume (acre-ft)	0.15	42.55	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	14.12	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2843.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.035	
W.S. Elev (ft)	2843.40	Reach Len. (ft)	172.10	172.10	172.10
Crit W.S. (ft)	2843.40	Flow Area (sq ft)		27.88	
E.G. Slope (ft/ft)	0.018741	Area (sq ft)		27.88	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	30.98	Top Width (ft)		30.98	
Vel Total (ft/s)	5.38	Avg. Vel. (ft/s)		5.38	
Max Chl Dpth (ft)	1.00	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	1095.7	Conv. (cfs)		1095.7	
Length Wtd. (ft)	172.10	Wetted Per. (ft)		31.30	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		1.04	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	2.64	Cum Volume (acre-ft)	0.01	12.35	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	12.02	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2846.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	2845.45	Reach Len. (ft)	172.10	172.10	172.10
Crit W.S. (ft)	2845.45	Flow Area (sq ft)		104.16	
E.G. Slope (ft/ft)	0.013840	Area (sq ft)		104.16	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	43.30	Top Width (ft)		43.30	

Vel Total (ft/s)	8.83	Avg. Vel. (ft/s)		8.83	
Max Chl Dpth (ft)	3.05	Hydr. Depth (ft)		2.41	
Conv. Total (cfs)	7820.2	Conv. (cfs)		7820.2	
Length Wtd. (ft)	172.10	Wetted Per. (ft)		44.29	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		2.03	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	2.04	Cum Volume (acre-ft)	0.15	40.56	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	13.99	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2845.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.99	Wt. n-Val.		0.035	
W.S. Elev (ft)	2844.81	Reach Len. (ft)	172.10	172.10	172.10
Crit W.S. (ft)	2844.81	Flow Area (sq ft)		77.57	
E.G. Slope (ft/ft)	0.014764	Area (sq ft)		77.57	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	39.44	Top Width (ft)		39.44	
Vel Total (ft/s)	7.99	Avg. Vel. (ft/s)		7.99	
Max Chl Dpth (ft)	2.41	Hydr. Depth (ft)		1.97	
Conv. Total (cfs)	5102.5	Conv. (cfs)		5102.5	
Length Wtd. (ft)	172.10	Wetted Per. (ft)		40.23	
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		1.78	
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00
Frctn Loss (ft)	2.17	Cum Volume (acre-ft)	0.09	31.01	0.09
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	13.41	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2844.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.		0.035	
W.S. Elev (ft)	2844.19	Reach Len. (ft)	172.10	172.10	172.10
Crit W.S. (ft)	2844.19	Flow Area (sq ft)		54.19	
E.G. Slope (ft/ft)	0.015985	Area (sq ft)		54.19	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	35.71	Top Width (ft)		35.71	
Vel Total (ft/s)	7.01	Avg. Vel. (ft/s)		7.01	
Max Chl Dpth (ft)	1.79	Hydr. Depth (ft)		1.52	
Conv. Total (cfs)	3005.5	Conv. (cfs)		3005.5	

Length Wtd. (ft)	172.10	Wetted Per. (ft)		36.29		
Min Ch El (ft)	2842.40	Shear (lb/sq ft)		1.49		
Alpha	1.00	Stream Power (lb/ft s)	412.70	0.00	0.00	
Frctn Loss (ft)	2.36	Cum Volume (acre-ft)	0.05	22.85	0.05	
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	12.83	0.07	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10963.9

INPUT
Description: Section 109+63.9
Station Elevation Data num= 6

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2853	131	2852	171	2839.3	196	2839.3	236	2852
283.88	2853								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	131	.03	236	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
131	236	243.5	243.5	243.5	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2846.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.97	Wt. n-Val.		0.030	
W.S. Elev (ft)	2843.12	Reach Len. (ft)	243.50	243.50	243.50
Crit W.S. (ft)	2843.98	Flow Area (sq ft)		141.67	
E.G. Slope (ft/ft)	0.019603	Area (sq ft)		141.67	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	49.09	Top Width (ft)		49.09	
Vel Total (ft/s)	13.84	Avg. Vel. (ft/s)		13.84	
Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)		2.89	
Conv. Total (cfs)	13998.8	Conv. (cfs)		13998.8	
Length Wtd. (ft)	243.50	Wetted Per. (ft)		50.27	
Min Ch El (ft)	2839.30	Shear (lb/sq ft)		3.45	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	2.65	Cum Volume (acre-ft)	0.54	69.35	0.38
C & E Loss (ft)	0.12	Cum SA (acres)	0.52	15.44	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2845.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.75	Wt. n-Val.		0.030	
W.S. Elev (ft)	2842.84	Reach Len. (ft)	243.50	243.50	243.50
Crit W.S. (ft)	2843.62	Flow Area (sq ft)		127.72	
E.G. Slope (ft/ft)	0.019784	Area (sq ft)		127.72	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	47.27	Top Width (ft)		47.27	
Vel Total (ft/s)	13.31	Avg. Vel. (ft/s)		13.31	
Max Chl Dpth (ft)	3.53	Hydr. Depth (ft)		2.70	
Conv. Total (cfs)	12086.4	Conv. (cfs)		12086.4	
Length Wtd. (ft)	243.50	Wetted Per. (ft)		48.36	
Min Ch El (ft)	2839.30	Shear (lb/sq ft)		3.26	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	2.69	Cum Volume (acre-ft)	0.37	64.00	0.31
C & E Loss (ft)	0.11	Cum SA (acres)	0.39	15.16	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2843.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2841.94	Reach Len. (ft)	243.50	243.50	243.50
Crit W.S. (ft)	2842.48	Flow Area (sq ft)		87.74	
E.G. Slope (ft/ft)	0.020086	Area (sq ft)		87.74	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	41.60	Top Width (ft)		41.60	
Vel Total (ft/s)	11.40	Avg. Vel. (ft/s)		11.40	
Max Chl Dpth (ft)	2.64	Hydr. Depth (ft)		2.11	
Conv. Total (cfs)	7055.9	Conv. (cfs)		7055.9	
Length Wtd. (ft)		Wetted Per. (ft)		42.42	
Min Ch El (ft)	2839.30	Shear (lb/sq ft)		2.59	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	2.83	Cum Volume (acre-ft)	0.15	42.16	0.15
C & E Loss (ft)	0.08	Cum SA (acres)	0.12	13.95	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2840.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.030	
W.S. Elev (ft)	2840.23	Reach Len. (ft)	243.50	243.50	243.50
Crit W.S. (ft)	2840.29	Flow Area (sq ft)		26.02	
E.G. Slope (ft/ft)	0.017230	Area (sq ft)		26.02	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	30.87	Top Width (ft)		30.87	
Vel Total (ft/s)	5.77	Avg. Vel. (ft/s)		5.77	
Max Chl Dpth (ft)	0.93	Hydr. Depth (ft)		0.84	
Conv. Total (cfs)	1142.7	Conv. (cfs)		1142.7	
Length Wtd. (ft)	243.50	Wetted Per. (ft)		31.16	

Min Ch El (ft)	2839.30	Shear (lb/sq ft)		0.90	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	3.09	Cum Volume (acre-ft)	0.01	12.24	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	11.90	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2843.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.91	Wt. n-Val.		0.030	
W.S. Elev (ft)	2841.82	Reach Len. (ft)	243.50	243.50	243.50
Crit W.S. (ft)	2842.33	Flow Area (sq ft)		82.86	
E.G. Slope (ft/ft)	0.020070	Area (sq ft)		82.86	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	40.85	Top Width (ft)		40.85	
Vel Total (ft/s)	11.10	Avg. Vel. (ft/s)		11.10	
Max Chl Dpth (ft)	2.52	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	6494.0	Conv. (cfs)		6494.0	
Length Wtd. (ft)		Wetted Per. (ft)		41.63	
Min Ch El (ft)	2839.30	Shear (lb/sq ft)		2.49	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	2.85	Cum Volume (acre-ft)	0.15	40.19	0.15
C & E Loss (ft)	0.07	Cum SA (acres)	0.14	13.83	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2842.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.48	Wt. n-Val.		0.030	
W.S. Elev (ft)	2841.32	Reach Len. (ft)	243.50	243.50	243.50
Crit W.S. (ft)	2841.69	Flow Area (sq ft)		63.43	
E.G. Slope (ft/ft)	0.019923	Area (sq ft)		63.43	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	37.74	Top Width (ft)		37.74	
Vel Total (ft/s)	9.78	Avg. Vel. (ft/s)		9.78	
Max Chl Dpth (ft)	2.02	Hydr. Depth (ft)		1.68	
Conv. Total (cfs)	4392.5	Conv. (cfs)		4392.5	
Length Wtd. (ft)	243.50	Wetted Per. (ft)		38.36	
Min Ch El (ft)	2839.30	Shear (lb/sq ft)		2.06	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	2.94	Cum Volume (acre-ft)	0.09	30.73	0.09
C & E Loss (ft)	0.05	Cum SA (acres)	0.09	13.25	0.09

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2841.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.030	

W.S. Elev (ft)	2840.85	Reach Len. (ft)	243.50	243.50	243.50
Crit W.S. (ft)	2841.07	Flow Area (sq ft)		46.14	
E.G. Slope (ft/ft)	0.019280	Area (sq ft)		46.14	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	34.73	Top Width (ft)		34.73	
Vel Total (ft/s)	8.24	Avg. Vel. (ft/s)		8.24	
Max Chl Dpth (ft)	1.54	Hydr. Depth (ft)		1.33	
Conv. Total (cfs)	2736.7	Conv. (cfs)		2736.7	
Length Wtd. (ft)	243.50	Wetted Per. (ft)		35.21	
Min Ch El (ft)	2839.30	Shear (lb/sq ft)		1.58	
Alpha	1.00	Stream Power (lb/ft s)	283.88	0.00	0.00
Frctn Loss (ft)	3.01	Cum Volume (acre-ft)	0.05	22.65	0.05
C & E Loss (ft)	0.03	Cum SA (acres)	0.07	12.69	0.07

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10745

INPUT
Description: Section 107+45
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2853	194.52	2852	271	2850	299	2836	323	2836
349	2850	385.8	2852	435.35	2853				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	271	.03	349	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
271	349	24.6	24.6	24.6	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2844.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.		0.030	
W.S. Elev (ft)	2843.96	Reach Len. (ft)	24.60	24.60	24.60
Crit W.S. (ft)	2841.10	Flow Area (sq ft)		313.32	
E.G. Slope (ft/ft)	0.001706	Area (sq ft)		313.32	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	54.71	Top Width (ft)		54.71	
Vel Total (ft/s)	6.26	Avg. Vel. (ft/s)		6.26	
Max Chl Dpth (ft)	7.96	Hydr. Depth (ft)		5.73	
Conv. Total (cfs)	47453.7	Conv. (cfs)		47453.7	
Length Wtd. (ft)	24.60	Wetted Per. (ft)		58.60	
Min Ch El (ft)	2836.00	Shear (lb/sq ft)		0.57	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.54	68.07	0.38
C & E Loss (ft)	0.14	Cum SA (acres)	0.52	15.15	0.20

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2843.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.83	Wt. n-Val.		0.030	
W.S. Elev (ft)	2842.41	Reach Len. (ft)	24.60	24.60	24.60
Crit W.S. (ft)	2840.69	Flow Area (sq ft)		233.11	
E.G. Slope (ft/ft)	0.002922	Area (sq ft)		233.11	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	48.73	Top Width (ft)		48.73	
Vel Total (ft/s)	7.29	Avg. Vel. (ft/s)		7.29	
Max Chl Dpth (ft)	6.41	Hydr. Depth (ft)		4.78	
Conv. Total (cfs)	31449.7	Conv. (cfs)		31449.7	
Length Wtd. (ft)	24.60	Wetted Per. (ft)		51.86	
Min Ch El (ft)	2836.00	Shear (lb/sq ft)		0.82	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.37	62.99	0.31
C & E Loss (ft)	0.20	Cum SA (acres)	0.39	14.89	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2840.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.42	Wt. n-Val.		0.030	
W.S. Elev (ft)	2839.42	Reach Len. (ft)	24.60	24.60	24.60
Crit W.S. (ft)	2839.42	Flow Area (sq ft)		104.48	
E.G. Slope (ft/ft)	0.009982	Area (sq ft)		104.48	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	37.18	Top Width (ft)		37.18	
Vel Total (ft/s)	9.57	Avg. Vel. (ft/s)		9.57	
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)		2.81	
Conv. Total (cfs)	10009.0	Conv. (cfs)		10009.0	
Length Wtd. (ft)	24.60	Wetted Per. (ft)		38.84	
Min Ch El (ft)	2836.00	Shear (lb/sq ft)		1.68	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	41.62	0.15
C & E Loss (ft)		Cum SA (acres)	0.12	13.73	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2837.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.		0.030	
W.S. Elev (ft)	2837.03	Reach Len. (ft)	24.60	24.60	24.60
Crit W.S. (ft)	2837.03	Flow Area (sq ft)		26.85	
E.G. Slope (ft/ft)	0.013769	Area (sq ft)		26.85	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	27.98	Top Width (ft)		27.98	
Vel Total (ft/s)	5.59	Avg. Vel. (ft/s)		5.59	
Max Chl Dpth (ft)	1.03	Hydr. Depth (ft)		0.96	
Conv. Total (cfs)	1278.3	Conv. (cfs)		1278.3	

Length Wtd. (ft)	24.60	Wetted Per. (ft)		28.49	
Min Ch El (ft)	2836.00	Shear (lb/sq ft)		0.81	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.01	12.09	0.01
C & E Loss (ft)	0.12	Cum SA (acres)	0.03	11.73	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2840.61	Element			
Vel Head (ft)	1.36	Wt. n-Val.		0.030	
W.S. Elev (ft)	2839.25	Reach Len. (ft)	24.60	24.60	24.60
Crit W.S. (ft)	2839.25	Flow Area (sq ft)		98.25	
E.G. Slope (ft/ft)	0.010108	Area (sq ft)		98.25	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	36.52	Top Width (ft)		36.52	
Vel Total (ft/s)	9.36	Avg. Vel. (ft/s)		9.36	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	9150.6	Conv. (cfs)		9150.6	
Length Wtd. (ft)	24.60	Wetted Per. (ft)		38.11	
Min Ch El (ft)	2836.00	Shear (lb/sq ft)		1.63	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	39.68	0.15
C & E Loss (ft)		Cum SA (acres)	0.14	13.61	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2839.65	Element			
Vel Head (ft)	1.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2838.55	Reach Len. (ft)	24.60	24.60	24.60
Crit W.S. (ft)	2838.55	Flow Area (sq ft)		73.66	
E.G. Slope (ft/ft)	0.010736	Area (sq ft)		73.66	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	33.83	Top Width (ft)		33.83	
Vel Total (ft/s)	8.42	Avg. Vel. (ft/s)		8.42	
Max Chl Dpth (ft)	2.55	Hydr. Depth (ft)		2.18	
Conv. Total (cfs)	5983.6	Conv. (cfs)		5983.6	
Length Wtd. (ft)	24.60	Wetted Per. (ft)		35.07	
Min Ch El (ft)	2836.00	Shear (lb/sq ft)		1.41	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00

Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.09	30.34	0.09
C & E Loss (ft)	0.29	Cum SA (acres)	0.09	13.05	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2838.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.84	Wt. n-Val.		0.030	
W.S. Elev (ft)	2837.87	Reach Len. (ft)	24.60	24.60	24.60
Crit W.S. (ft)	2837.87	Flow Area (sq ft)		51.70	
E.G. Slope (ft/ft)	0.011679	Area (sq ft)		51.70	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	31.22	Top Width (ft)		31.22	
Vel Total (ft/s)	7.35	Avg. Vel. (ft/s)		7.35	
Max Chl Dpth (ft)	1.87	Hydr. Depth (ft)		1.66	
Conv. Total (cfs)	3516.2	Conv. (cfs)		3516.2	
Length Wtd. (ft)	24.60	Wetted Per. (ft)		32.14	
Min Ch El (ft)	2836.00	Shear (lb/sq ft)		1.17	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.05	22.37	0.05
C & E Loss (ft)	0.21	Cum SA (acres)	0.07	12.51	0.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10720.4

INPUT
Description: Section 107+20.4 (U/S Face private road)

```
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2853  194.52    2852     262    2850     299  2831.6     323  2831.6
     360    2850   385.8    2852  435.35    2853

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     262     .03     360    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           262     360               61      61      61             .3       .5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)          2844.42    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              0.15    Wt. n-Val.                            0.030
  W.S. Elev (ft)          2844.27    Reach Len. (ft)            61.00      61.00      61.00
  Crit W.S. (ft)          2836.68    Flow Area (sq ft)                    626.59
  E.G. Slope (ft/ft)      0.000260   Area (sq ft)                         626.59
  Q Total (cfs)           1960.00    Flow (cfs)                          1960.00
  Top Width (ft)            74.94    Top Width (ft)                        74.94
  Vel Total (ft/s)           3.13    Avg. Vel. (ft/s)                       3.13
  Max Chl Dpth (ft)         12.67    Hydr. Depth (ft)                       8.36
  Conv. Total (cfs)       121499.8   Conv. (cfs)                        121499.8
  Length Wtd. (ft)          61.00    Wetted Per. (ft)                      80.89
  Min Ch El (ft)          2831.60    Shear (lb/sq ft)                       0.13
  Alpha                      1.00    Stream Power (lb/ft s)    435.35       0.00       0.00
  Frctn Loss (ft)                    Cum Volume (acre-ft)        0.54      67.81       0.38
  C & E Loss (ft)                    Cum SA (acres)              0.52      15.11       0.20


CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)          2843.02    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              0.16    Wt. n-Val.                            0.030
  W.S. Elev (ft)          2842.86    Reach Len. (ft)            61.00      61.00      61.00
  Crit W.S. (ft)          2836.29    Flow Area (sq ft)                    524.98
  E.G. Slope (ft/ft)      0.000317   Area (sq ft)                         524.98
  Q Total (cfs)           1700.00    Flow (cfs)                          1700.00
  Top Width (ft)            69.27    Top Width (ft)                        69.27
  Vel Total (ft/s)           3.24    Avg. Vel. (ft/s)                       3.24
  Max Chl Dpth (ft)         11.26    Hydr. Depth (ft)                       7.58
  Conv. Total (cfs)        95520.5   Conv. (cfs)                         95520.5
  Length Wtd. (ft)          61.00    Wetted Per. (ft)                      74.56
  Min Ch El (ft)          2831.60    Shear (lb/sq ft)                       0.14
  Alpha                      1.00    Stream Power (lb/ft s)    435.35       0.00       0.00
  Frctn Loss (ft)                    Cum Volume (acre-ft)        0.37      62.77       0.31
  C & E Loss (ft)                    Cum SA (acres)              0.39      14.86       0.17


CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)          2839.70    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              0.15    Wt. n-Val.                            0.030
  W.S. Elev (ft)          2839.54    Reach Len. (ft)            61.00      61.00      61.00
  Crit W.S. (ft)          2835.00    Flow Area (sq ft)                    317.37
  E.G. Slope (ft/ft)      0.000436   Area (sq ft)                         317.37
  Q Total (cfs)           1000.00    Flow (cfs)                          1000.00
  Top Width (ft)            55.94    Top Width (ft)                        55.94
  Vel Total (ft/s)           3.15    Avg. Vel. (ft/s)                       3.15
  Max Chl Dpth (ft)          7.94    Hydr. Depth (ft)                       5.67
  Conv. Total (cfs)        47899.7   Conv. (cfs)                         47899.7
  Length Wtd. (ft)          61.00    Wetted Per. (ft)                      59.67
  Min Ch El (ft)          2831.60    Shear (lb/sq ft)                       0.14
  Alpha                      1.00    Stream Power (lb/ft s)    435.35       0.00       0.00
```

Frctn Loss (ft)	Cum Volume (acre-ft)	0.15	41.50	0.15
C & E Loss (ft)	Cum SA (acres)	0.12	13.71	0.12

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2834.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.030	
W.S. Elev (ft)	2833.93	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2832.63	Flow Area (sq ft)		66.69	
E.G. Slope (ft/ft)	0.000854	Area (sq ft)		66.69	
Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	33.35	Top Width (ft)		33.35	
Vel Total (ft/s)	2.25	Avg. Vel. (ft/s)		2.25	
Max Chl Dpth (ft)	2.33	Hydr. Depth (ft)		2.00	
Conv. Total (cfs)	5131.5	Conv. (cfs)		5131.5	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		34.45	
Min Ch El (ft)	2831.60	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	12.07	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	11.72	0.03

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2839.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2838.97	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2834.84	Flow Area (sq ft)		286.01	
E.G. Slope (ft/ft)	0.000492	Area (sq ft)		286.01	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	53.63	Top Width (ft)		53.63	
Vel Total (ft/s)	3.22	Avg. Vel. (ft/s)		3.22	
Max Chl Dpth (ft)	7.37	Hydr. Depth (ft)		5.33	
Conv. Total (cfs)	41473.3	Conv. (cfs)		41473.3	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		57.09	
Min Ch El (ft)	2831.60	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	39.57	0.15
C & E Loss (ft)		Cum SA (acres)	0.14	13.58	0.12

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2837.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.030	
W.S. Elev (ft)	2837.31	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2834.14	Flow Area (sq ft)		202.36	
E.G. Slope (ft/ft)	0.000587	Area (sq ft)		202.36	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	46.94	Top Width (ft)		46.94	
Vel Total (ft/s)	3.06	Avg. Vel. (ft/s)		3.06	
Max Chl Dpth (ft)	5.70	Hydr. Depth (ft)		4.31	
Conv. Total (cfs)	25583.3	Conv. (cfs)		25583.3	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		49.62	
Min Ch El (ft)	2831.60	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.09	30.27	0.09
C & E Loss (ft)		Cum SA (acres)	0.09	13.03	0.09

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2835.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.030	
W.S. Elev (ft)	2835.77	Reach Len. (ft)	61.00	61.00	61.00
Crit W.S. (ft)	2833.47	Flow Area (sq ft)		135.05	
E.G. Slope (ft/ft)	0.000696	Area (sq ft)		135.05	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	40.77	Top Width (ft)		40.77	
Vel Total (ft/s)	2.81	Avg. Vel. (ft/s)		2.81	
Max Chl Dpth (ft)	4.17	Hydr. Depth (ft)		3.31	
Conv. Total (cfs)	14406.5	Conv. (cfs)		14406.5	
Length Wtd. (ft)	61.00	Wetted Per. (ft)		42.73	
Min Ch El (ft)	2831.60	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.05	22.32	0.05
C & E Loss (ft)		Cum SA (acres)	0.07	12.49	0.07

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 10694.4

INPUT
Description: Private Road
Distance from Upstream XS = .5
Deck/Roadway Width = 60
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
100	2850		194.5	2850		274	2850	
340	2850		386	2850				

Upstream Bridge Cross Section Data
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2853	194.52	2852	262	2850	299	2831.6	323	2831.6
360	2850	385.8	2852	435.35	2853				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	262	.03	360	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
262	360	.3	.5

Downstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
100	2850		194.5	2850		274	2850	
340	2850		386	2850				

Downstream Bridge Cross Section Data
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2853	194.52	2852	262	2850	299	2831.6	323	2831.6

```
     360    2850   385.8    2852  435.35    2853

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     262     .03     360    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           262     360             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       9       9
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  1      60     .013     .013        0                   .5                1
Number of Barrels =  2
Upstream   Elevation =  2831.6
Centerline Stations
    Sta.    Sta.
     306     317
Downstream Elevation =  2831.6
Centerline Stations
    Sta.    Sta.
     306     317

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1960.00    Culv Full Len (ft)
  # Barrels                      2    Culv Vel US (ft/s)         12.80
  Q Barrel (cfs)            980.00    Culv Vel DS (ft/s)         13.72
  E.G. US. (ft)            2844.42    Culv Inv El Up (ft)      2831.60
  W.S. US. (ft)            2844.27    Culv Inv El Dn (ft)      2831.60
  E.G. DS (ft)             2840.13    Culv Frctn Ls (ft)          0.19
  W.S. DS (ft)             2839.54    Culv Exit Loss (ft)         2.33
  Delta EG (ft)               4.29    Culv Entr Loss (ft)         1.77
  Delta WS (ft)               4.73    Q Weir (cfs)
  E.G. IC (ft)             2844.42    Weir Sta Lft (ft)
  E.G. OC (ft)             2843.92    Weir Sta Rgt (ft)
  Culvert Control            Inlet    Weir Submerg
  Culv WS Inlet (ft)       2840.11    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2839.54    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         7.17    Min El Weir Flow (ft)    2850.01


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1700.00    Culv Full Len (ft)
  # Barrels                      2    Culv Vel US (ft/s)         10.94
  Q Barrel (cfs)            850.00    Culv Vel DS (ft/s)         11.25
  E.G. US. (ft)            2843.02    Culv Inv El Up (ft)      2831.60
  W.S. US. (ft)            2842.86    Culv Inv El Dn (ft)      2831.60
  E.G. DS (ft)             2840.37    Culv Frctn Ls (ft)          0.13
  W.S. DS (ft)             2839.99    Culv Exit Loss (ft)         1.59
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Delta EG (ft)	2.65	Culv Entr Loss (ft)	0.93
Delta WS (ft)	2.87	Q Weir (cfs)	
E.G. IC (ft)	2842.20	Weir Sta Lft (ft)	
E.G. OC (ft)	2843.02	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2840.24	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2839.99	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	6.52	Min El Weir Flow (ft)	2850.01

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	1000.00	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	8.87
Q Barrel (cfs)	500.00	Culv Vel DS (ft/s)	9.12
E.G. US. (ft)	2839.70	Culv Inv El Up (ft)	2831.60
W.S. US. (ft)	2839.54	Culv Inv El Dn (ft)	2831.60
E.G. DS (ft)	2838.01	Culv Frctn Ls (ft)	0.10
W.S. DS (ft)	2837.69	Culv Exit Loss (ft)	0.97
Delta EG (ft)	1.69	Culv Entr Loss (ft)	0.61
Delta WS (ft)	1.85	Q Weir (cfs)	
E.G. IC (ft)	2838.95	Weir Sta Lft (ft)	
E.G. OC (ft)	2839.70	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2837.87	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2837.69	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.58	Min El Weir Flow (ft)	2850.01

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	150.00	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	4.16
Q Barrel (cfs)	75.00	Culv Vel DS (ft/s)	4.33
E.G. US. (ft)	2834.01	Culv Inv El Up (ft)	2831.60
W.S. US. (ft)	2833.93	Culv Inv El Dn (ft)	2831.60
E.G. DS (ft)	2833.65	Culv Frctn Ls (ft)	0.05
W.S. DS (ft)	2833.53	Culv Exit Loss (ft)	0.17
Delta EG (ft)	0.36	Culv Entr Loss (ft)	0.13
Delta WS (ft)	0.40	Q Weir (cfs)	
E.G. IC (ft)	2833.61	Weir Sta Lft (ft)	
E.G. OC (ft)	2834.01	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2833.60	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2833.53	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.29	Min El Weir Flow (ft)	2850.01

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	920.00	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	9.17
Q Barrel (cfs)	460.00	Culv Vel DS (ft/s)	9.59
E.G. US. (ft)	2839.13	Culv Inv El Up (ft)	2831.60
W.S. US. (ft)	2838.97	Culv Inv El Dn (ft)	2831.60
E.G. DS (ft)	2837.31	Culv Frctn Ls (ft)	0.12
W.S. DS (ft)	2836.93	Culv Exit Loss (ft)	1.04
Delta EG (ft)	1.82	Culv Entr Loss (ft)	0.65
Delta WS (ft)	2.04	Q Weir (cfs)	
E.G. IC (ft)	2838.54	Weir Sta Lft (ft)	
E.G. OC (ft)	2839.13	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	

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  Culv WS Inlet (ft)       2837.17    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2836.93    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         4.33    Min El Weir Flow (ft)    2850.01


CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        620.00    Culv Full Len (ft)
  # Barrels                      2    Culv Vel US (ft/s)          7.70
  Q Barrel (cfs)            310.00    Culv Vel DS (ft/s)          8.02
  E.G. US. (ft)            2837.45    Culv Inv El Up (ft)      2831.60
  W.S. US. (ft)            2837.31    Culv Inv El Dn (ft)      2831.60
  E.G. DS (ft)             2836.20    Culv Frctn Ls (ft)          0.10
  W.S. DS (ft)             2835.90    Culv Exit Loss (ft)         0.69
  Delta EG (ft)               1.25    Culv Entr Loss (ft)         0.46
  Delta WS (ft)               1.41    Q Weir (cfs)
  E.G. IC (ft)             2836.89    Weir Sta Lft (ft)
  E.G. OC (ft)             2837.45    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2836.07    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2835.90    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.33    Min El Weir Flow (ft)    2850.01


CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        380.00    Culv Full Len (ft)
  # Barrels                      2    Culv Vel US (ft/s)          6.22
  Q Barrel (cfs)            190.00    Culv Vel DS (ft/s)          6.45
  E.G. US. (ft)            2835.90    Culv Inv El Up (ft)      2831.60
  W.S. US. (ft)            2835.77    Culv Inv El Dn (ft)      2831.60
  E.G. DS (ft)             2835.10    Culv Frctn Ls (ft)          0.08
  W.S. DS (ft)             2834.87    Culv Exit Loss (ft)         0.42
  Delta EG (ft)               0.80    Culv Entr Loss (ft)         0.30
  Delta WS (ft)               0.90    Q Weir (cfs)
  E.G. IC (ft)             2835.39    Weir Sta Lft (ft)
  E.G. OC (ft)             2835.90    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2835.00    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2834.87    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         2.40    Min El Weir Flow (ft)    2850.01


CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 10659.4

INPUT
Description: Section 106+59.4 (D/S Face private road)
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2853  194.52    2852     262    2850     299  2831.6     323  2831.6
     360    2850   385.8    2852  435.35    2853

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     262     .03     360    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           262     360             45.5    45.5    45.5             .3       .5
```

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2840.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.		0.030	
W.S. Elev (ft)	2839.54	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)		Flow Area (sq ft)		317.19	
E.G. Slope (ft/ft)	0.001677	Area (sq ft)		317.19	
Q Total (cfs)	1960.00	Flow (cfs)		1960.00	
Top Width (ft)	55.92	Top Width (ft)		55.92	
Vel Total (ft/s)	6.18	Avg. Vel. (ft/s)		6.18	
Max Chl Dpth (ft)	7.94	Hydr. Depth (ft)		5.67	
Conv. Total (cfs)	47862.6	Conv. (cfs)		47862.6	
Length Wtd. (ft)	45.50	Wetted Per. (ft)		59.65	
Min Ch El (ft)	2831.60	Shear (lb/sq ft)		0.56	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.54	67.69	0.38
C & E Loss (ft)	0.02	Cum SA (acres)	0.52	15.02	0.20

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2840.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.030	
W.S. Elev (ft)	2839.99	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)		Flow Area (sq ft)		342.99	
E.G. Slope (ft/ft)	0.001017	Area (sq ft)		342.99	
Q Total (cfs)	1700.00	Flow (cfs)		1700.00	
Top Width (ft)	57.75	Top Width (ft)		57.75	
Vel Total (ft/s)	4.96	Avg. Vel. (ft/s)		4.96	
Max Chl Dpth (ft)	8.39	Hydr. Depth (ft)		5.94	
Conv. Total (cfs)	53316.3	Conv. (cfs)		53316.3	
Length Wtd. (ft)	45.50	Wetted Per. (ft)		61.69	
Min Ch El (ft)	2831.60	Shear (lb/sq ft)		0.35	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.37	62.65	0.31
C & E Loss (ft)	0.09	Cum SA (acres)	0.39	14.77	0.17

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2838.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.030	
W.S. Elev (ft)	2837.69	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)		Flow Area (sq ft)		220.83	
E.G. Slope (ft/ft)	0.001196	Area (sq ft)		220.83	
Q Total (cfs)	1000.00	Flow (cfs)		1000.00	
Top Width (ft)	48.50	Top Width (ft)		48.50	
Vel Total (ft/s)	4.53	Avg. Vel. (ft/s)		4.53	
Max Chl Dpth (ft)	6.09	Hydr. Depth (ft)		4.55	
Conv. Total (cfs)	28920.1	Conv. (cfs)		28920.1	
Length Wtd. (ft)	45.50	Wetted Per. (ft)		51.36	
Min Ch El (ft)	2831.60	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.15	41.42	0.15
C & E Loss (ft)	0.04	Cum SA (acres)	0.12	13.63	0.12

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2833.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.030	
W.S. Elev (ft)	2833.53	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)		Flow Area (sq ft)		53.71	
E.G. Slope (ft/ft)	0.001638	Area (sq ft)		53.71	

Q Total (cfs)	150.00	Flow (cfs)		150.00	
Top Width (ft)	31.75	Top Width (ft)		31.75	
Vel Total (ft/s)	2.79	Avg. Vel. (ft/s)		2.79	
Max Chl Dpth (ft)	1.93	Hydr. Depth (ft)		1.69	
Conv. Total (cfs)	3706.6	Conv. (cfs)		3706.6	
Length Wtd. (ft)	45.50	Wetted Per. (ft)		32.65	
Min Ch El (ft)	2831.60	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.01	12.04	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	11.67	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2837.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.030	
W.S. Elev (ft)	2836.93	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)		Flow Area (sq ft)		184.95	
E.G. Slope (ft/ft)	0.001666	Area (sq ft)		184.95	
Q Total (cfs)	920.00	Flow (cfs)		920.00	
Top Width (ft)	45.43	Top Width (ft)		45.43	
Vel Total (ft/s)	4.97	Avg. Vel. (ft/s)		4.97	
Max Chl Dpth (ft)	5.33	Hydr. Depth (ft)		4.07	
Conv. Total (cfs)	22536.7	Conv. (cfs)		22536.7	
Length Wtd. (ft)	45.50	Wetted Per. (ft)		47.93	
Min Ch El (ft)	2831.60	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.15	39.50	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	13.52	0.12

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2836.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.030	
W.S. Elev (ft)	2835.90	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)		Flow Area (sq ft)		140.26	
E.G. Slope (ft/ft)	0.001662	Area (sq ft)		140.26	
Q Total (cfs)	620.00	Flow (cfs)		620.00	
Top Width (ft)	41.28	Top Width (ft)		41.28	
Vel Total (ft/s)	4.42	Avg. Vel. (ft/s)		4.42	
Max Chl Dpth (ft)	4.30	Hydr. Depth (ft)		3.40	
Conv. Total (cfs)	15209.3	Conv. (cfs)		15209.3	
Length Wtd. (ft)	45.50	Wetted Per. (ft)		43.30	
Min Ch El (ft)	2831.60	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.09	30.21	0.09
C & E Loss (ft)	0.01	Cum SA (acres)	0.09	12.97	0.09

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2835.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.030	
W.S. Elev (ft)	2834.87	Reach Len. (ft)	45.50	45.50	45.50
Crit W.S. (ft)		Flow Area (sq ft)		100.06	
E.G. Slope (ft/ft)	0.001656	Area (sq ft)		100.06	
Q Total (cfs)	380.00	Flow (cfs)		380.00	
Top Width (ft)	37.16	Top Width (ft)		37.16	
Vel Total (ft/s)	3.80	Avg. Vel. (ft/s)		3.80	
Max Chl Dpth (ft)	3.27	Hydr. Depth (ft)		2.69	

Conv. Total (cfs)	9337.2	Conv. (cfs)		9337.2	
Length Wtd. (ft)	45.50	Wetted Per. (ft)		38.70	
Min Ch El (ft)	2831.60	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)	435.35	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.05	22.28	0.05
C & E Loss (ft)	0.01	Cum SA (acres)	0.07	12.43	0.07

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10613.9

INPUT
Description: Section 106+13.9
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2855	143.02	2854	165.01	2853	183.37	2852	201.27	2851
234.79	2850	246	2849	281	2831.5	316	2831.5	345	2846
362.58	2847	367.33	2848	443.58	2849	462.06	2850	510.91	2851
529.53	2854								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	246	.03	345	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
246	345	400	400	400	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2840.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.030	
W.S. Elev (ft)	2839.39	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)		400.52	
E.G. Slope (ft/ft)	0.001674	Area (sq ft)		400.52	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	66.55	Top Width (ft)		66.55	
Vel Total (ft/s)	6.47	Avg. Vel. (ft/s)		6.47	
Max Chl Dpth (ft)	7.89	Hydr. Depth (ft)		6.02	
Conv. Total (cfs)	63295.3	Conv. (cfs)		63295.3	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		70.28	
Min Ch El (ft)	2831.50	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)	529.53	0.00	0.00
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)	0.54	67.32	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.52	14.96	0.20

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2840.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.030	
W.S. Elev (ft)	2839.56	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)		411.88	
E.G. Slope (ft/ft)	0.001682	Area (sq ft)		411.88	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	67.23	Top Width (ft)		67.23	
Vel Total (ft/s)	6.56	Avg. Vel. (ft/s)		6.56	
Max Chl Dpth (ft)	8.06	Hydr. Depth (ft)		6.13	
Conv. Total (cfs)	65843.5	Conv. (cfs)		65843.5	

Length Wtd. (ft)	400.00	Wetted Per. (ft)		71.04	
Min Ch El (ft)	2831.50	Shear (lb/sq ft)		0.61	
Alpha	1.00	Stream Power (lb/ft s)	529.53	0.00	0.00
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)	0.37	62.26	0.31
C & E Loss (ft)	0.00	Cum SA (acres)	0.39	14.70	0.17

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2837.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.030	
W.S. Elev (ft)	2837.46	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)		279.74	
E.G. Slope (ft/ft)	0.001560	Area (sq ft)		279.74	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	58.85	Top Width (ft)		58.85	
Vel Total (ft/s)	5.36	Avg. Vel. (ft/s)		5.36	
Max Chl Dpth (ft)	5.96	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	37971.7	Conv. (cfs)		37971.7	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		61.66	
Min Ch El (ft)	2831.50	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)	529.53	0.00	0.00
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	0.15	41.15	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	13.58	0.12

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2833.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.030	
W.S. Elev (ft)	2833.47	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)		76.67	
E.G. Slope (ft/ft)	0.001315	Area (sq ft)		76.67	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	42.88	Top Width (ft)		42.88	
Vel Total (ft/s)	2.61	Avg. Vel. (ft/s)		2.61	
Max Chl Dpth (ft)	1.97	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	5515.1	Conv. (cfs)		5515.1	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		43.81	
Min Ch El (ft)	2831.50	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	529.53	0.00	0.00
Frctn Loss (ft)	0.46	Cum Volume (acre-ft)	0.01	11.97	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	11.63	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2837.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.030	
W.S. Elev (ft)	2836.85	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)		244.56	
E.G. Slope (ft/ft)	0.001521	Area (sq ft)		244.56	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	56.40	Top Width (ft)		56.40	
Vel Total (ft/s)	4.99	Avg. Vel. (ft/s)		4.99	
Max Chl Dpth (ft)	5.35	Hydr. Depth (ft)		4.34	
Conv. Total (cfs)	31280.6	Conv. (cfs)		31280.6	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		58.93	
Min Ch El (ft)	2831.50	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)	529.53	0.00	0.00
Frctn Loss (ft)	0.61	Cum Volume (acre-ft)	0.15	39.28	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	13.46	0.12

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2836.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.030	
W.S. Elev (ft)	2835.83	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)		189.22	
E.G. Slope (ft/ft)	0.001452	Area (sq ft)		189.22	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	52.33	Top Width (ft)		52.33	
Vel Total (ft/s)	4.33	Avg. Vel. (ft/s)		4.33	
Max Chl Dpth (ft)	4.33	Hydr. Depth (ft)		3.62	
Conv. Total (cfs)	21520.8	Conv. (cfs)		21520.8	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		54.38	
Min Ch El (ft)	2831.50	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)	529.53	0.00	0.00
Frctn Loss (ft)	0.57	Cum Volume (acre-ft)	0.09	30.03	0.09
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	12.92	0.09

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2835.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.030	
W.S. Elev (ft)	2834.82	Reach Len. (ft)	400.00	400.00	400.00
Crit W.S. (ft)		Flow Area (sq ft)		137.99	
E.G. Slope (ft/ft)	0.001376	Area (sq ft)		137.99	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	48.26	Top Width (ft)		48.26	
Vel Total (ft/s)	3.62	Avg. Vel. (ft/s)		3.62	
Max Chl Dpth (ft)	3.31	Hydr. Depth (ft)		2.86	
Conv. Total (cfs)	13479.0	Conv. (cfs)		13479.0	
Length Wtd. (ft)	400.00	Wetted Per. (ft)		49.82	
Min Ch El (ft)	2831.50	Shear (lb/sq ft)		0.24	
Alpha	1.00	Stream Power (lb/ft s)	529.53	0.00	0.00
Frctn Loss (ft)	0.53	Cum Volume (acre-ft)	0.05	22.15	0.05
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	12.39	0.07

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10213.9

INPUT
Description: Section 102+13.9
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2850	105.29	2849	110.43	2848	115.26	2847	126	2842
148	2830.9	183	2830.9	203	2841	205	2842	214.89	2843
252.3	2844	264.02	2844	351.58	2845	411.96	2846	447.34	2847
456.99	2850								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	126	.03	205	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
126	205	43.9	43.9	43.9	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2839.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.		0.030	
W.S. Elev (ft)	2838.66	Reach Len. (ft)	43.90	43.90	43.90
Crit W.S. (ft)		Flow Area (sq ft)		390.99	

E.G. Slope (ft/ft)	0.001786	Area (sq ft)		390.99	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	65.75	Top Width (ft)		65.75	
Vel Total (ft/s)	6.62	Avg. Vel. (ft/s)		6.62	
Max Chl Dpth (ft)	7.76	Hydr. Depth (ft)		5.95	
Conv. Total (cfs)	61288.9	Conv. (cfs)		61288.9	
Length Wtd. (ft)	43.90	Wetted Per. (ft)		69.45	
Min Ch El (ft)	2830.90	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.54	63.68	0.38
C & E Loss (ft)	0.06	Cum SA (acres)	0.52	14.35	0.20

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2839.53	Element			
Vel Head (ft)	0.70	Wt. n-Val.		0.030	
W.S. Elev (ft)	2838.83	Reach Len. (ft)	43.90	43.90	43.90
Crit W.S. (ft)		Flow Area (sq ft)		401.91	
E.G. Slope (ft/ft)	0.001795	Area (sq ft)		401.91	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	66.41	Top Width (ft)		66.41	
Vel Total (ft/s)	6.72	Avg. Vel. (ft/s)		6.72	
Max Chl Dpth (ft)	7.93	Hydr. Depth (ft)		6.05	
Conv. Total (cfs)	63720.8	Conv. (cfs)		63720.8	
Length Wtd. (ft)	43.90	Wetted Per. (ft)		70.18	
Min Ch El (ft)	2830.90	Shear (lb/sq ft)		0.64	
Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00
Frctn Loss (ft)	0.08	Cum Volume (acre-ft)	0.37	58.52	0.31
C & E Loss (ft)	0.06	Cum SA (acres)	0.39	14.09	0.17

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2837.27	Element			
Vel Head (ft)	0.46	Wt. n-Val.		0.030	
W.S. Elev (ft)	2836.82	Reach Len. (ft)	43.90	43.90	43.90
Crit W.S. (ft)		Flow Area (sq ft)		276.38	
E.G. Slope (ft/ft)	0.001610	Area (sq ft)		276.38	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	58.44	Top Width (ft)		58.44	
Vel Total (ft/s)	5.43	Avg. Vel. (ft/s)		5.43	
Max Chl Dpth (ft)	5.92	Hydr. Depth (ft)		4.73	
Conv. Total (cfs)	37378.8	Conv. (cfs)		37378.8	
Length Wtd. (ft)	43.90	Wetted Per. (ft)		61.26	
Min Ch El (ft)	2830.90	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.15	38.60	0.15
C & E Loss (ft)	0.03	Cum SA (acres)	0.12	13.04	0.12

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2833.11	Element			
Vel Head (ft)	0.09	Wt. n-Val.		0.030	
W.S. Elev (ft)	2833.02	Reach Len. (ft)	43.90	43.90	43.90
Crit W.S. (ft)		Flow Area (sq ft)		82.94	
E.G. Slope (ft/ft)	0.001030	Area (sq ft)		82.94	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	43.38	Top Width (ft)		43.38	
Vel Total (ft/s)	2.41	Avg. Vel. (ft/s)		2.41	
Max Chl Dpth (ft)	2.12	Hydr. Depth (ft)		1.91	
Conv. Total (cfs)	6231.6	Conv. (cfs)		6231.6	
Length Wtd. (ft)	43.90	Wetted Per. (ft)		44.39	
Min Ch El (ft)	2830.90	Shear (lb/sq ft)		0.12	

Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.01	11.24	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	11.24	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2836.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.030	
W.S. Elev (ft)	2836.23	Reach Len. (ft)	43.90	43.90	43.90
Crit W.S. (ft)		Flow Area (sq ft)		242.96	
E.G. Slope (ft/ft)	0.001545	Area (sq ft)		242.96	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	56.13	Top Width (ft)		56.13	
Vel Total (ft/s)	5.02	Avg. Vel. (ft/s)		5.02	
Max Chl Dpth (ft)	5.33	Hydr. Depth (ft)		4.33	
Conv. Total (cfs)	31033.7	Conv. (cfs)		31033.7	
Length Wtd. (ft)	43.90	Wetted Per. (ft)		58.67	
Min Ch El (ft)	2830.90	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.15	37.04	0.15
C & E Loss (ft)	0.03	Cum SA (acres)	0.14	12.95	0.12

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2835.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.030	
W.S. Elev (ft)	2835.26	Reach Len. (ft)	43.90	43.90	43.90
Crit W.S. (ft)		Flow Area (sq ft)		190.37	
E.G. Slope (ft/ft)	0.001422	Area (sq ft)		190.37	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	52.28	Top Width (ft)		52.28	
Vel Total (ft/s)	4.31	Avg. Vel. (ft/s)		4.31	
Max Chl Dpth (ft)	4.36	Hydr. Depth (ft)		3.64	
Conv. Total (cfs)	21744.0	Conv. (cfs)		21744.0	
Length Wtd. (ft)	43.90	Wetted Per. (ft)		54.36	
Min Ch El (ft)	2830.90	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.09	28.29	0.09
C & E Loss (ft)	0.02	Cum SA (acres)	0.09	12.44	0.09

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2834.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.		0.030	
W.S. Elev (ft)	2834.29	Reach Len. (ft)	43.90	43.90	43.90
Crit W.S. (ft)		Flow Area (sq ft)		141.57	
E.G. Slope (ft/ft)	0.001272	Area (sq ft)		141.57	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	48.44	Top Width (ft)		48.44	
Vel Total (ft/s)	3.53	Avg. Vel. (ft/s)		3.53	
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)		2.92	
Conv. Total (cfs)	14022.0	Conv. (cfs)		14022.0	
Length Wtd. (ft)	43.90	Wetted Per. (ft)		50.06	
Min Ch El (ft)	2830.90	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	456.99	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.05	20.87	0.05
C & E Loss (ft)	0.01	Cum SA (acres)	0.07	11.95	0.07

CROSS SECTION

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RIVER: Desert Knolls Wa
REACH: Main               RS: 10170.*

INPUT
Description: Boulder Stabilizer #11 (inlet)
Station Elevation Data    num=      17
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      40    2845      92    2842    92.4    2842   111.5    2842   145.1  2830.8
   180.1  2830.8     214    2842     233    2842     236    2843   248.2  2843.5
   259.7  2843.6   284.5  2843.9   345.7  2844.6   360.6  2844.8   405.1  2845.6
   439.9  2846.5   449.3  2849.1

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
      40     .04   111.5    .035     214     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         111.5     214                2       2       2             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2839.20    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.48    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2838.73    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)                      Flow Area (sq ft)                    466.66
  E.G. Slope (ft/ft)      0.001774    Area (sq ft)                         466.66
  Q Total (cfs)            2590.00    Flow (cfs)                          2590.00
  Top Width (ft)             82.76    Top Width (ft)                        82.76
  Vel Total (ft/s)            5.55    Avg. Vel. (ft/s)                       5.55
  Max Chl Dpth (ft)           7.93    Hydr. Depth (ft)                       5.64
  Conv. Total (cfs)        61499.6    Conv. (cfs)                         61499.6
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      85.33
  Min Ch El (ft)           2830.80    Shear (lb/sq ft)                       0.61
  Alpha                       1.00    Stream Power (lb/ft s)    449.30       0.00       0.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.54      63.25       0.38
  C & E Loss (ft)             0.00    Cum SA (acres)              0.52      14.27       0.20


CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2839.39    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.49    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2838.90    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)                      Flow Area (sq ft)                    480.89
  E.G. Slope (ft/ft)      0.001773    Area (sq ft)                         480.89
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             83.79    Top Width (ft)                        83.79
  Vel Total (ft/s)            5.61    Avg. Vel. (ft/s)                       5.61
  Max Chl Dpth (ft)           8.10    Hydr. Depth (ft)                       5.74
  Conv. Total (cfs)        64114.8    Conv. (cfs)                         64114.8
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      86.41
  Min Ch El (ft)           2830.80    Shear (lb/sq ft)                       0.62
  Alpha                       1.00    Stream Power (lb/ft s)    449.30       0.00       0.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.37      58.08       0.31
  C & E Loss (ft)             0.00    Cum SA (acres)              0.39      14.02       0.17


CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2837.17    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.34    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2836.82    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)                      Flow Area (sq ft)                    320.22
  E.G. Slope (ft/ft)      0.001703    Area (sq ft)                         320.22
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
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Top Width (ft)	71.31	Top Width (ft)		71.31	
Vel Total (ft/s)	4.68	Avg. Vel. (ft/s)		4.68	
Max Chl Dpth (ft)	6.02	Hydr. Depth (ft)		4.49	
Conv. Total (cfs)	36345.7	Conv. (cfs)		36345.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		73.26	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.46	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	38.30	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	12.97	0.12

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2833.05	Element			
Vel Head (ft)	0.08	Wt. n-Val.		0.035	
W.S. Elev (ft)	2832.98	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		90.50	
E.G. Slope (ft/ft)	0.001190	Area (sq ft)		90.50	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	48.12	Top Width (ft)		48.12	
Vel Total (ft/s)	2.21	Avg. Vel. (ft/s)		2.21	
Max Chl Dpth (ft)	2.18	Hydr. Depth (ft)		1.88	
Conv. Total (cfs)	5797.4	Conv. (cfs)		5797.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		48.83	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	11.15	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	11.19	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2836.53	Element			
Vel Head (ft)	0.30	Wt. n-Val.		0.035	
W.S. Elev (ft)	2836.23	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		278.73	
E.G. Slope (ft/ft)	0.001667	Area (sq ft)		278.73	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	67.71	Top Width (ft)		67.71	
Vel Total (ft/s)	4.38	Avg. Vel. (ft/s)		4.38	
Max Chl Dpth (ft)	5.43	Hydr. Depth (ft)		4.12	
Conv. Total (cfs)	29880.7	Conv. (cfs)		29880.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		69.46	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	36.77	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	12.88	0.12

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2835.47	Element			
Vel Head (ft)	0.23	Wt. n-Val.		0.035	
W.S. Elev (ft)	2835.24	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		214.77	
E.G. Slope (ft/ft)	0.001583	Area (sq ft)		214.77	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	61.76	Top Width (ft)		61.76	
Vel Total (ft/s)	3.82	Avg. Vel. (ft/s)		3.82	
Max Chl Dpth (ft)	4.44	Hydr. Depth (ft)		3.48	
Conv. Total (cfs)	20612.0	Conv. (cfs)		20612.0	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		63.19	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.09	28.09	0.09

C & E Loss (ft)	0.00	Cum SA (acres)	0.09	12.38	0.09

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2834.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	2834.26	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		157.10	
E.G. Slope (ft/ft)	0.001453	Area (sq ft)		157.10	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	55.85	Top Width (ft)		55.85	
Vel Total (ft/s)	3.18	Avg. Vel. (ft/s)		3.18	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)		2.81	
Conv. Total (cfs)	13117.4	Conv. (cfs)		13117.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		56.96	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.05	20.72	0.05
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	11.89	0.07

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10168

INPUT
Description: Boulder Stabilizer #11
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
40	2845	91.5	2842	111.5	2842	145.1	2830.8	180.1	2830.8
213.7	2842	233.7	2842	248.2	2843.5	259.7	2843.6	284.5	2843.9
345.7	2844.6	360.6	2844.8	405.1	2845.6	439.9	2846.5	449.3	2849.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
40	.035	111.5	.035	213.7	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
111.5	213.7	15	15	15	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2839.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.		0.035	
W.S. Elev (ft)	2838.72	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		465.29	
E.G. Slope (ft/ft)	0.001784	Area (sq ft)		465.29	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	82.51	Top Width (ft)		82.51	
Vel Total (ft/s)	5.57	Avg. Vel. (ft/s)		5.57	
Max Chl Dpth (ft)	7.92	Hydr. Depth (ft)		5.64	
Conv. Total (cfs)	61315.8	Conv. (cfs)		61315.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		85.08	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.61	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.54	63.23	0.38
C & E Loss (ft)	0.11	Cum SA (acres)	0.52	14.27	0.20

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2839.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.035	
W.S. Elev (ft)	2838.89	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		479.48	
E.G. Slope (ft/ft)	0.001784	Area (sq ft)		479.48	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	83.54	Top Width (ft)		83.54	
Vel Total (ft/s)	5.63	Avg. Vel. (ft/s)		5.63	
Max Chl Dpth (ft)	8.09	Hydr. Depth (ft)		5.74	
Conv. Total (cfs)	63923.6	Conv. (cfs)		63923.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		86.16	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.62	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	58.06	0.31
C & E Loss (ft)	0.11	Cum SA (acres)	0.39	14.01	0.17

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2837.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2836.82	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		319.37	
E.G. Slope (ft/ft)	0.001713	Area (sq ft)		319.37	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	71.12	Top Width (ft)		71.12	
Vel Total (ft/s)	4.70	Avg. Vel. (ft/s)		4.70	
Max Chl Dpth (ft)	6.02	Hydr. Depth (ft)		4.49	
Conv. Total (cfs)	36246.2	Conv. (cfs)		36246.2	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		73.07	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.47	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	38.29	0.15
C & E Loss (ft)	0.09	Cum SA (acres)	0.12	12.97	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2833.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.035	
W.S. Elev (ft)	2832.98	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		90.31	
E.G. Slope (ft/ft)	0.001196	Area (sq ft)		90.31	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	48.05	Top Width (ft)		48.05	
Vel Total (ft/s)	2.21	Avg. Vel. (ft/s)		2.21	
Max Chl Dpth (ft)	2.17	Hydr. Depth (ft)		1.88	
Conv. Total (cfs)	5782.6	Conv. (cfs)		5782.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		48.75	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	11.15	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	11.19	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2836.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.035	
W.S. Elev (ft)	2836.22	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		278.06	
E.G. Slope (ft/ft)	0.001675	Area (sq ft)		278.06	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	67.54	Top Width (ft)		67.54	
Vel Total (ft/s)	4.39	Avg. Vel. (ft/s)		4.39	
Max Chl Dpth (ft)	5.42	Hydr. Depth (ft)		4.12	
Conv. Total (cfs)	29807.2	Conv. (cfs)		29807.2	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		69.30	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	36.76	0.15
C & E Loss (ft)	0.08	Cum SA (acres)	0.14	12.88	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2835.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.035	
W.S. Elev (ft)	2835.24	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		214.25	
E.G. Slope (ft/ft)	0.001591	Area (sq ft)		214.25	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	61.61	Top Width (ft)		61.61	
Vel Total (ft/s)	3.83	Avg. Vel. (ft/s)		3.83	
Max Chl Dpth (ft)	4.44	Hydr. Depth (ft)		3.48	
Conv. Total (cfs)	20559.1	Conv. (cfs)		20559.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		63.05	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.34	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.09	28.08	0.09
C & E Loss (ft)	0.06	Cum SA (acres)	0.09	12.38	0.09

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2834.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	2834.26	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		156.77	
E.G. Slope (ft/ft)	0.001460	Area (sq ft)		156.77	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	55.73	Top Width (ft)		55.73	
Vel Total (ft/s)	3.19	Avg. Vel. (ft/s)		3.19	
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)		2.81	
Conv. Total (cfs)	13087.1	Conv. (cfs)		13087.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		56.86	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.25	

Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.05	20.71	0.05
C & E Loss (ft)	0.04	Cum SA (acres)	0.07	11.89	0.07

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10153

INPUT
Description: Boulder Stabilizer #11
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
40	2845	76	2842.2	96	2842.2	145.1	2825.8	180.1	2825.8
229.3	2842.2	249.3	2842.2	250.6	2843.5	259.7	2843.6	284.5	2843.9
345.7	2844.6	360.6	2844.8	405.1	2845.6	439.9	2846.5	449.3	2849.1

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
40	.035	96	.035	229.3	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
96	229.3	2	2	2	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2839.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	2838.97	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		980.98	
E.G. Slope (ft/ft)	0.000230	Area (sq ft)		980.98	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	113.95	Top Width (ft)		113.95	
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)		2.64	
Max Chl Dpth (ft)	13.17	Hydr. Depth (ft)		8.61	
Conv. Total (cfs)	170691.2	Conv. (cfs)		170691.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		118.23	
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.54	62.98	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.52	14.24	0.20

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2839.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	2839.15	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		1001.02	
E.G. Slope (ft/ft)	0.000237	Area (sq ft)		1001.02	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	115.00	Top Width (ft)		115.00	
Vel Total (ft/s)	2.70	Avg. Vel. (ft/s)		2.70	
Max Chl Dpth (ft)	13.35	Hydr. Depth (ft)		8.70	
Conv. Total (cfs)	175449.4	Conv. (cfs)		175449.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		119.34	
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	57.80	0.31

C & E Loss (ft)	0.00	Cum SA (acres)	0.39	13.98	0.17

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2837.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2837.01	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		769.13	
E.G. Slope (ft/ft)	0.000150	Area (sq ft)		769.13	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	102.20	Top Width (ft)		102.20	
Vel Total (ft/s)	1.95	Avg. Vel. (ft/s)		1.95	
Max Chl Dpth (ft)	11.21	Hydr. Depth (ft)		7.53	
Conv. Total (cfs)	122504.0	Conv. (cfs)		122504.0	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		105.84	
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	38.10	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	12.94	0.12

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2833.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2833.03	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		409.31	
E.G. Slope (ft/ft)	0.000015	Area (sq ft)		409.31	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	78.31	Top Width (ft)		78.31	
Vel Total (ft/s)	0.49	Avg. Vel. (ft/s)		0.49	
Max Chl Dpth (ft)	7.22	Hydr. Depth (ft)		5.23	
Conv. Total (cfs)	51317.4	Conv. (cfs)		51317.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		80.65	
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	11.06	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	11.17	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2836.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.035	
W.S. Elev (ft)	2836.40	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		707.27	
E.G. Slope (ft/ft)	0.000125	Area (sq ft)		707.27	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	98.51	Top Width (ft)		98.51	
Vel Total (ft/s)	1.72	Avg. Vel. (ft/s)		1.72	
Max Chl Dpth (ft)	10.60	Hydr. Depth (ft)		7.18	
Conv. Total (cfs)	109222.4	Conv. (cfs)		109222.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		101.95	
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	36.59	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	12.85	0.12

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2835.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2835.37	Reach Len. (ft)	2.00	2.00	2.00

Crit W.S. (ft)		Flow Area (sq ft)		609.57		
E.G. Slope (ft/ft)	0.000085	Area (sq ft)		609.57		
Q Total (cfs)	820.00	Flow (cfs)		820.00		
Top Width (ft)	92.37	Top Width (ft)		92.37		
Vel Total (ft/s)	1.35	Avg. Vel. (ft/s)		1.35		
Max Chl Dpth (ft)	9.57	Hydr. Depth (ft)		6.60		
Conv. Total (cfs)	89061.1	Conv. (cfs)		89061.1		
Length Wtd. (ft)	2.00	Wetted Per. (ft)		95.48		
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.03		
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00	
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.09	27.93	0.09	
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	12.35	0.09	

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2834.37	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	2834.35	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		518.66	
E.G. Slope (ft/ft)	0.000049	Area (sq ft)		518.66	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	86.27	Top Width (ft)		86.27	
Vel Total (ft/s)	0.96	Avg. Vel. (ft/s)		0.96	
Max Chl Dpth (ft)	8.55	Hydr. Depth (ft)		6.01	
Conv. Total (cfs)	71280.8	Conv. (cfs)		71280.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		89.05	
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.05	20.59	0.05
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	11.87	0.07

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10151

INPUT
Description: Boulder Stabilizer #11
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
40	2845	77	2842.2	78.6	2842.2	96	2842.2	145.1	2825.8
180.1	2825.8	229.5	2842.2	249.5	2842.2	250.6	2843.5	259.7	2843.6
284.5	2843.9	345.7	2844.6	360.6	2844.8	405.1	2845.6	439.9	2846.5
449.3	2849.1								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
40	.035	96	.035	229.5	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
96	229.5	15	15	15	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2839.08	Element			
Vel Head (ft)	0.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	2838.97	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		982.01	
E.G. Slope (ft/ft)	0.000230	Area (sq ft)		982.01	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	114.11	Top Width (ft)		114.11	
Vel Total (ft/s)	2.64	Avg. Vel. (ft/s)		2.64	

Max Chl Dpth (ft)	13.17	Hydr. Depth (ft)		8.61	
Conv. Total (cfs)	170844.7	Conv. (cfs)		170844.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		118.38	
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.54	62.93	0.38
C & E Loss (ft)	0.04	Cum SA (acres)	0.52	14.23	0.20

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2839.26	Element			
Vel Head (ft)	0.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	2839.15	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		1002.08	
E.G. Slope (ft/ft)	0.000236	Area (sq ft)		1002.08	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	115.16	Top Width (ft)		115.16	
Vel Total (ft/s)	2.69	Avg. Vel. (ft/s)		2.69	
Max Chl Dpth (ft)	13.35	Hydr. Depth (ft)		8.70	
Conv. Total (cfs)	175608.6	Conv. (cfs)		175608.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		119.49	
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	57.76	0.31
C & E Loss (ft)	0.04	Cum SA (acres)	0.39	13.97	0.17

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2837.07	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2837.01	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		769.90	
E.G. Slope (ft/ft)	0.000150	Area (sq ft)		769.90	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	102.34	Top Width (ft)		102.34	
Vel Total (ft/s)	1.95	Avg. Vel. (ft/s)		1.95	
Max Chl Dpth (ft)	11.21	Hydr. Depth (ft)		7.52	
Conv. Total (cfs)	122607.4	Conv. (cfs)		122607.4	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		105.97	
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	38.06	0.15
C & E Loss (ft)	0.03	Cum SA (acres)	0.12	12.93	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2833.03	Element			
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2833.03	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		409.63	

E.G. Slope (ft/ft)	0.000015	Area (sq ft)		409.63	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	78.39	Top Width (ft)		78.39	
Vel Total (ft/s)	0.49	Avg. Vel. (ft/s)		0.49	
Max Chl Dpth (ft)	7.22	Hydr. Depth (ft)		5.23	
Conv. Total (cfs)	51348.4	Conv. (cfs)		51348.4	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		80.74	
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	11.04	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	11.16	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2836.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.035	
W.S. Elev (ft)	2836.40	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		707.93	
E.G. Slope (ft/ft)	0.000125	Area (sq ft)		707.93	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	98.63	Top Width (ft)		98.63	
Vel Total (ft/s)	1.72	Avg. Vel. (ft/s)		1.72	
Max Chl Dpth (ft)	10.59	Hydr. Depth (ft)		7.18	
Conv. Total (cfs)	109305.9	Conv. (cfs)		109305.9	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		102.07	
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	36.56	0.15
C & E Loss (ft)	0.03	Cum SA (acres)	0.14	12.85	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2835.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2835.37	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		610.10	
E.G. Slope (ft/ft)	0.000085	Area (sq ft)		610.10	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	92.49	Top Width (ft)		92.49	
Vel Total (ft/s)	1.34	Avg. Vel. (ft/s)		1.34	
Max Chl Dpth (ft)	9.57	Hydr. Depth (ft)		6.60	
Conv. Total (cfs)	89123.7	Conv. (cfs)		89123.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		95.59	
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.09	27.91	0.09
C & E Loss (ft)	0.02	Cum SA (acres)	0.09	12.35	0.09

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2834.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	2834.35	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		519.10	
E.G. Slope (ft/ft)	0.000049	Area (sq ft)		519.10	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	86.37	Top Width (ft)		86.37	
Vel Total (ft/s)	0.96	Avg. Vel. (ft/s)		0.96	
Max Chl Dpth (ft)	8.55	Hydr. Depth (ft)		6.01	
Conv. Total (cfs)	71330.2	Conv. (cfs)		71330.2	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		89.15	
Min Ch El (ft)	2825.80	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.05	20.57	0.05
C & E Loss (ft)	0.02	Cum SA (acres)	0.07	11.86	0.07

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 10136

INPUT
Description: Boulder Stabilizer #11 (exit)
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
40	2845	92	2842	92.4	2841.7	112.4	2841.7	145.1	2830.8
180.1	2830.8	213	2841.7	223	2841.7	225.3	2843	248.2	2843.5
259.7	2843.6	284.5	2843.9	345.7	2844.6	360.6	2844.8	405.1	2845.6
439.9	2846.5	449.3	2849.1						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
40	.04	112.4	.035	213	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112.4	213	272.1	272.1	272.1	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2839.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.035	
W.S. Elev (ft)	2838.52	Reach Len. (ft)	272.10	272.10	272.10
Crit W.S. (ft)		Flow Area (sq ft)		449.10	
E.G. Slope (ft/ft)	0.001971	Area (sq ft)		449.10	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	81.43	Top Width (ft)		81.43	
Vel Total (ft/s)	5.77	Avg. Vel. (ft/s)		5.77	
Max Chl Dpth (ft)	7.71	Hydr. Depth (ft)		5.52	
Conv. Total (cfs)	58332.0	Conv. (cfs)		58332.0	
Length Wtd. (ft)	272.10	Wetted Per. (ft)		83.93	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.66	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.68	Cum Volume (acre-ft)	0.54	62.69	0.38
C & E Loss (ft)	0.05	Cum SA (acres)	0.52	14.20	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2839.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.035	
W.S. Elev (ft)	2838.68	Reach Len. (ft)	272.10	272.10	272.10
Crit W.S. (ft)		Flow Area (sq ft)		462.79	
E.G. Slope (ft/ft)	0.001971	Area (sq ft)		462.79	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	82.43	Top Width (ft)		82.43	
Vel Total (ft/s)	5.83	Avg. Vel. (ft/s)		5.83	
Max Chl Dpth (ft)	7.88	Hydr. Depth (ft)		5.61	
Conv. Total (cfs)	60813.2	Conv. (cfs)		60813.2	
Length Wtd. (ft)	272.10	Wetted Per. (ft)		84.99	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.68	Cum Volume (acre-ft)	0.37	57.50	0.31
C & E Loss (ft)	0.05	Cum SA (acres)	0.39	13.94	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2837.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.035	
W.S. Elev (ft)	2836.67	Reach Len. (ft)	272.10	272.10	272.10
Crit W.S. (ft)		Flow Area (sq ft)		309.04	
E.G. Slope (ft/ft)	0.001881	Area (sq ft)		309.04	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	70.32	Top Width (ft)		70.32	
Vel Total (ft/s)	4.85	Avg. Vel. (ft/s)		4.85	
Max Chl Dpth (ft)	5.87	Hydr. Depth (ft)		4.39	
Conv. Total (cfs)	34582.6	Conv. (cfs)		34582.6	
Length Wtd. (ft)	272.10	Wetted Per. (ft)		72.22	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.63	Cum Volume (acre-ft)	0.15	37.88	0.15
C & E Loss (ft)	0.03	Cum SA (acres)	0.12	12.91	0.12

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2833.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.035	
W.S. Elev (ft)	2832.94	Reach Len. (ft)	272.10	272.10	272.10
Crit W.S. (ft)		Flow Area (sq ft)		88.75	
E.G. Slope (ft/ft)	0.001262	Area (sq ft)		88.75	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	47.89	Top Width (ft)		47.89	
Vel Total (ft/s)	2.25	Avg. Vel. (ft/s)		2.25	
Max Chl Dpth (ft)	2.14	Hydr. Depth (ft)		1.85	
Conv. Total (cfs)	5630.3	Conv. (cfs)		5630.3	
Length Wtd. (ft)	272.10	Wetted Per. (ft)		48.58	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	0.01	10.96	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	11.14	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2836.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.035	
W.S. Elev (ft)	2836.09	Reach Len. (ft)	272.10	272.10	272.10

Crit W.S. (ft)		Flow Area (sq ft)		269.41	
E.G. Slope (ft/ft)	0.001835	Area (sq ft)		269.41	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	66.84	Top Width (ft)		66.84	
Vel Total (ft/s)	4.53	Avg. Vel. (ft/s)		4.53	
Max Chl Dpth (ft)	5.29	Hydr. Depth (ft)		4.03	
Conv. Total (cfs)	28483.8	Conv. (cfs)		28483.8	
Length Wtd. (ft)	272.10	Wetted Per. (ft)		68.55	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)	0.15	36.39	0.15
C & E Loss (ft)	0.03	Cum SA (acres)	0.14	12.82	0.12

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2835.38	Element			
Vel Head (ft)	0.24	Wt. n-Val.		0.035	
W.S. Elev (ft)	2835.13	Reach Len. (ft)	272.10	272.10	272.10
Crit W.S. (ft)		Flow Area (sq ft)		208.21	
E.G. Slope (ft/ft)	0.001729	Area (sq ft)		208.21	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	61.08	Top Width (ft)		61.08	
Vel Total (ft/s)	3.94	Avg. Vel. (ft/s)		3.94	
Max Chl Dpth (ft)	4.33	Hydr. Depth (ft)		3.41	
Conv. Total (cfs)	19720.4	Conv. (cfs)		19720.4	
Length Wtd. (ft)	272.10	Wetted Per. (ft)		62.49	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)	0.09	27.77	0.09
C & E Loss (ft)	0.02	Cum SA (acres)	0.09	12.32	0.09

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2834.35	Element			
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2834.19	Reach Len. (ft)	272.10	272.10	272.10
Crit W.S. (ft)		Flow Area (sq ft)		152.94	
E.G. Slope (ft/ft)	0.001571	Area (sq ft)		152.94	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	55.37	Top Width (ft)		55.37	
Vel Total (ft/s)	3.27	Avg. Vel. (ft/s)		3.27	
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)		2.76	
Conv. Total (cfs)	12616.7	Conv. (cfs)		12616.7	
Length Wtd. (ft)	272.10	Wetted Per. (ft)		56.47	
Min Ch El (ft)	2830.80	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)	449.30	0.00	0.00
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	0.05	20.45	0.05
C & E Loss (ft)	0.01	Cum SA (acres)	0.07	11.84	0.07

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9863.9

INPUT
Description: Section 98+63.9
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2843	125	2830.7	160	2830.7	177	2839	180	2840.5
199.44	2840	251.36	2841	318.14	2842	395.97	2843		

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Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     100     .03     180    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           100     180            127.9   127.9   127.9             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2838.30    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.03    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2837.28    Reach Len. (ft)           127.90     127.90     127.90
  Crit W.S. (ft)           2835.68    Flow Area (sq ft)                    318.37
  E.G. Slope (ft/ft)      0.003235    Area (sq ft)                         318.37
  Q Total (cfs)            2590.00    Flow (cfs)                          2590.00
  Top Width (ft)             61.83    Top Width (ft)                        61.83
  Vel Total (ft/s)            8.14    Avg. Vel. (ft/s)                       8.14
  Max Chl Dpth (ft)           6.58    Hydr. Depth (ft)                       5.15
  Conv. Total (cfs)        45535.1    Conv. (cfs)                         45535.1
  Length Wtd. (ft)          127.90    Wetted Per. (ft)                      64.88
  Min Ch El (ft)           2830.70    Shear (lb/sq ft)                       0.99
  Alpha                       1.00    Stream Power (lb/ft s)    395.97       0.00       0.00
  Frctn Loss (ft)             0.63    Cum Volume (acre-ft)        0.54      60.29       0.38
  C & E Loss (ft)             0.10    Cum SA (acres)              0.52      13.75       0.20


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2838.48    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.05    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2837.43    Reach Len. (ft)           127.90     127.90     127.90
  Crit W.S. (ft)           2835.82    Flow Area (sq ft)                    327.81
  E.G. Slope (ft/ft)      0.003235    Area (sq ft)                         327.81
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             62.45    Top Width (ft)                        62.45
  Vel Total (ft/s)            8.24    Avg. Vel. (ft/s)                       8.24
  Max Chl Dpth (ft)           6.73    Hydr. Depth (ft)                       5.25
  Conv. Total (cfs)        47470.8    Conv. (cfs)                         47470.8
  Length Wtd. (ft)          127.90    Wetted Per. (ft)                      65.57
  Min Ch El (ft)           2830.70    Shear (lb/sq ft)                       1.01
  Alpha                       1.00    Stream Power (lb/ft s)    395.97       0.00       0.00
  Frctn Loss (ft)             0.64    Cum Volume (acre-ft)        0.37      55.03       0.31
  C & E Loss (ft)             0.10    Cum SA (acres)              0.39      13.49       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2836.37    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.69    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2835.68    Reach Len. (ft)           127.90     127.90     127.90
  Crit W.S. (ft)                      Flow Area (sq ft)                    224.66
  E.G. Slope (ft/ft)      0.002961    Area (sq ft)                         224.66
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
```

Top Width (ft)	55.30	Top Width (ft)		55.30	
Vel Total (ft/s)	6.68	Avg. Vel. (ft/s)		6.68	
Max Chl Dpth (ft)	4.98	Hydr. Depth (ft)		4.06	
Conv. Total (cfs)	27567.8	Conv. (cfs)		27567.8	
Length Wtd. (ft)	127.90	Wetted Per. (ft)		57.61	
Min Ch El (ft)	2830.70	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)	395.97	0.00	0.00
Frctn Loss (ft)	0.62	Cum Volume (acre-ft)	0.15	36.21	0.15
C & E Loss (ft)	0.08	Cum SA (acres)	0.12	12.51	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2832.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.030	
W.S. Elev (ft)	2832.46	Reach Len. (ft)	127.90	127.90	127.90
Crit W.S. (ft)		Flow Area (sq ft)		68.06	
E.G. Slope (ft/ft)	0.001909	Area (sq ft)		68.06	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	42.20	Top Width (ft)		42.20	
Vel Total (ft/s)	2.94	Avg. Vel. (ft/s)		2.94	
Max Chl Dpth (ft)	1.76	Hydr. Depth (ft)		1.61	
Conv. Total (cfs)	4578.0	Conv. (cfs)		4578.0	
Length Wtd. (ft)	127.90	Wetted Per. (ft)		43.01	
Min Ch El (ft)	2830.70	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	395.97	0.00	0.00
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	0.01	10.47	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	10.86	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2835.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.		0.030	
W.S. Elev (ft)	2835.17	Reach Len. (ft)	127.90	127.90	127.90
Crit W.S. (ft)		Flow Area (sq ft)		197.44	
E.G. Slope (ft/ft)	0.002854	Area (sq ft)		197.44	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	53.26	Top Width (ft)		53.26	
Vel Total (ft/s)	6.18	Avg. Vel. (ft/s)		6.18	
Max Chl Dpth (ft)	4.47	Hydr. Depth (ft)		3.71	
Conv. Total (cfs)	22835.1	Conv. (cfs)		22835.1	
Length Wtd. (ft)	127.90	Wetted Per. (ft)		55.33	
Min Ch El (ft)	2830.70	Shear (lb/sq ft)		0.64	
Alpha	1.00	Stream Power (lb/ft s)	395.97	0.00	0.00
Frctn Loss (ft)	0.61	Cum Volume (acre-ft)	0.15	34.93	0.15
C & E Loss (ft)	0.07	Cum SA (acres)	0.14	12.44	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2834.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.030	
W.S. Elev (ft)	2834.34	Reach Len. (ft)	127.90	127.90	127.90
Crit W.S. (ft)		Flow Area (sq ft)		154.49	
E.G. Slope (ft/ft)	0.002658	Area (sq ft)		154.49	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	49.86	Top Width (ft)		49.86	
Vel Total (ft/s)	5.31	Avg. Vel. (ft/s)		5.31	
Max Chl Dpth (ft)	3.64	Hydr. Depth (ft)		3.10	
Conv. Total (cfs)	15906.3	Conv. (cfs)		15906.3	
Length Wtd. (ft)	127.90	Wetted Per. (ft)		51.55	
Min Ch El (ft)	2830.70	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	395.97	0.00	0.00
Frctn Loss (ft)	0.60	Cum Volume (acre-ft)	0.09	26.63	0.09
C & E Loss (ft)	0.06	Cum SA (acres)	0.09	11.98	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2833.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.		0.030	
W.S. Elev (ft)	2833.52	Reach Len. (ft)	127.90	127.90	127.90
Crit W.S. (ft)		Flow Area (sq ft)		115.08	
E.G. Slope (ft/ft)	0.002387	Area (sq ft)		115.08	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	46.52	Top Width (ft)		46.52	
Vel Total (ft/s)	4.34	Avg. Vel. (ft/s)		4.34	
Max Chl Dpth (ft)	2.82	Hydr. Depth (ft)		2.47	
Conv. Total (cfs)	10234.1	Conv. (cfs)		10234.1	
Length Wtd. (ft)	127.90	Wetted Per. (ft)		47.83	
Min Ch El (ft)	2830.70	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)	395.97	0.00	0.00
Frctn Loss (ft)	0.57	Cum Volume (acre-ft)	0.05	19.62	0.05
C & E Loss (ft)	0.05	Cum SA (acres)	0.07	11.52	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9736

INPUT
Description: Section 97+36
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2841	122.95	2840	145.5	2839	180.5	2838	244	2837
258	2830.6	293	2830.6	307	2837	424.69	2838	460.03	2839

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val

```
     100    .035     244     .03     307    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           244     307                8       8       8             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     244    2839       T
     307  460.03    2839       T
Left Levee      Station=     244      Elevation=    2839
Right Levee     Station=     307      Elevation=    2839

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)          2837.57    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              1.98    Wt. n-Val.                            0.030
  W.S. Elev (ft)          2835.59    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)          2835.59    Flow Area (sq ft)                    229.22
  E.G. Slope (ft/ft)      0.008524   Area (sq ft)                         229.22
  Q Total (cfs)           2590.00    Flow (cfs)                          2590.00
  Top Width (ft)            56.84    Top Width (ft)                        56.84
  Vel Total (ft/s)          11.30    Avg. Vel. (ft/s)                      11.30
  Max Chl Dpth (ft)          4.99    Hydr. Depth (ft)                       4.03
  Conv. Total (cfs)        28053.4    Conv. (cfs)                         28053.4
  Length Wtd. (ft)           8.00    Wetted Per. (ft)                      59.01
  Min Ch El (ft)          2830.60    Shear (lb/sq ft)                       2.07
  Alpha                      1.00    Stream Power (lb/ft s)    460.03     244.00     307.00
  Frctn Loss (ft)            0.02    Cum Volume (acre-ft)        0.54      59.49       0.38
  C & E Loss (ft)            0.70    Cum SA (acres)              0.52      13.58       0.20


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)          2837.74    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              2.06    Wt. n-Val.                            0.030
  W.S. Elev (ft)          2835.69    Reach Len. (ft)             8.00       8.00       8.00
  Crit W.S. (ft)          2835.69    Flow Area (sq ft)                    234.54
  E.G. Slope (ft/ft)      0.008668   Area (sq ft)                         234.54
  Q Total (cfs)           2700.00    Flow (cfs)                          2700.00
  Top Width (ft)            57.25    Top Width (ft)                        57.25
  Vel Total (ft/s)          11.51    Avg. Vel. (ft/s)                      11.51
  Max Chl Dpth (ft)          5.08    Hydr. Depth (ft)                       4.10
  Conv. Total (cfs)        29000.2    Conv. (cfs)                         29000.2
  Length Wtd. (ft)           8.00    Wetted Per. (ft)                      59.46
  Min Ch El (ft)          2830.60    Shear (lb/sq ft)                       2.13
  Alpha                      1.00    Stream Power (lb/ft s)    460.03     244.00     307.00
  Frctn Loss (ft)            0.02    Cum Volume (acre-ft)        0.37      54.21       0.31
```

C & E Loss (ft)	0.73	Cum SA (acres)	0.39	13.31	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2835.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.50	Wt. n-Val.		0.030	
W.S. Elev (ft)	2834.17	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2834.17	Flow Area (sq ft)		152.62	
E.G. Slope (ft/ft)	0.009406	Area (sq ft)		152.62	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	50.60	Top Width (ft)		50.60	
Vel Total (ft/s)	9.83	Avg. Vel. (ft/s)		9.83	
Max Chl Dpth (ft)	3.57	Hydr. Depth (ft)		3.02	
Conv. Total (cfs)	15466.2	Conv. (cfs)		15466.2	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		52.15	
Min Ch El (ft)	2830.60	Shear (lb/sq ft)		1.72	
Alpha	1.00	Stream Power (lb/ft s)	460.03	244.00	307.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.15	35.66	0.15
C & E Loss (ft)	0.50	Cum SA (acres)	0.12	12.36	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2832.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.		0.030	
W.S. Elev (ft)	2831.59	Reach Len. (ft)	8.00	8.00	8.00

Crit W.S. (ft)	2831.59	Flow Area (sq ft)		36.78	
E.G. Slope (ft/ft)	0.013368	Area (sq ft)		36.78	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	39.33	Top Width (ft)		39.33	
Vel Total (ft/s)	5.44	Avg. Vel. (ft/s)		5.44	
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)		0.94	
Conv. Total (cfs)	1729.8	Conv. (cfs)		1729.8	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		39.76	
Min Ch El (ft)	2830.60	Shear (lb/sq ft)		0.77	
Alpha	1.00	Stream Power (lb/ft s)	460.03	244.00	307.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01	10.31	0.01
C & E Loss (ft)	0.14	Cum SA (acres)	0.03	10.74	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2835.08	Element			
Vel Head (ft)	1.34	Wt. n-Val.		0.030	
W.S. Elev (ft)	2833.74	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2833.74	Flow Area (sq ft)		131.25	
E.G. Slope (ft/ft)	0.009748	Area (sq ft)		131.25	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	48.72	Top Width (ft)		48.72	
Vel Total (ft/s)	9.30	Avg. Vel. (ft/s)		9.30	
Max Chl Dpth (ft)	3.14	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	12356.7	Conv. (cfs)		12356.7	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		50.08	
Min Ch El (ft)	2830.60	Shear (lb/sq ft)		1.59	
Alpha	1.00	Stream Power (lb/ft s)	460.03	244.00	307.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.15	34.45	0.15
C & E Loss (ft)	0.44	Cum SA (acres)	0.14	12.29	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program

defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2834.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.07	Wt. n-Val.		0.030	
W.S. Elev (ft)	2833.05	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2833.05	Flow Area (sq ft)		99.00	
E.G. Slope (ft/ft)	0.010297	Area (sq ft)		99.00	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	45.73	Top Width (ft)		45.73	
Vel Total (ft/s)	8.28	Avg. Vel. (ft/s)		8.28	
Max Chl Dpth (ft)	2.45	Hydr. Depth (ft)		2.16	
Conv. Total (cfs)	8080.8	Conv. (cfs)		8080.8	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		46.80	
Min Ch El (ft)	2830.60	Shear (lb/sq ft)		1.36	
Alpha	1.00	Stream Power (lb/ft s)	460.03	244.00	307.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.09	26.26	0.09
C & E Loss (ft)	0.33	Cum SA (acres)	0.09	11.84	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2833.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.81	Wt. n-Val.		0.030	
W.S. Elev (ft)	2832.38	Reach Len. (ft)	8.00	8.00	8.00
Crit W.S. (ft)	2832.38	Flow Area (sq ft)		69.35	
E.G. Slope (ft/ft)	0.011405	Area (sq ft)		69.35	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	42.80	Top Width (ft)		42.80	
Vel Total (ft/s)	7.21	Avg. Vel. (ft/s)		7.21	
Max Chl Dpth (ft)	1.78	Hydr. Depth (ft)		1.62	
Conv. Total (cfs)	4681.9	Conv. (cfs)		4681.9	
Length Wtd. (ft)	8.00	Wetted Per. (ft)		43.58	
Min Ch El (ft)	2830.60	Shear (lb/sq ft)		1.13	
Alpha	1.00	Stream Power (lb/ft s)	460.03	244.00	307.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.05	19.35	0.05
C & E Loss (ft)	0.25	Cum SA (acres)	0.07	11.39	0.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.

```
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 9728

INPUT
Description: Section 97+28
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2841  122.95    2840   145.5    2839   180.5    2838     244    2837
     258  2825.3     293  2825.3     307    2837  424.69    2838  460.03    2839

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     244     .03     307    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           244     307            191.1   191.1   191.1             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     244    2838       T
     307  460.03    2838       T
Left Levee      Station=     244      Elevation=    2838
Right Levee     Station=     307      Elevation=    2838

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2835.07    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.58    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2834.49    Reach Len. (ft)           191.10     191.10     191.10
  Crit W.S. (ft)           2830.53    Flow Area (sq ft)                    422.52
  E.G. Slope (ft/ft)      0.001228    Area (sq ft)                         422.52
  Q Total (cfs)            2590.00    Flow (cfs)                          2590.00
  Top Width (ft)             56.99    Top Width (ft)                        56.99
  Vel Total (ft/s)            6.13    Avg. Vel. (ft/s)                       6.13
  Max Chl Dpth (ft)           9.19    Hydr. Depth (ft)                       7.41
  Conv. Total (cfs)        73918.3    Conv. (cfs)                         73918.3
  Length Wtd. (ft)          191.10    Wetted Per. (ft)                      63.65
  Min Ch El (ft)           2825.30    Shear (lb/sq ft)                       0.51
  Alpha                       1.00    Stream Power (lb/ft s)    460.03     244.00     307.00
  Frctn Loss (ft)             0.06    Cum Volume (acre-ft)        0.54      59.43       0.38
  C & E Loss (ft)             0.09    Cum SA (acres)              0.52      13.56       0.20


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.
```

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2835.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.		0.030	
W.S. Elev (ft)	2834.77	Reach Len. (ft)	191.10	191.10	191.10
Crit W.S. (ft)	2830.66	Flow Area (sq ft)		438.49	
E.G. Slope (ft/ft)	0.001201	Area (sq ft)		438.49	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	57.65	Top Width (ft)		57.65	
Vel Total (ft/s)	6.16	Avg. Vel. (ft/s)		6.16	
Max Chl Dpth (ft)	9.47	Hydr. Depth (ft)		7.61	
Conv. Total (cfs)	77924.7	Conv. (cfs)		77924.7	
Length Wtd. (ft)	191.10	Wetted Per. (ft)		64.52	
Min Ch El (ft)	2825.30	Shear (lb/sq ft)		0.51	
Alpha	1.00	Stream Power (lb/ft s)	460.03	244.00	307.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.37	54.15	0.31
C & E Loss (ft)	0.10	Cum SA (acres)	0.39	13.30	0.17

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2832.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.030	
W.S. Elev (ft)	2831.54	Reach Len. (ft)	191.10	191.10	191.10
Crit W.S. (ft)	2828.99	Flow Area (sq ft)		264.74	
E.G. Slope (ft/ft)	0.001589	Area (sq ft)		264.74	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	49.92	Top Width (ft)		49.92	
Vel Total (ft/s)	5.67	Avg. Vel. (ft/s)		5.67	
Max Chl Dpth (ft)	6.23	Hydr. Depth (ft)		5.30	
Conv. Total (cfs)	37634.5	Conv. (cfs)		37634.5	
Length Wtd. (ft)	191.10	Wetted Per. (ft)		54.45	
Min Ch El (ft)	2825.30	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)	460.03	244.00	307.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.15	35.62	0.15
C & E Loss (ft)	0.07	Cum SA (acres)	0.12	12.35	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2830.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.80	Wt. n-Val.		0.030	
W.S. Elev (ft)	2825.62	Reach Len. (ft)	191.10	191.10	191.10
Crit W.S. (ft)	2826.28	Flow Area (sq ft)		11.38	
E.G. Slope (ft/ft)	0.585178	Area (sq ft)		11.38	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	35.77	Top Width (ft)		35.77	
Vel Total (ft/s)	17.58	Avg. Vel. (ft/s)		17.58	
Max Chl Dpth (ft)	0.32	Hydr. Depth (ft)		0.32	
Conv. Total (cfs)	261.4	Conv. (cfs)		261.4	

Length Wtd. (ft)	191.10	Wetted Per. (ft)		36.00	
Min Ch El (ft)	2825.30	Shear (lb/sq ft)		11.54	
Alpha	1.00	Stream Power (lb/ft s)	460.03	244.00	307.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.01	10.31	0.01
C & E Loss (ft)	1.30	Cum SA (acres)	0.03	10.73	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2833.37	Element			
Vel Head (ft)	6.45	Wt. n-Val.		0.030	
W.S. Elev (ft)	2826.92	Reach Len. (ft)	191.10	191.10	191.10
Crit W.S. (ft)	2828.54	Flow Area (sq ft)		59.88	
E.G. Slope (ft/ft)	0.098974	Area (sq ft)		59.88	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	38.88	Top Width (ft)		38.88	
Vel Total (ft/s)	20.37	Avg. Vel. (ft/s)		20.37	
Max Chl Dpth (ft)	1.62	Hydr. Depth (ft)		1.54	
Conv. Total (cfs)	3877.9	Conv. (cfs)		3877.9	
Length Wtd. (ft)	191.10	Wetted Per. (ft)		40.06	
Min Ch El (ft)	2825.30	Shear (lb/sq ft)		9.24	
Alpha	1.00	Stream Power (lb/ft s)	460.03	244.00	307.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.15	34.43	0.15
C & E Loss (ft)	1.53	Cum SA (acres)	0.14	12.29	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2832.44	Element			
Vel Head (ft)	5.99	Wt. n-Val.		0.030	
W.S. Elev (ft)	2826.45	Reach Len. (ft)	191.10	191.10	191.10
Crit W.S. (ft)	2827.81	Flow Area (sq ft)		41.74	
E.G. Slope (ft/ft)	0.141673	Area (sq ft)		41.74	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	37.75	Top Width (ft)		37.75	
Vel Total (ft/s)	19.65	Avg. Vel. (ft/s)		19.65	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)		1.11	
Conv. Total (cfs)	2178.6	Conv. (cfs)		2178.6	
Length Wtd. (ft)	191.10	Wetted Per. (ft)		38.58	
Min Ch El (ft)	2825.30	Shear (lb/sq ft)		9.57	
Alpha	1.00	Stream Power (lb/ft s)	460.03	244.00	307.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)	0.09	26.25	0.09
C & E Loss (ft)	1.48	Cum SA (acres)	0.09	11.83	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2831.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.50	Wt. n-Val.		0.030	
W.S. Elev (ft)	2826.04	Reach Len. (ft)	191.10	191.10	191.10
Crit W.S. (ft)	2827.11	Flow Area (sq ft)		26.57	
E.G. Slope (ft/ft)	0.226894	Area (sq ft)		26.57	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	36.77	Top Width (ft)		36.77	
Vel Total (ft/s)	18.82	Avg. Vel. (ft/s)		18.82	
Max Chl Dpth (ft)	0.74	Hydr. Depth (ft)		0.72	
Conv. Total (cfs)	1049.7	Conv. (cfs)		1049.7	
Length Wtd. (ft)	191.10	Wetted Per. (ft)		37.31	
Min Ch El (ft)	2825.30	Shear (lb/sq ft)		10.09	
Alpha	1.00	Stream Power (lb/ft s)	460.03	244.00	307.00
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.05	19.34	0.05
C & E Loss (ft)	1.41	Cum SA (acres)	0.07	11.38	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9536.1

INPUT
Description: Section 95+36.1 (u/s face of Pohez Rd.)
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2841	122.95	2840	145.5	2839	180.5	2838	234	2837
258	2825	293	2825	317	2837	424.69	2838	460.03	2839

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	234	.013	317	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
234	317	20.9	20.9	20.9	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	234	2838	T

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     317  460.03    2838       T
Left Levee      Station=     234      Elevation=    2838
Right Levee     Station=     317      Elevation=    2838
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CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2834.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.013	
W.S. Elev (ft)	2834.52	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2830.03	Flow Area (sq ft)		514.23	
E.G. Slope (ft/ft)	0.000156	Area (sq ft)		514.23	
Q Total (cfs)	2590.00	Flow (cfs)		2590.00	
Top Width (ft)	73.07	Top Width (ft)		73.07	
Vel Total (ft/s)	5.04	Avg. Vel. (ft/s)		5.04	
Max Chl Dpth (ft)	9.52	Hydr. Depth (ft)		7.04	
Conv. Total (cfs)	207437.4	Conv. (cfs)		207437.4	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		77.56	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	460.03	234.00	317.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.54	57.37	0.38
C & E Loss (ft)		Cum SA (acres)	0.52	13.28	0.20

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2835.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2834.80	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2830.15	Flow Area (sq ft)		534.99	
E.G. Slope (ft/ft)	0.000152	Area (sq ft)		534.99	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	74.20	Top Width (ft)		74.20	
Vel Total (ft/s)	5.05	Avg. Vel. (ft/s)		5.05	
Max Chl Dpth (ft)	9.80	Hydr. Depth (ft)		7.21	
Conv. Total (cfs)	219214.0	Conv. (cfs)		219214.0	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		78.82	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	460.03	234.00	317.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.37	52.01	0.31
C & E Loss (ft)		Cum SA (acres)	0.39	13.01	0.17

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2831.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.013	
W.S. Elev (ft)	2831.52	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2828.60	Flow Area (sq ft)		313.16	
E.G. Slope (ft/ft)	0.000212	Area (sq ft)		313.16	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	61.08	Top Width (ft)		61.08	
Vel Total (ft/s)	4.79	Avg. Vel. (ft/s)		4.79	
Max Chl Dpth (ft)	6.52	Hydr. Depth (ft)		5.13	
Conv. Total (cfs)	103003.4	Conv. (cfs)		103003.4	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		64.15	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	460.03	234.00	317.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	34.35	0.15
C & E Loss (ft)		Cum SA (acres)	0.12	12.10	0.12

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2826.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2826.74	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2825.98	Flow Area (sq ft)		66.95	
E.G. Slope (ft/ft)	0.000376	Area (sq ft)		66.95	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	41.96	Top Width (ft)		41.96	
Vel Total (ft/s)	2.99	Avg. Vel. (ft/s)		2.99	
Max Chl Dpth (ft)	1.74	Hydr. Depth (ft)		1.60	
Conv. Total (cfs)	10316.1	Conv. (cfs)		10316.1	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		42.78	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	460.03	234.00	317.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	10.14	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	10.56	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2830.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.013	
W.S. Elev (ft)	2830.65	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2828.16	Flow Area (sq ft)		261.73	
E.G. Slope (ft/ft)	0.000235	Area (sq ft)		261.73	
Q Total (cfs)	1220.00	Flow (cfs)		1220.00	
Top Width (ft)	57.61	Top Width (ft)		57.61	
Vel Total (ft/s)	4.66	Avg. Vel. (ft/s)		4.66	
Max Chl Dpth (ft)	5.65	Hydr. Depth (ft)		4.54	
Conv. Total (cfs)	79622.3	Conv. (cfs)		79622.3	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		60.28	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	460.03	234.00	317.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	33.73	0.15
C & E Loss (ft)		Cum SA (acres)	0.14	12.07	0.12

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2829.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.31	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2827.47	Flow Area (sq ft)		187.87	
E.G. Slope (ft/ft)	0.000278	Area (sq ft)		187.87	
Q Total (cfs)	820.00	Flow (cfs)		820.00	
Top Width (ft)	52.23	Top Width (ft)		52.23	
Vel Total (ft/s)	4.36	Avg. Vel. (ft/s)		4.36	
Max Chl Dpth (ft)	4.31	Hydr. Depth (ft)		3.60	
Conv. Total (cfs)	49142.6	Conv. (cfs)		49142.6	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		54.26	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.06	

Alpha	1.00	Stream Power (lb/ft s)	460.03	234.00	317.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.09	25.74	0.09
C & E Loss (ft)		Cum SA (acres)	0.09	11.63	0.09

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2828.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.013	
W.S. Elev (ft)	2828.11	Reach Len. (ft)	20.90	20.90	20.90
Crit W.S. (ft)	2826.78	Flow Area (sq ft)		128.00	
E.G. Slope (ft/ft)	0.000324	Area (sq ft)		128.00	
Q Total (cfs)	500.00	Flow (cfs)		500.00	
Top Width (ft)	47.42	Top Width (ft)		47.42	
Vel Total (ft/s)	3.91	Avg. Vel. (ft/s)		3.91	
Max Chl Dpth (ft)	3.11	Hydr. Depth (ft)		2.70	
Conv. Total (cfs)	27792.9	Conv. (cfs)		27792.9	
Length Wtd. (ft)	20.90	Wetted Per. (ft)		48.89	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	460.03	234.00	317.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.05	19.00	0.05
C & E Loss (ft)		Cum SA (acres)	0.07	11.20	0.07

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 9525.6

INPUT
Description: Pohez Road
Distance from Upstream XS = .3
Deck/Roadway Width = 20.5
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
125	2838		240	2838		310	2838	
405	2838		530	2838				

Upstream Bridge Cross Section Data
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2841	122.95	2840	145.5	2839	180.5	2838	234	2837
258	2825	293	2825	317	2837	424.69	2838	460.03	2839

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	234	.013	317	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
234	317	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	234	2838	T
317	460.03	2838	T

```
Left Levee      Station=     234      Elevation=    2838
Right Levee     Station=     317      Elevation=    2838

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     125    2838             240    2838             310    2838
   460.5    2838             530    2838

Downstream Bridge Cross Section Data
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2841  122.95    2840   145.5    2839   180.5    2838     234    2837
     258    2825     293    2825     317    2837  424.69    2838  460.03    2839

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     234    .013     317    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           234     317             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       9      11
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .9      20     .013     .013        0                   .5                1
Number of Barrels =  3
Upstream   Elevation =  2825
Centerline Stations
    Sta.    Sta.    Sta.
     264   275.5     287
Downstream Elevation =  2825
Centerline Stations
    Sta.    Sta.    Sta.
     264   275.5     287

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2590.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         12.40
  Q Barrel (cfs)            863.33    Culv Vel DS (ft/s)         13.07
  E.G. US. (ft)            2834.91    Culv Inv El Up (ft)      2825.00
  W.S. US. (ft)            2834.52    Culv Inv El Dn (ft)      2825.00
  E.G. DS (ft)             2832.34    Culv Frctn Ls (ft)          0.06
  W.S. DS (ft)             2831.00    Culv Exit Loss (ft)         1.32
  Delta EG (ft)               2.57    Culv Entr Loss (ft)         1.19
  Delta WS (ft)               3.51    Q Weir (cfs)
  E.G. IC (ft)             2834.32    Weir Sta Lft (ft)
  E.G. OC (ft)             2834.91    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2831.33    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2831.00    Weir Avg Depth (ft)
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  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.76     Min El Weir Flow (ft)    2838.01


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2700.00     Culv Full Len (ft)
  # Barrels                      3     Culv Vel US (ft/s)         12.64
  Q Barrel (cfs)            900.00     Culv Vel DS (ft/s)         13.44
  E.G. US. (ft)            2835.19     Culv Inv El Up (ft)      2825.00
  W.S. US. (ft)            2834.80     Culv Inv El Dn (ft)      2825.00
  E.G. DS (ft)             2832.46     Culv Frctn Ls (ft)          0.06
  W.S. DS (ft)             2831.09     Culv Exit Loss (ft)         1.43
  Delta EG (ft)               2.73     Culv Entr Loss (ft)         1.24
  Delta WS (ft)               3.71     Q Weir (cfs)
  E.G. IC (ft)             2834.60     Weir Sta Lft (ft)
  E.G. OC (ft)             2835.19     Weir Sta Rgt (ft)
  Culvert Control           Outlet     Weir Submerg
  Culv WS Inlet (ft)       2831.47     Weir Max Depth (ft)
  Culv WS Outlet (ft)      2831.09     Weir Avg Depth (ft)
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.92     Min El Weir Flow (ft)    2838.01


CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1500.00     Culv Full Len (ft)
  # Barrels                      3     Culv Vel US (ft/s)         10.05
  Q Barrel (cfs)            500.00     Culv Vel DS (ft/s)         10.48
  E.G. US. (ft)            2831.88     Culv Inv El Up (ft)      2825.00
  W.S. US. (ft)            2831.52     Culv Inv El Dn (ft)      2825.00
  E.G. DS (ft)             2830.31     Culv Frctn Ls (ft)          0.05
  W.S. DS (ft)             2829.34     Culv Exit Loss (ft)         0.73
  Delta EG (ft)               1.56     Culv Entr Loss (ft)         0.78
  Delta WS (ft)               2.18     Q Weir (cfs)
  E.G. IC (ft)             2831.40     Weir Sta Lft (ft)
  E.G. OC (ft)             2831.88     Weir Sta Rgt (ft)
  Culvert Control           Outlet     Weir Submerg
  Culv WS Inlet (ft)       2829.52     Weir Max Depth (ft)
  Culv WS Outlet (ft)      2829.34     Weir Avg Depth (ft)
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         4.00     Min El Weir Flow (ft)    2838.01


CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)        200.00     Culv Full Len (ft)
  # Barrels                      3     Culv Vel US (ft/s)          4.01
  Q Barrel (cfs)             66.67     Culv Vel DS (ft/s)          4.09
  E.G. US. (ft)            2826.89     Culv Inv El Up (ft)      2825.00
  W.S. US. (ft)            2826.74     Culv Inv El Dn (ft)      2825.00
  E.G. DS (ft)             2826.68     Culv Frctn Ls (ft)          0.02
  W.S. DS (ft)             2826.48     Culv Exit Loss (ft)         0.06
  Delta EG (ft)               0.21     Culv Entr Loss (ft)         0.12
  Delta WS (ft)               0.26     Q Weir (cfs)
  E.G. IC (ft)             2826.62     Weir Sta Lft (ft)
  E.G. OC (ft)             2826.89     Weir Sta Rgt (ft)
  Culvert Control           Outlet     Weir Submerg
  Culv WS Inlet (ft)       2826.51     Weir Max Depth (ft)
  Culv WS Outlet (ft)      2826.48     Weir Avg Depth (ft)
  Culv Nml Depth (ft)                  Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.04     Min El Weir Flow (ft)    2838.01


CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1
```

Q Culv Group (cfs)	1220.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	9.24
Q Barrel (cfs)	406.67	Culv Vel DS (ft/s)	9.60
E.G. US. (ft)	2830.99	Culv Inv El Up (ft)	2825.00
W.S. US. (ft)	2830.65	Culv Inv El Dn (ft)	2825.00
E.G. DS (ft)	2829.72	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2828.85	Culv Exit Loss (ft)	0.56
Delta EG (ft)	1.27	Culv Entr Loss (ft)	0.66
Delta WS (ft)	1.80	Q Weir (cfs)	
E.G. IC (ft)	2830.55	Weir Sta Lft (ft)	
E.G. OC (ft)	2830.99	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2829.00	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2828.85	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.49	Min El Weir Flow (ft)	2838.01

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	820.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	7.79
Q Barrel (cfs)	273.33	Culv Vel DS (ft/s)	8.04
E.G. US. (ft)	2829.60	Culv Inv El Up (ft)	2825.00
W.S. US. (ft)	2829.31	Culv Inv El Dn (ft)	2825.00
E.G. DS (ft)	2828.75	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2828.09	Culv Exit Loss (ft)	0.34
Delta EG (ft)	0.85	Culv Entr Loss (ft)	0.47
Delta WS (ft)	1.22	Q Weir (cfs)	
E.G. IC (ft)	2829.23	Weir Sta Lft (ft)	
E.G. OC (ft)	2829.60	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2828.19	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2828.09	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.68	Min El Weir Flow (ft)	2838.01

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	500.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	6.16
Q Barrel (cfs)	166.67	Culv Vel DS (ft/s)	6.32
E.G. US. (ft)	2828.34	Culv Inv El Up (ft)	2825.00
W.S. US. (ft)	2828.11	Culv Inv El Dn (ft)	2825.00
E.G. DS (ft)	2827.84	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	2827.40	Culv Exit Loss (ft)	0.18
Delta EG (ft)	0.50	Culv Entr Loss (ft)	0.29
Delta WS (ft)	0.71	Q Weir (cfs)	
E.G. IC (ft)	2828.02	Weir Sta Lft (ft)	
E.G. OC (ft)	2828.34	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2827.46	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2827.40	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.92	Min El Weir Flow (ft)	2838.01

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9515.2

```
INPUT
Description: Section 95+15.2 (d/s face of Pohez Rd.)
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2841  122.95    2840   145.5    2839   180.5    2838     234    2837
     258    2825     293    2825     317    2837  424.69    2838  460.03    2839

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     234    .013     317    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           234     317            201.3   201.3   201.3             .3       .5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2832.34    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.34    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2831.00    Reach Len. (ft)           201.30     201.30     201.30
  Crit W.S. (ft)                      Flow Area (sq ft)                    282.19
  E.G. Slope (ft/ft)      0.000872    Area (sq ft)                         282.19
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             59.01    Top Width (ft)                        59.01
  Vel Total (ft/s)            9.28    Avg. Vel. (ft/s)                       9.28
  Max Chl Dpth (ft)           6.00    Hydr. Depth (ft)                       4.78
  Conv. Total (cfs)        88729.6    Conv. (cfs)                         88729.6
  Length Wtd. (ft)          201.30    Wetted Per. (ft)                      61.85
  Min Ch El (ft)           2825.00    Shear (lb/sq ft)                       0.25
  Alpha                       1.00    Stream Power (lb/ft s)    460.03       0.00       0.00
  Frctn Loss (ft)             0.41    Cum Volume (acre-ft)        0.54      57.33       0.38
  C & E Loss (ft)             0.21    Cum SA (acres)              0.52      13.25       0.20


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2832.46    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.37    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2831.09    Reach Len. (ft)           201.30     201.30     201.30
  Crit W.S. (ft)                      Flow Area (sq ft)                    287.19
  E.G. Slope (ft/ft)      0.000880    Area (sq ft)                         287.19
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             59.35    Top Width (ft)                        59.35
  Vel Total (ft/s)            9.40    Avg. Vel. (ft/s)                       9.40
  Max Chl Dpth (ft)           6.09    Hydr. Depth (ft)                       4.84
  Conv. Total (cfs)        90994.7    Conv. (cfs)                         90994.7
  Length Wtd. (ft)          201.30    Wetted Per. (ft)                      62.22
  Min Ch El (ft)           2825.00    Shear (lb/sq ft)                       0.25
  Alpha                       1.00    Stream Power (lb/ft s)    460.03       0.00       0.00
  Frctn Loss (ft)             0.41    Cum Volume (acre-ft)        0.37      51.97       0.31
  C & E Loss (ft)             0.20    Cum SA (acres)              0.39      12.98       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr FIS
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E.G. Elev (ft)	2830.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.97	Wt. n-Val.		0.013	
W.S. Elev (ft)	2829.34	Reach Len. (ft)	201.30	201.30	201.30
Crit W.S. (ft)		Flow Area (sq ft)		189.45	
E.G. Slope (ft/ft)	0.000909	Area (sq ft)		189.45	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	52.35	Top Width (ft)		52.35	
Vel Total (ft/s)	7.92	Avg. Vel. (ft/s)		7.92	
Max Chl Dpth (ft)	4.34	Hydr. Depth (ft)		3.62	
Conv. Total (cfs)	49752.0	Conv. (cfs)		49752.0	
Length Wtd. (ft)	201.30	Wetted Per. (ft)		54.40	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	460.03	0.00	0.00
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	0.15	34.32	0.15
C & E Loss (ft)	0.12	Cum SA (acres)	0.12	12.08	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2826.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.013	
W.S. Elev (ft)	2826.48	Reach Len. (ft)	201.30	201.30	201.30
Crit W.S. (ft)		Flow Area (sq ft)		56.28	
E.G. Slope (ft/ft)	0.000647	Area (sq ft)		56.28	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	40.93	Top Width (ft)		40.93	
Vel Total (ft/s)	3.55	Avg. Vel. (ft/s)		3.55	
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)		1.38	
Conv. Total (cfs)	7865.1	Conv. (cfs)		7865.1	
Length Wtd. (ft)	201.30	Wetted Per. (ft)		41.63	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	460.03	0.00	0.00
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.01	10.13	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	10.54	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2829.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.		0.013	
W.S. Elev (ft)	2828.85	Reach Len. (ft)	201.30	201.30	201.30
Crit W.S. (ft)		Flow Area (sq ft)		164.39	
E.G. Slope (ft/ft)	0.000929	Area (sq ft)		164.39	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	50.40	Top Width (ft)		50.40	
Vel Total (ft/s)	7.48	Avg. Vel. (ft/s)		7.48	
Max Chl Dpth (ft)	3.85	Hydr. Depth (ft)		3.26	
Conv. Total (cfs)	40360.7	Conv. (cfs)		40360.7	
Length Wtd. (ft)	201.30	Wetted Per. (ft)		52.22	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	460.03	0.00	0.00
Frctn Loss (ft)	0.41	Cum Volume (acre-ft)	0.15	33.70	0.15
C & E Loss (ft)	0.07	Cum SA (acres)	0.14	12.05	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2828.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.013	
W.S. Elev (ft)	2828.09	Reach Len. (ft)	201.30	201.30	201.30
Crit W.S. (ft)		Flow Area (sq ft)		127.29	
E.G. Slope (ft/ft)	0.000907	Area (sq ft)		127.29	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	47.36	Top Width (ft)		47.36	
Vel Total (ft/s)	6.52	Avg. Vel. (ft/s)		6.52	
Max Chl Dpth (ft)	3.09	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	27559.2	Conv. (cfs)		27559.2	
Length Wtd. (ft)	201.30	Wetted Per. (ft)		48.82	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	460.03	0.00	0.00
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.09	25.72	0.09
C & E Loss (ft)	0.03	Cum SA (acres)	0.09	11.61	0.09

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2827.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.013	
W.S. Elev (ft)	2827.40	Reach Len. (ft)	201.30	201.30	201.30
Crit W.S. (ft)		Flow Area (sq ft)		95.47	
E.G. Slope (ft/ft)	0.000819	Area (sq ft)		95.47	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	44.60	Top Width (ft)		44.60	
Vel Total (ft/s)	5.34	Avg. Vel. (ft/s)		5.34	
Max Chl Dpth (ft)	2.40	Hydr. Depth (ft)		2.14	
Conv. Total (cfs)	17826.1	Conv. (cfs)		17826.1	
Length Wtd. (ft)	201.30	Wetted Per. (ft)		45.73	
Min Ch El (ft)	2825.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	460.03	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.05	18.98	0.05
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	11.17	0.07

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 9313.9

INPUT
Description: Section 93+13.9
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2840	105.32	2839	107.64	2838	110.04	2837	113.64	2836
128.23	2835	147.54	2834	200	2833	218	2824.7	253	2824.7
271	2833	292	2835	344.15	2836	406.31	2837		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	200	.03	271	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
200	271	188.9	188.9	188.9	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2831.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2829.69	Reach Len. (ft)	188.90	188.90	188.90
Crit W.S. (ft)	2829.69	Flow Area (sq ft)		228.75	
E.G. Slope (ft/ft)	0.008748	Area (sq ft)		228.75	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	56.65	Top Width (ft)		56.65	
Vel Total (ft/s)	11.45	Avg. Vel. (ft/s)		11.45	
Max Chl Dpth (ft)	4.99	Hydr. Depth (ft)		4.04	
Conv. Total (cfs)	28011.8	Conv. (cfs)		28011.8	
Length Wtd. (ft)	188.90	Wetted Per. (ft)		58.84	
Min Ch El (ft)	2824.70	Shear (lb/sq ft)		2.12	
Alpha	1.00	Stream Power (lb/ft s)	406.31	0.00	0.00
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)	0.54	56.15	0.38
C & E Loss (ft)	0.38	Cum SA (acres)	0.52	12.98	0.20

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2831.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.05	Wt. n-Val.		0.030	
W.S. Elev (ft)	2829.80	Reach Len. (ft)	188.90	188.90	188.90
Crit W.S. (ft)	2829.80	Flow Area (sq ft)		234.70	
E.G. Slope (ft/ft)	0.008624	Area (sq ft)		234.70	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	57.10	Top Width (ft)		57.10	
Vel Total (ft/s)	11.50	Avg. Vel. (ft/s)		11.50	
Max Chl Dpth (ft)	5.10	Hydr. Depth (ft)		4.11	
Conv. Total (cfs)	29073.6	Conv. (cfs)		29073.6	
Length Wtd. (ft)	188.90	Wetted Per. (ft)		59.34	
Min Ch El (ft)	2824.70	Shear (lb/sq ft)		2.13	
Alpha	1.00	Stream Power (lb/ft s)	406.31	0.00	0.00
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)	0.37	50.76	0.31
C & E Loss (ft)	0.39	Cum SA (acres)	0.39	12.71	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2829.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.36	Wt. n-Val.		0.030	
W.S. Elev (ft)	2828.42	Reach Len. (ft)	188.90	188.90	188.90
Crit W.S. (ft)	2828.25	Flow Area (sq ft)		160.08	
E.G. Slope (ft/ft)	0.008146	Area (sq ft)		160.08	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	51.12	Top Width (ft)		51.12	
Vel Total (ft/s)	9.37	Avg. Vel. (ft/s)		9.37	
Max Chl Dpth (ft)	3.72	Hydr. Depth (ft)		3.13	
Conv. Total (cfs)	16619.2	Conv. (cfs)		16619.2	
Length Wtd. (ft)	188.90	Wetted Per. (ft)		52.76	
Min Ch El (ft)	2824.70	Shear (lb/sq ft)		1.54	
Alpha	1.00	Stream Power (lb/ft s)	406.31	0.00	0.00
Frctn Loss (ft)	1.76	Cum Volume (acre-ft)	0.15	33.51	0.15
C & E Loss (ft)	0.05	Cum SA (acres)	0.12	11.84	0.12

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2826.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.030	
W.S. Elev (ft)	2826.25	Reach Len. (ft)	188.90	188.90	188.90
Crit W.S. (ft)	2825.68	Flow Area (sq ft)		59.62	
E.G. Slope (ft/ft)	0.002915	Area (sq ft)		59.62	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	41.74	Top Width (ft)		41.74	
Vel Total (ft/s)	3.35	Avg. Vel. (ft/s)		3.35	
Max Chl Dpth (ft)	1.55	Hydr. Depth (ft)		1.43	
Conv. Total (cfs)	3704.7	Conv. (cfs)		3704.7	
Length Wtd. (ft)	188.90	Wetted Per. (ft)		42.42	
Min Ch El (ft)	2824.70	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)	406.31	0.00	0.00
Frctn Loss (ft)	1.08	Cum Volume (acre-ft)	0.01	9.86	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	10.35	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2829.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.11	Wt. n-Val.		0.030	
W.S. Elev (ft)	2828.13	Reach Len. (ft)	188.90	188.90	188.90
Crit W.S. (ft)	2827.84	Flow Area (sq ft)		145.44	
E.G. Slope (ft/ft)	0.007279	Area (sq ft)		145.44	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	49.87	Top Width (ft)		49.87	
Vel Total (ft/s)	8.46	Avg. Vel. (ft/s)		8.46	
Max Chl Dpth (ft)	3.43	Hydr. Depth (ft)		2.92	
Conv. Total (cfs)	14416.7	Conv. (cfs)		14416.7	
Length Wtd. (ft)	188.90	Wetted Per. (ft)		51.37	
Min Ch El (ft)	2824.70	Shear (lb/sq ft)		1.29	
Alpha	1.00	Stream Power (lb/ft s)	406.31	0.00	0.00
Frctn Loss (ft)	1.69	Cum Volume (acre-ft)	0.15	32.98	0.15
C & E Loss (ft)	0.02	Cum SA (acres)	0.14	11.82	0.12

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2828.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.		0.030	
W.S. Elev (ft)	2827.60	Reach Len. (ft)	188.90	188.90	188.90
Crit W.S. (ft)	2827.16	Flow Area (sq ft)		119.64	
E.G. Slope (ft/ft)	0.005941	Area (sq ft)		119.64	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	47.57	Top Width (ft)		47.57	
Vel Total (ft/s)	6.94	Avg. Vel. (ft/s)		6.94	
Max Chl Dpth (ft)	2.90	Hydr. Depth (ft)		2.52	
Conv. Total (cfs)	10768.3	Conv. (cfs)		10768.3	
Length Wtd. (ft)	188.90	Wetted Per. (ft)		48.84	
Min Ch El (ft)	2824.70	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)	406.31	0.00	0.00
Frctn Loss (ft)	1.53	Cum Volume (acre-ft)	0.09	25.15	0.09
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	11.39	0.09

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2827.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.030	
W.S. Elev (ft)	2827.07	Reach Len. (ft)	188.90	188.90	188.90
Crit W.S. (ft)	2826.50	Flow Area (sq ft)		95.20	
E.G. Slope (ft/ft)	0.004477	Area (sq ft)		95.20	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	45.29	Top Width (ft)		45.29	
Vel Total (ft/s)	5.36	Avg. Vel. (ft/s)		5.36	
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)		2.10	
Conv. Total (cfs)	7621.9	Conv. (cfs)		7621.9	
Length Wtd. (ft)	188.90	Wetted Per. (ft)		46.33	
Min Ch El (ft)	2824.70	Shear (lb/sq ft)		0.57	
Alpha	1.00	Stream Power (lb/ft s)	406.31	0.00	0.00
Frctn Loss (ft)	1.36	Cum Volume (acre-ft)	0.05	18.54	0.05
C & E Loss (ft)	0.01	Cum SA (acres)	0.07	10.97	0.07

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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 9125

INPUT
Description: Section 91+25
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2835   123.1    2834  152.88    2833     219    2832     219  2824.4
     291  2824.4     291    2832   315.1    2832  417.14  2831.2  480.21    2833
  513.02    2834  528.24    2835

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     219     .03     291    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           219     291                9       9       9             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     219    2833       T
     291  528.24    2833       T
Left Levee      Station=     219      Elevation=    2833
Right Levee     Station=     291      Elevation=    2833

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2830.35    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.76    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2829.59    Reach Len. (ft)             9.00       9.00       9.00
  Crit W.S. (ft)           2827.87    Flow Area (sq ft)                    373.62
  E.G. Slope (ft/ft)      0.002670    Area (sq ft)                         373.62
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             72.00    Top Width (ft)                        72.00
  Vel Total (ft/s)            7.01    Avg. Vel. (ft/s)                       7.01
  Max Chl Dpth (ft)           5.19    Hydr. Depth (ft)                       5.19
  Conv. Total (cfs)        50705.4    Conv. (cfs)                         50705.4
  Length Wtd. (ft)            9.00    Wetted Per. (ft)                      82.38
  Min Ch El (ft)           2824.40    Shear (lb/sq ft)                       0.76
  Alpha                       1.00    Stream Power (lb/ft s)    528.24     219.00     291.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.54      54.84       0.38
  C & E Loss (ft)             0.27    Cum SA (acres)              0.52      12.70       0.20


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS
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E.G. Elev (ft)	2830.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.75	Wt. n-Val.		0.030	
W.S. Elev (ft)	2829.80	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	2827.94	Flow Area (sq ft)		388.65	
E.G. Slope (ft/ft)	0.002503	Area (sq ft)		388.65	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	72.00	Top Width (ft)		72.00	
Vel Total (ft/s)	6.95	Avg. Vel. (ft/s)		6.95	
Max Chl Dpth (ft)	5.40	Hydr. Depth (ft)		5.40	
Conv. Total (cfs)	53968.1	Conv. (cfs)		53968.1	
Length Wtd. (ft)	9.00	Wetted Per. (ft)		82.80	
Min Ch El (ft)	2824.40	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)	528.24	219.00	291.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	49.41	0.31
C & E Loss (ft)	0.26	Cum SA (acres)	0.39	12.43	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2827.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.		0.030	
W.S. Elev (ft)	2826.78	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	2826.78	Flow Area (sq ft)		171.04	
E.G. Slope (ft/ft)	0.010771	Area (sq ft)		171.04	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	72.00	Top Width (ft)		72.00	
Vel Total (ft/s)	8.77	Avg. Vel. (ft/s)		8.77	
Max Chl Dpth (ft)	2.38	Hydr. Depth (ft)		2.38	
Conv. Total (cfs)	14453.1	Conv. (cfs)		14453.1	
Length Wtd. (ft)	9.00	Wetted Per. (ft)		76.75	
Min Ch El (ft)	2824.40	Shear (lb/sq ft)		1.50	
Alpha	1.00	Stream Power (lb/ft s)	528.24	219.00	291.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	32.79	0.15
C & E Loss (ft)	0.52	Cum SA (acres)	0.12	11.57	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2825.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.030	
W.S. Elev (ft)	2825.02	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	2825.02	Flow Area (sq ft)		44.75	
E.G. Slope (ft/ft)	0.015700	Area (sq ft)		44.75	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	72.00	Top Width (ft)		72.00	
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)		4.47	
Max Chl Dpth (ft)	0.62	Hydr. Depth (ft)		0.62	
Conv. Total (cfs)	1596.2	Conv. (cfs)		1596.2	
Length Wtd. (ft)	9.00	Wetted Per. (ft)		73.24	
Min Ch El (ft)	2824.40	Shear (lb/sq ft)		0.60	
Alpha	1.00	Stream Power (lb/ft s)	528.24	219.00	291.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	9.63	0.01
C & E Loss (ft)	0.13	Cum SA (acres)	0.03	10.10	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2827.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	2826.47	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	2826.47	Flow Area (sq ft)		149.06	
E.G. Slope (ft/ft)	0.011332	Area (sq ft)		149.06	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	72.00	Top Width (ft)		72.00	
Vel Total (ft/s)	8.25	Avg. Vel. (ft/s)		8.25	
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)		2.07	
Conv. Total (cfs)	11554.3	Conv. (cfs)		11554.3	
Length Wtd. (ft)	9.00	Wetted Per. (ft)		76.14	
Min Ch El (ft)	2824.40	Shear (lb/sq ft)		1.39	
Alpha	1.00	Stream Power (lb/ft s)	528.24	219.00	291.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	32.35	0.15
C & E Loss (ft)	0.46	Cum SA (acres)	0.14	11.55	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2826.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.		0.030	
W.S. Elev (ft)	2826.01	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	2826.01	Flow Area (sq ft)		115.86	
E.G. Slope (ft/ft)	0.011761	Area (sq ft)		115.86	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	72.00	Top Width (ft)		72.00	
Vel Total (ft/s)	7.16	Avg. Vel. (ft/s)		7.16	
Max Chl Dpth (ft)	1.61	Hydr. Depth (ft)		1.61	
Conv. Total (cfs)	7653.6	Conv. (cfs)		7653.6	
Length Wtd. (ft)	9.00	Wetted Per. (ft)		75.22	
Min Ch El (ft)	2824.40	Shear (lb/sq ft)		1.13	
Alpha	1.00	Stream Power (lb/ft s)	528.24	219.00	291.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.09	24.64	0.09
C & E Loss (ft)	0.35	Cum SA (acres)	0.09	11.13	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2826.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.		0.030	
W.S. Elev (ft)	2825.55	Reach Len. (ft)	9.00	9.00	9.00
Crit W.S. (ft)	2825.55	Flow Area (sq ft)		82.86	
E.G. Slope (ft/ft)	0.013351	Area (sq ft)		82.86	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	72.00	Top Width (ft)		72.00	
Vel Total (ft/s)	6.15	Avg. Vel. (ft/s)		6.15	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)		1.15	
Conv. Total (cfs)	4413.8	Conv. (cfs)		4413.8	
Length Wtd. (ft)	9.00	Wetted Per. (ft)		74.30	
Min Ch El (ft)	2824.40	Shear (lb/sq ft)		0.93	
Alpha	1.00	Stream Power (lb/ft s)	528.24	219.00	291.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.05	18.16	0.05
C & E Loss (ft)	0.26	Cum SA (acres)	0.07	10.71	0.07

```
Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 9116

INPUT
Description: Section 91+16 (approach to Mondamon Rd.)
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2835   123.1    2834  152.88    2833     219    2832     219  2820.1
     291  2820.1     291    2830     297    2832  417.14  2831.2  480.21    2833
  513.02    2834  528.24    2835

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     219     .03     297    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           219     297             80.2    80.2    80.2             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     219  2833.5       T
     297  528.24  2833.5       T
Left Levee      Station=     219      Elevation=  2833.5
Right Levee     Station=     297      Elevation=  2833.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2830.07    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.22    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2829.85    Reach Len. (ft)            80.20      80.20      80.20
  Crit W.S. (ft)           2823.56    Flow Area (sq ft)                    702.30
  E.G. Slope (ft/ft)      0.000375    Area (sq ft)                         702.30
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             72.00    Top Width (ft)                        72.00
  Vel Total (ft/s)            3.73    Avg. Vel. (ft/s)                       3.73
  Max Chl Dpth (ft)           9.75    Hydr. Depth (ft)                       9.75
  Conv. Total (cfs)       135343.3    Conv. (cfs)                        135343.3
  Length Wtd. (ft)           80.20    Wetted Per. (ft)                      91.51
  Min Ch El (ft)           2820.10    Shear (lb/sq ft)                       0.18
  Alpha                       1.00    Stream Power (lb/ft s)    528.24     219.00     297.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.54      54.73       0.38
  C & E Loss (ft)             0.09    Cum SA (acres)              0.52      12.69       0.20
```

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2830.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.030	
W.S. Elev (ft)	2830.05	Reach Len. (ft)	80.20	80.20	80.20
Crit W.S. (ft)	2823.64	Flow Area (sq ft)		716.70	
E.G. Slope (ft/ft)	0.000375	Area (sq ft)		716.70	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	72.16	Top Width (ft)		72.16	
Vel Total (ft/s)	3.77	Avg. Vel. (ft/s)		3.77	
Max Chl Dpth (ft)	9.95	Hydr. Depth (ft)		9.93	
Conv. Total (cfs)	139475.4	Conv. (cfs)		139475.4	
Length Wtd. (ft)	80.20	Wetted Per. (ft)		92.03	
Min Ch El (ft)	2820.10	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	528.24	219.00	297.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	49.30	0.31
C & E Loss (ft)	0.09	Cum SA (acres)	0.39	12.41	0.17

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2826.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.030	
W.S. Elev (ft)	2826.79	Reach Len. (ft)	80.20	80.20	80.20
Crit W.S. (ft)	2822.49	Flow Area (sq ft)		481.68	
E.G. Slope (ft/ft)	0.000394	Area (sq ft)		481.68	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	72.00	Top Width (ft)		72.00	
Vel Total (ft/s)	3.11	Avg. Vel. (ft/s)		3.11	
Max Chl Dpth (ft)	6.69	Hydr. Depth (ft)		6.69	
Conv. Total (cfs)	75606.9	Conv. (cfs)		75606.9	
Length Wtd. (ft)	80.20	Wetted Per. (ft)		85.38	
Min Ch El (ft)	2820.10	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	528.24	219.00	297.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	32.73	0.15
C & E Loss (ft)	0.06	Cum SA (acres)	0.12	11.56	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2821.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2821.78	Reach Len. (ft)	80.20	80.20	80.20
Crit W.S. (ft)	2820.72	Flow Area (sq ft)		121.03	
E.G. Slope (ft/ft)	0.000592	Area (sq ft)		121.03	
Q Total (cfs)	200.00	Flow (cfs)		200.00	

Top Width (ft)	72.00	Top Width (ft)		72.00	
Vel Total (ft/s)	1.65	Avg. Vel. (ft/s)		1.65	
Max Chl Dpth (ft)	1.68	Hydr. Depth (ft)		1.68	
Conv. Total (cfs)	8220.5	Conv. (cfs)		8220.5	
Length Wtd. (ft)	80.20	Wetted Per. (ft)		75.36	
Min Ch El (ft)	2820.10	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	528.24	219.00	297.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	9.62	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	10.09	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2826.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.030	
W.S. Elev (ft)	2825.95	Reach Len. (ft)	80.20	80.20	80.20
Crit W.S. (ft)	2822.20	Flow Area (sq ft)		421.03	
E.G. Slope (ft/ft)	0.000404	Area (sq ft)		421.03	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	72.00	Top Width (ft)		72.00	
Vel Total (ft/s)	2.92	Avg. Vel. (ft/s)		2.92	
Max Chl Dpth (ft)	5.85	Hydr. Depth (ft)		5.85	
Conv. Total (cfs)	61225.2	Conv. (cfs)		61225.2	
Length Wtd. (ft)	80.20	Wetted Per. (ft)		83.70	
Min Ch El (ft)	2820.10	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	528.24	219.00	297.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	32.29	0.15
C & E Loss (ft)	0.05	Cum SA (acres)	0.14	11.54	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2824.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2824.58	Reach Len. (ft)	80.20	80.20	80.20
Crit W.S. (ft)	2821.69	Flow Area (sq ft)		322.22	
E.G. Slope (ft/ft)	0.000429	Area (sq ft)		322.22	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	72.00	Top Width (ft)		72.00	
Vel Total (ft/s)	2.58	Avg. Vel. (ft/s)		2.58	
Max Chl Dpth (ft)	4.48	Hydr. Depth (ft)		4.48	
Conv. Total (cfs)	40085.9	Conv. (cfs)		40085.9	
Length Wtd. (ft)	80.20	Wetted Per. (ft)		80.95	
Min Ch El (ft)	2820.10	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	528.24	219.00	297.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.09	24.60	0.09
C & E Loss (ft)	0.04	Cum SA (acres)	0.09	11.11	0.09

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

```
          This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2823.38    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.08    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2823.31    Reach Len. (ft)             80.20      80.20      80.20
  Crit W.S. (ft)           2821.26    Flow Area (sq ft)                     230.99
  E.G. Slope (ft/ft)      0.000471    Area (sq ft)                          230.99
  Q Total (cfs)             510.00    Flow (cfs)                            510.00
  Top Width (ft)             72.00    Top Width (ft)                         72.00
  Vel Total (ft/s)            2.21    Avg. Vel. (ft/s)                        2.21
  Max Chl Dpth (ft)           3.21    Hydr. Depth (ft)                        3.21
  Conv. Total (cfs)        23511.0    Conv. (cfs)                          23511.0
  Length Wtd. (ft)           80.20    Wetted Per. (ft)                       78.42
  Min Ch El (ft)           2820.10    Shear (lb/sq ft)                        0.09
  Alpha                       1.00    Stream Power (lb/ft s)    528.24     219.00     297.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.05      18.12       0.05
  C & E Loss (ft)             0.03    Cum SA (acres)              0.07      10.70       0.07


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 9035.8

INPUT
Description: Section 90+35.8 (u/s face of Mondamon Rd.)
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2835  126.93    2834  152.67    2833  183.32    2832  183.32    2820
  345.88    2820  345.88  2831.6  454.95    2832  480.21    2833  513.02    2834
  528.24    2835

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  183.32    .013  345.88    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        183.32  345.88             30.7    30.7    30.7             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100  183.32  2833.5       T
  345.88  528.24  2833.5       T
Left Levee      Station=  183.32      Elevation=  2833.5
Right Levee     Station=  345.88      Elevation=  2833.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2829.98    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.04    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2829.94    Reach Len. (ft)             30.70      30.70      30.70
  Crit W.S. (ft)           2822.01    Flow Area (sq ft)                    1615.76
  E.G. Slope (ft/ft)      0.000011    Area (sq ft)                         1615.76
```

Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	162.56	Top Width (ft)		162.56	
Vel Total (ft/s)	1.62	Avg. Vel. (ft/s)		1.62	
Max Chl Dpth (ft)	9.94	Hydr. Depth (ft)		9.94	
Conv. Total (cfs)	790558.1	Conv. (cfs)		790558.1	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		182.44	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	528.24	183.32	345.88
Frctn Loss (ft)		Cum Volume (acre-ft)	0.54	52.60	0.38
C & E Loss (ft)		Cum SA (acres)	0.52	12.47	0.20

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2830.18	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.013	
W.S. Elev (ft)	2830.14	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2822.06	Flow Area (sq ft)		1648.54	
E.G. Slope (ft/ft)	0.000011	Area (sq ft)		1648.54	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	162.56	Top Width (ft)		162.56	
Vel Total (ft/s)	1.64	Avg. Vel. (ft/s)		1.64	
Max Chl Dpth (ft)	10.14	Hydr. Depth (ft)		10.14	
Conv. Total (cfs)	816268.3	Conv. (cfs)		816268.3	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		182.84	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	528.24	183.32	345.88
Frctn Loss (ft)		Cum Volume (acre-ft)	0.37	47.12	0.31
C & E Loss (ft)		Cum SA (acres)	0.39	12.20	0.17

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2826.88	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.013	
W.S. Elev (ft)	2826.85	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2821.39	Flow Area (sq ft)		1113.31	
E.G. Slope (ft/ft)	0.000012	Area (sq ft)		1113.31	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	162.56	Top Width (ft)		162.56	
Vel Total (ft/s)	1.35	Avg. Vel. (ft/s)		1.35	
Max Chl Dpth (ft)	6.85	Hydr. Depth (ft)		6.85	
Conv. Total (cfs)	434826.9	Conv. (cfs)		434826.9	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		176.26	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	528.24	183.32	345.88
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	31.26	0.15
C & E Loss (ft)		Cum SA (acres)	0.12	11.34	0.12

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2821.80	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2821.79	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2820.36	Flow Area (sq ft)		291.70	

E.G. Slope (ft/ft)	0.000017	Area (sq ft)		291.70	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	162.56	Top Width (ft)		162.56	
Vel Total (ft/s)	0.69	Avg. Vel. (ft/s)		0.69	
Max Chl Dpth (ft)	1.79	Hydr. Depth (ft)		1.79	
Conv. Total (cfs)	48523.9	Conv. (cfs)		48523.9	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		166.15	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	528.24	183.32	345.88
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	9.24	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	9.87	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2826.02	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.013	
W.S. Elev (ft)	2826.00	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2821.21	Flow Area (sq ft)		975.16	
E.G. Slope (ft/ft)	0.000012	Area (sq ft)		975.16	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	162.56	Top Width (ft)		162.56	
Vel Total (ft/s)	1.26	Avg. Vel. (ft/s)		1.26	
Max Chl Dpth (ft)	6.00	Hydr. Depth (ft)		6.00	
Conv. Total (cfs)	350929.8	Conv. (cfs)		350929.8	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		174.56	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	528.24	183.32	345.88
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	31.00	0.15
C & E Loss (ft)		Cum SA (acres)	0.14	11.32	0.12

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2824.63	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.013	
W.S. Elev (ft)	2824.61	Reach Len. (ft)	30.70	30.70	30.70
Crit W.S. (ft)	2820.93	Flow Area (sq ft)		750.09	
E.G. Slope (ft/ft)	0.000013	Area (sq ft)		750.09	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	162.56	Top Width (ft)		162.56	
Vel Total (ft/s)	1.11	Avg. Vel. (ft/s)		1.11	
Max Chl Dpth (ft)	4.61	Hydr. Depth (ft)		4.61	
Conv. Total (cfs)	229041.9	Conv. (cfs)		229041.9	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		171.79	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	528.24	183.32	345.88
Frctn Loss (ft)		Cum Volume (acre-ft)	0.09	23.61	0.09
C & E Loss (ft)		Cum SA (acres)	0.09	10.90	0.09

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2823.35	Element			
Vel Head (ft)	0.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2823.34	Reach Len. (ft)	30.70	30.70	30.70

Crit W.S. (ft)	2820.68	Flow Area (sq ft)		542.29	
E.G. Slope (ft/ft)	0.000014	Area (sq ft)		542.29	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	162.56	Top Width (ft)		162.56	
Vel Total (ft/s)	0.94	Avg. Vel. (ft/s)		0.94	
Max Chl Dpth (ft)	3.34	Hydr. Depth (ft)		3.34	
Conv. Total (cfs)	134725.5	Conv. (cfs)		134725.5	
Length Wtd. (ft)	30.70	Wetted Per. (ft)		169.23	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	528.24	183.32	345.88
Frctn Loss (ft)		Cum Volume (acre-ft)	0.05	17.41	0.05
C & E Loss (ft)		Cum SA (acres)	0.07	10.48	0.07

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 9020.4

INPUT
Description: Mondamon Road
Distance from Upstream XS = .5
Deck/Roadway Width = 30
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 5

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
100	2833		220	2833		315	2833	
455	2833		528	2833				

Upstream Bridge Cross Section Data
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2835	126.93	2834	152.67	2833	183.32	2832	183.32	2820
345.88	2820	345.88	2831.6	454.95	2832	480.21	2833	513.02	2834
528.24	2835								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	183.32	.013	345.88	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
183.32	345.88	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	183.32	2833.5	T
345.88	528.24	2833.5	T

Left Levee Station= 183.32 Elevation= 2833.5
Right Levee Station= 345.88 Elevation= 2833.5

Downstream Deck/Roadway Coordinates
num= 4

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
100	2833		220	2833		315	2833	
420	2833							

Downstream Bridge Cross Section Data
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2835	123.1	2834	152.88	2833	185.37	2832	220	2820
289.76	2820	315	2825	327	2831	417.14	2831.2		

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Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  185.37    .013     327    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        185.37     327             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       9      11
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  .7      30     .013     .013        0                   .5                1
Number of Barrels =  3
Upstream   Elevation =  2820
Centerline Stations
    Sta.    Sta.    Sta.
     255     267     279
Downstream Elevation =  2820
Centerline Stations
    Sta.    Sta.    Sta.
     255     267     279

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2620.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         12.33
  Q Barrel (cfs)            873.33    Culv Vel DS (ft/s)         13.67
  E.G. US. (ft)            2829.98    Culv Inv El Up (ft)      2820.00
  W.S. US. (ft)            2829.94    Culv Inv El Dn (ft)      2820.00
  E.G. DS (ft)             2824.95    Culv Frctn Ls (ft)          0.09
  W.S. DS (ft)             2824.08    Culv Exit Loss (ft)         3.76
  Delta EG (ft)               5.03    Culv Entr Loss (ft)         1.18
  Delta WS (ft)               5.86    Q Weir (cfs)
  E.G. IC (ft)             2829.40    Weir Sta Lft (ft)
  E.G. OC (ft)             2829.98    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2826.44    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2825.81    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.81    Min El Weir Flow (ft)    2833.01


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2700.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         12.47
  Q Barrel (cfs)            900.00    Culv Vel DS (ft/s)         13.81
  E.G. US. (ft)            2830.18    Culv Inv El Up (ft)      2820.00
  W.S. US. (ft)            2830.14    Culv Inv El Dn (ft)      2820.00
  E.G. DS (ft)             2825.06    Culv Frctn Ls (ft)          0.09
  W.S. DS (ft)             2824.21    Culv Exit Loss (ft)         3.82
  Delta EG (ft)               5.12    Culv Entr Loss (ft)         1.21
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  Delta WS (ft)               5.94    Q Weir (cfs)
  E.G. IC (ft)             2829.60    Weir Sta Lft (ft)
  E.G. OC (ft)             2830.18    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2826.56    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2825.92    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.92    Min El Weir Flow (ft)    2833.01


CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1500.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         10.11
  Q Barrel (cfs)            500.00    Culv Vel DS (ft/s)         11.35
  E.G. US. (ft)            2826.88    Culv Inv El Up (ft)      2820.00
  W.S. US. (ft)            2826.85    Culv Inv El Dn (ft)      2820.00
  E.G. DS (ft)             2823.36    Culv Frctn Ls (ft)          0.08
  W.S. DS (ft)             2822.31    Culv Exit Loss (ft)         2.64
  Delta EG (ft)               3.52    Culv Entr Loss (ft)         0.79
  Delta WS (ft)               4.54    Q Weir (cfs)
  E.G. IC (ft)             2826.40    Weir Sta Lft (ft)
  E.G. OC (ft)             2826.88    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2824.50    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2824.00    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         4.00    Min El Weir Flow (ft)    2833.01


CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)        200.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          4.74
  Q Barrel (cfs)             66.67    Culv Vel DS (ft/s)          5.80
  E.G. US. (ft)            2821.80    Culv Inv El Up (ft)      2820.00
  W.S. US. (ft)            2821.79    Culv Inv El Dn (ft)      2820.00
  E.G. DS (ft)             2820.93    Culv Frctn Ls (ft)          0.06
  W.S. DS (ft)             2820.63    Culv Exit Loss (ft)         0.64
  Delta EG (ft)               0.87    Culv Entr Loss (ft)         0.17
  Delta WS (ft)               1.17    Q Weir (cfs)
  E.G. IC (ft)             2821.62    Weir Sta Lft (ft)
  E.G. OC (ft)             2821.80    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2821.28    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2821.05    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.04    Min El Weir Flow (ft)    2833.01


CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1230.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          9.41
  Q Barrel (cfs)            410.00    Culv Vel DS (ft/s)         10.63
  E.G. US. (ft)            2826.02    Culv Inv El Up (ft)      2820.00
  W.S. US. (ft)            2826.00    Culv Inv El Dn (ft)      2820.00
  E.G. DS (ft)             2822.97    Culv Frctn Ls (ft)          0.07
  W.S. DS (ft)             2822.04    Culv Exit Loss (ft)         2.29
  Delta EG (ft)               3.05    Culv Entr Loss (ft)         0.69
  Delta WS (ft)               3.96    Q Weir (cfs)
  E.G. IC (ft)             2825.58    Weir Sta Lft (ft)
  E.G. OC (ft)             2826.02    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2823.96    Weir Max Depth (ft)
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  Culv WS Outlet (ft)      2823.51    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.51    Min El Weir Flow (ft)    2833.01


CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        830.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          8.15
  Q Barrel (cfs)            276.67    Culv Vel DS (ft/s)          9.32
  E.G. US. (ft)            2824.63    Culv Inv El Up (ft)      2820.00
  W.S. US. (ft)            2824.61    Culv Inv El Dn (ft)      2820.00
  E.G. DS (ft)             2822.32    Culv Frctn Ls (ft)          0.07
  W.S. DS (ft)             2821.58    Culv Exit Loss (ft)         1.73
  Delta EG (ft)               2.31    Culv Entr Loss (ft)         0.52
  Delta WS (ft)               3.03    Q Weir (cfs)
  E.G. IC (ft)             2824.27    Weir Sta Lft (ft)
  E.G. OC (ft)             2824.63    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2823.09    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2822.70    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         2.70    Min El Weir Flow (ft)    2833.01


CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        510.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          6.80
  Q Barrel (cfs)            170.00    Culv Vel DS (ft/s)          7.92
  E.G. US. (ft)            2823.35    Culv Inv El Up (ft)      2820.00
  W.S. US. (ft)            2823.34    Culv Inv El Dn (ft)      2820.00
  E.G. DS (ft)             2821.70    Culv Frctn Ls (ft)          0.07
  W.S. DS (ft)             2821.15    Culv Exit Loss (ft)         1.22
  Delta EG (ft)               1.65    Culv Entr Loss (ft)         0.36
  Delta WS (ft)               2.18    Q Weir (cfs)
  E.G. IC (ft)             2823.06    Weir Sta Lft (ft)
  E.G. OC (ft)             2823.35    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2822.27    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2821.95    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.95    Min El Weir Flow (ft)    2833.01


CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 9005

INPUT
Description: Section 90+05 (d/s face of Mondamon Rd.)
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2835   123.1    2834  152.88    2833  185.37    2832     220    2820
  289.76    2820     315    2825     327    2831  417.14  2831.2

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  185.37    .013     327    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        185.37     327            291.2   291.2   291.2             .3       .5
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CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2824.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.		0.013	
W.S. Elev (ft)	2824.08	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)		Flow Area (sq ft)		350.96	
E.G. Slope (ft/ft)	0.000835	Area (sq ft)		350.96	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	102.15	Top Width (ft)		102.15	
Vel Total (ft/s)	7.47	Avg. Vel. (ft/s)		7.47	
Max Chl Dpth (ft)	4.08	Hydr. Depth (ft)		3.44	
Conv. Total (cfs)	90695.0	Conv. (cfs)		90695.0	
Length Wtd. (ft)	291.20	Wetted Per. (ft)		103.24	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	0.57	Cum Volume (acre-ft)	0.54	52.52	0.38
C & E Loss (ft)	0.34	Cum SA (acres)	0.52	12.38	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2825.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.013	
W.S. Elev (ft)	2824.21	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)		Flow Area (sq ft)		363.49	
E.G. Slope (ft/ft)	0.000799	Area (sq ft)		363.49	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	103.12	Top Width (ft)		103.12	
Vel Total (ft/s)	7.43	Avg. Vel. (ft/s)		7.43	
Max Chl Dpth (ft)	4.21	Hydr. Depth (ft)		3.52	
Conv. Total (cfs)	95538.7	Conv. (cfs)		95538.7	
Length Wtd. (ft)	291.20	Wetted Per. (ft)		104.24	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)	0.37	47.04	0.31
C & E Loss (ft)	0.35	Cum SA (acres)	0.39	12.10	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2823.36	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2822.31	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)	2822.31	Flow Area (sq ft)		182.58	
E.G. Slope (ft/ft)	0.001974	Area (sq ft)		182.58	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	88.11	Top Width (ft)		88.11	
Vel Total (ft/s)	8.22	Avg. Vel. (ft/s)		8.22	
Max Chl Dpth (ft)	2.31	Hydr. Depth (ft)		2.07	
Conv. Total (cfs)	33761.6	Conv. (cfs)		33761.6	
Length Wtd. (ft)	291.20	Wetted Per. (ft)		88.73	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)		0.25	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00

Frctn Loss (ft)	1.07	Cum Volume (acre-ft)	0.15	31.21	0.15
C & E Loss (ft)	0.11	Cum SA (acres)	0.12	11.25	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2820.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.30	Wt. n-Val.		0.013	
W.S. Elev (ft)	2820.63	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)	2820.63	Flow Area (sq ft)		45.20	
E.G. Slope (ft/ft)	0.002937	Area (sq ft)		45.20	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	74.72	Top Width (ft)		74.72	
Vel Total (ft/s)	4.42	Avg. Vel. (ft/s)		4.42	
Max Chl Dpth (ft)	0.63	Hydr. Depth (ft)		0.60	
Conv. Total (cfs)	3690.3	Conv. (cfs)		3690.3	
Length Wtd. (ft)	291.20	Wetted Per. (ft)		74.89	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	1.42	Cum Volume (acre-ft)	0.01	9.22	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	9.79	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2822.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.93	Wt. n-Val.		0.013	
W.S. Elev (ft)	2822.04	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)	2822.04	Flow Area (sq ft)		158.63	
E.G. Slope (ft/ft)	0.002049	Area (sq ft)		158.63	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	85.93	Top Width (ft)		85.93	
Vel Total (ft/s)	7.75	Avg. Vel. (ft/s)		7.75	
Max Chl Dpth (ft)	2.04	Hydr. Depth (ft)		1.85	
Conv. Total (cfs)	27172.6	Conv. (cfs)		27172.6	

Length Wtd. (ft)	291.20	Wetted Per. (ft)		86.47	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	1.10	Cum Volume (acre-ft)	0.15	30.96	0.15
C & E Loss (ft)	0.09	Cum SA (acres)	0.14	11.23	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2822.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.		0.013	
W.S. Elev (ft)	2821.58	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)	2821.58	Flow Area (sq ft)		120.31	
E.G. Slope (ft/ft)	0.002211	Area (sq ft)		120.31	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	82.31	Top Width (ft)		82.31	
Vel Total (ft/s)	6.90	Avg. Vel. (ft/s)		6.90	
Max Chl Dpth (ft)	1.58	Hydr. Depth (ft)		1.46	
Conv. Total (cfs)	17651.0	Conv. (cfs)		17651.0	
Length Wtd. (ft)	291.20	Wetted Per. (ft)		82.74	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	417.14	0.00	0.00
Frctn Loss (ft)	1.16	Cum Volume (acre-ft)	0.09	23.58	0.09
C & E Loss (ft)	0.06	Cum SA (acres)	0.09	10.81	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2821.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.		0.013	
W.S. Elev (ft)	2821.15	Reach Len. (ft)	291.20	291.20	291.20
Crit W.S. (ft)	2821.15	Flow Area (sq ft)		85.71	
E.G. Slope (ft/ft)	0.002439	Area (sq ft)		85.71	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	78.91	Top Width (ft)		78.91	

Vel Total (ft/s)	5.95	Avg. Vel. (ft/s)			5.95	
Max Chl Dpth (ft)	1.15	Hydr. Depth (ft)			1.09	
Conv. Total (cfs)	10325.8	Conv. (cfs)			10325.8	
Length Wtd. (ft)	291.20	Wetted Per. (ft)			79.22	
Min Ch El (ft)	2820.00	Shear (lb/sq ft)			0.16	
Alpha	1.00	Stream Power (lb/ft s)	417.14		0.00	0.00
Frctn Loss (ft)	1.25	Cum Volume (acre-ft)	0.05		17.39	0.05
C & E Loss (ft)	0.04	Cum SA (acres)	0.07		10.40	0.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8713.9

INPUT
Description: Section 87+13.9
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2832	119.23	2831	153.31	2830	182.45	2829	221	2826
238	2817.35	278	2817.35	295	2826	305.8	2828	351.77	2829
400.68	2830	511.11	2829	530.32	2830	545.86	2833		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	221	.03	295	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
221	295	243.9	243.9	243.9	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2824.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.00	Wt. n-Val.		0.030	
W.S. Elev (ft)	2822.04	Reach Len. (ft)	243.90	243.90	243.90
Crit W.S. (ft)	2822.04	Flow Area (sq ft)		231.08	
E.G. Slope (ft/ft)	0.008815	Area (sq ft)		231.08	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	58.45	Top Width (ft)		58.45	
Vel Total (ft/s)	11.34	Avg. Vel. (ft/s)		11.34	
Max Chl Dpth (ft)	4.69	Hydr. Depth (ft)		3.95	
Conv. Total (cfs)	27904.9	Conv. (cfs)		27904.9	
Length Wtd. (ft)	243.90	Wetted Per. (ft)		60.70	
Min Ch El (ft)	2817.35	Shear (lb/sq ft)		2.10	
Alpha	1.00	Stream Power (lb/ft s)	545.86	0.00	0.00
Frctn Loss (ft)	1.55	Cum Volume (acre-ft)	0.54	50.58	0.38
C & E Loss (ft)	0.32	Cum SA (acres)	0.52	11.84	0.20

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2824.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	2822.13	Reach Len. (ft)	243.90	243.90	243.90
Crit W.S. (ft)	2822.13	Flow Area (sq ft)		236.16	
E.G. Slope (ft/ft)	0.008780	Area (sq ft)		236.16	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	58.79	Top Width (ft)		58.79	
Vel Total (ft/s)	11.43	Avg. Vel. (ft/s)		11.43	
Max Chl Dpth (ft)	4.78	Hydr. Depth (ft)		4.02	
Conv. Total (cfs)	28814.1	Conv. (cfs)		28814.1	
Length Wtd. (ft)	243.90	Wetted Per. (ft)		61.09	
Min Ch El (ft)	2817.35	Shear (lb/sq ft)		2.12	
Alpha	1.00	Stream Power (lb/ft s)	545.86	0.00	0.00
Frctn Loss (ft)	1.55	Cum Volume (acre-ft)	0.37	45.04	0.31
C & E Loss (ft)	0.33	Cum SA (acres)	0.39	11.56	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2822.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.41	Wt. n-Val.		0.030	
W.S. Elev (ft)	2820.73	Reach Len. (ft)	243.90	243.90	243.90
Crit W.S. (ft)	2820.67	Flow Area (sq ft)		157.56	
E.G. Slope (ft/ft)	0.009059	Area (sq ft)		157.56	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	53.28	Top Width (ft)		53.28	
Vel Total (ft/s)	9.52	Avg. Vel. (ft/s)		9.52	
Max Chl Dpth (ft)	3.38	Hydr. Depth (ft)		2.96	
Conv. Total (cfs)	15760.0	Conv. (cfs)		15760.0	
Length Wtd. (ft)	243.90	Wetted Per. (ft)		54.90	
Min Ch El (ft)	2817.35	Shear (lb/sq ft)		1.62	
Alpha	1.00	Stream Power (lb/ft s)	545.86	0.00	0.00
Frctn Loss (ft)	1.62	Cum Volume (acre-ft)	0.15	30.07	0.15
C & E Loss (ft)	0.21	Cum SA (acres)	0.12	10.78	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2818.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.		0.030	
W.S. Elev (ft)	2818.06	Reach Len. (ft)	243.90	243.90	243.90
Crit W.S. (ft)	2818.25	Flow Area (sq ft)		29.18	
E.G. Slope (ft/ft)	0.032219	Area (sq ft)		29.18	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	42.77	Top Width (ft)		42.77	
Vel Total (ft/s)	6.85	Avg. Vel. (ft/s)		6.85	
Max Chl Dpth (ft)	0.71	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	1114.2	Conv. (cfs)		1114.2	
Length Wtd. (ft)	243.90	Wetted Per. (ft)		43.11	
Min Ch El (ft)	2817.35	Shear (lb/sq ft)		1.36	
Alpha	1.00	Stream Power (lb/ft s)	545.86	0.00	0.00
Frctn Loss (ft)	2.02	Cum Volume (acre-ft)	0.01	8.97	0.01
C & E Loss (ft)	0.13	Cum SA (acres)	0.03	9.40	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2821.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.50	Wt. n-Val.		0.030	
W.S. Elev (ft)	2820.11	Reach Len. (ft)	243.90	243.90	243.90
Crit W.S. (ft)	2820.27	Flow Area (sq ft)		125.31	
E.G. Slope (ft/ft)	0.012208	Area (sq ft)		125.31	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	50.84	Top Width (ft)		50.84	
Vel Total (ft/s)	9.82	Avg. Vel. (ft/s)		9.82	
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)		2.46	
Conv. Total (cfs)	11132.3	Conv. (cfs)		11132.3	
Length Wtd. (ft)	243.90	Wetted Per. (ft)		52.17	
Min Ch El (ft)	2817.35	Shear (lb/sq ft)		1.83	
Alpha	1.00	Stream Power (lb/ft s)	545.86	0.00	0.00
Frctn Loss (ft)	1.20	Cum Volume (acre-ft)	0.15	30.01	0.15
C & E Loss (ft)	0.17	Cum SA (acres)	0.14	10.78	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2820.74	Element	Left OB	Channel	Right OB

Vel Head (ft)	1.39	Wt. n-Val.		0.030	
W.S. Elev (ft)	2819.34	Reach Len. (ft)	243.90	243.90	243.90
Crit W.S. (ft)	2819.63	Flow Area (sq ft)		87.58	
E.G. Slope (ft/ft)	0.016783	Area (sq ft)		87.58	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	47.84	Top Width (ft)		47.84	
Vel Total (ft/s)	9.48	Avg. Vel. (ft/s)		9.48	
Max Chl Dpth (ft)	1.99	Hydr. Depth (ft)		1.83	
Conv. Total (cfs)	6406.8	Conv. (cfs)		6406.8	
Length Wtd. (ft)	243.90	Wetted Per. (ft)		48.79	
Min Ch El (ft)	2817.35	Shear (lb/sq ft)		1.88	
Alpha	1.00	Stream Power (lb/ft s)	545.86	0.00	0.00
Frctn Loss (ft)	1.39	Cum Volume (acre-ft)	0.09	22.88	0.09
C & E Loss (ft)	0.20	Cum SA (acres)	0.09	10.38	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2819.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.		0.030	
W.S. Elev (ft)	2818.72	Reach Len. (ft)	243.90	243.90	243.90
Crit W.S. (ft)	2819.02	Flow Area (sq ft)		58.24	
E.G. Slope (ft/ft)	0.022834	Area (sq ft)		58.24	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	45.36	Top Width (ft)		45.36	
Vel Total (ft/s)	8.76	Avg. Vel. (ft/s)		8.76	
Max Chl Dpth (ft)	1.36	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	3375.1	Conv. (cfs)		3375.1	
Length Wtd. (ft)	243.90	Wetted Per. (ft)		46.02	
Min Ch El (ft)	2817.35	Shear (lb/sq ft)		1.80	
Alpha	1.00	Stream Power (lb/ft s)	545.86	0.00	0.00
Frctn Loss (ft)	1.61	Cum Volume (acre-ft)	0.05	16.91	0.05
C & E Loss (ft)	0.19	Cum SA (acres)	0.07	9.98	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8470.*

INPUT
Description: Boulder Stabilizer #10 (inlet)
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2830.4	116	2829.6	123.7	2829.3	144.4	2828.7	160	2828.3
168.6	2827.9	182.5	2827.1	191.5	2826.2	194	2824.4	222	2815.2

```
     257  2815.2     295  2824.4     296  2824.9   308.5  2825.2   331.3  2825.7
   331.5  2825.7   344.5  2826.6   377.4  2827.1   415.9  2827.5   481.3  2828.2
   482.2  2828.2   499.3  2828.9   508.7  2829.5     514  2830.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04     194    .035     295     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           194     295                 2       2       2             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2822.13    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.93    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2821.20    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2819.90    Flow Area (sq ft)                    339.05
  E.G. Slope (ft/ft)      0.004807    Area (sq ft)                         339.05
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             78.04    Top Width (ft)                        78.04
  Vel Total (ft/s)            7.73    Avg. Vel. (ft/s)                       7.73
  Max Chl Dpth (ft)           6.00    Hydr. Depth (ft)                       4.34
  Conv. Total (cfs)        37788.4    Conv. (cfs)                         37788.4
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      79.71
  Min Ch El (ft)           2815.20    Shear (lb/sq ft)                       1.28
  Alpha                       1.00    Stream Power (lb/ft s)    514.00       0.00       0.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.54      48.98       0.38
  C & E Loss (ft)             0.00    Cum SA (acres)              0.52      11.46       0.20


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2822.24    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.94    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2821.30    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2819.98    Flow Area (sq ft)                    346.83
  E.G. Slope (ft/ft)      0.004792    Area (sq ft)                         346.83
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             78.75    Top Width (ft)                        78.75
  Vel Total (ft/s)            7.78    Avg. Vel. (ft/s)                       7.78
  Max Chl Dpth (ft)           6.10    Hydr. Depth (ft)                       4.40
  Conv. Total (cfs)        39002.1    Conv. (cfs)                         39002.1
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      80.45
  Min Ch El (ft)           2815.20    Shear (lb/sq ft)                       1.29
  Alpha                       1.00    Stream Power (lb/ft s)    514.00       0.00       0.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.37      43.41       0.31
  C & E Loss (ft)             0.00    Cum SA (acres)              0.39      11.18       0.17


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2820.30    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.70    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2819.60    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)                      Flow Area (sq ft)                    223.50
  E.G. Slope (ft/ft)      0.005094    Area (sq ft)                         223.50
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
  Top Width (ft)             66.57    Top Width (ft)                        66.57
  Vel Total (ft/s)            6.71    Avg. Vel. (ft/s)                       6.71
  Max Chl Dpth (ft)           4.40    Hydr. Depth (ft)                       3.36
  Conv. Total (cfs)        21017.1    Conv. (cfs)                         21017.1
```

Length Wtd. (ft)	2.00	Wetted Per. (ft)		67.80	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	29.00	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	10.44	0.12

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2816.74	Element			
Vel Head (ft)	0.23	Wt. n-Val.		0.035	
W.S. Elev (ft)	2816.52	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2816.17	Flow Area (sq ft)		52.34	
E.G. Slope (ft/ft)	0.006586	Area (sq ft)		52.34	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	44.45	Top Width (ft)		44.45	
Vel Total (ft/s)	3.82	Avg. Vel. (ft/s)		3.82	
Max Chl Dpth (ft)	1.32	Hydr. Depth (ft)		1.18	
Conv. Total (cfs)	2464.5	Conv. (cfs)		2464.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		44.82	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		0.48	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	8.75	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	9.15	0.03

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2819.76	Element			
Vel Head (ft)	0.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	2819.13	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2818.21	Flow Area (sq ft)		192.96	
E.G. Slope (ft/ft)	0.005207	Area (sq ft)		192.96	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	63.19	Top Width (ft)		63.19	
Vel Total (ft/s)	6.37	Avg. Vel. (ft/s)		6.37	
Max Chl Dpth (ft)	3.93	Hydr. Depth (ft)		3.05	
Conv. Total (cfs)	17045.2	Conv. (cfs)		17045.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		64.29	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		0.98	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	29.12	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	10.46	0.12

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2818.84	Element			
Vel Head (ft)	0.51	Wt. n-Val.		0.035	
W.S. Elev (ft)	2818.33	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2817.57	Flow Area (sq ft)		144.57	
E.G. Slope (ft/ft)	0.005450	Area (sq ft)		144.57	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	57.44	Top Width (ft)		57.44	
Vel Total (ft/s)	5.74	Avg. Vel. (ft/s)		5.74	
Max Chl Dpth (ft)	3.13	Hydr. Depth (ft)		2.52	
Conv. Total (cfs)	11243.2	Conv. (cfs)		11243.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		58.31	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		0.84	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.09	22.23	0.09

C & E Loss (ft)	0.00	Cum SA (acres)	0.09	10.08	0.09

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2817.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.		0.035	
W.S. Elev (ft)	2817.54	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2816.96	Flow Area (sq ft)		101.57	
E.G. Slope (ft/ft)	0.005794	Area (sq ft)		101.57	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	51.79	Top Width (ft)		51.79	
Vel Total (ft/s)	5.02	Avg. Vel. (ft/s)		5.02	
Max Chl Dpth (ft)	2.34	Hydr. Depth (ft)		1.96	
Conv. Total (cfs)	6699.9	Conv. (cfs)		6699.9	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		52.45	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.05	16.46	0.05
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	9.71	0.07

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8468

INPUT
Description: Boulder Stabilizer #10
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2830.4	116	2829.6	123.7	2829.3	144.4	2828.7	160	2828.3
168.6	2827.9	182.5	2827.1	191.5	2826.2	194	2824.4	222	2815.2
257	2815.2	295	2824.4	296	2824.9	308.5	2825.2	331.3	2825.7
331.5	2825.7	344.5	2826.6	377.4	2827.1	415.9	2827.5	481.3	2828.2
482.2	2828.2	499.3	2828.9	508.7	2829.5	514	2830.6		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	194	.035	295	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
194	295	15	15	15	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2822.12	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.93	Wt. n-Val.		0.035	
W.S. Elev (ft)	2821.19	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		338.24	
E.G. Slope (ft/ft)	0.004840	Area (sq ft)		338.24	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	77.96	Top Width (ft)		77.96	
Vel Total (ft/s)	7.75	Avg. Vel. (ft/s)		7.75	
Max Chl Dpth (ft)	5.99	Hydr. Depth (ft)		4.34	
Conv. Total (cfs)	37661.1	Conv. (cfs)		37661.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		79.63	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		1.28	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.54	48.96	0.38

C & E Loss (ft)	0.23	Cum SA (acres)	0.52	11.46	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2822.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.95	Wt. n-Val.		0.035	
W.S. Elev (ft)	2821.29	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		346.00	
E.G. Slope (ft/ft)	0.004824	Area (sq ft)		346.00	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	78.67	Top Width (ft)		78.67	
Vel Total (ft/s)	7.80	Avg. Vel. (ft/s)		7.80	
Max Chl Dpth (ft)	6.09	Hydr. Depth (ft)		4.40	
Conv. Total (cfs)	38872.6	Conv. (cfs)		38872.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		80.37	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	43.39	0.31
C & E Loss (ft)	0.23	Cum SA (acres)	0.39	11.17	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2820.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.		0.035	
W.S. Elev (ft)	2819.59	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		222.77	
E.G. Slope (ft/ft)	0.005141	Area (sq ft)		222.77	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	66.49	Top Width (ft)		66.49	
Vel Total (ft/s)	6.73	Avg. Vel. (ft/s)		6.73	
Max Chl Dpth (ft)	4.39	Hydr. Depth (ft)		3.35	
Conv. Total (cfs)	20919.5	Conv. (cfs)		20919.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		67.72	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		1.06	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	28.99	0.15
C & E Loss (ft)	0.19	Cum SA (acres)	0.12	10.44	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2816.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.035	
W.S. Elev (ft)	2816.50	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		51.54	

E.G. Slope (ft/ft)	0.006906	Area (sq ft)		51.54	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	44.32	Top Width (ft)		44.32	
Vel Total (ft/s)	3.88	Avg. Vel. (ft/s)		3.88	
Max Chl Dpth (ft)	1.30	Hydr. Depth (ft)		1.16	
Conv. Total (cfs)	2406.7	Conv. (cfs)		2406.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		44.69	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	8.74	0.01
C & E Loss (ft)	0.07	Cum SA (acres)	0.03	9.15	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2819.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.035	
W.S. Elev (ft)	2819.12	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		192.27	
E.G. Slope (ft/ft)	0.005261	Area (sq ft)		192.27	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	63.12	Top Width (ft)		63.12	
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.40	
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		3.05	
Conv. Total (cfs)	16957.6	Conv. (cfs)		16957.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		64.21	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		0.98	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	29.11	0.15
C & E Loss (ft)	0.17	Cum SA (acres)	0.14	10.45	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2818.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.035	
W.S. Elev (ft)	2818.31	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		143.72	
E.G. Slope (ft/ft)	0.005544	Area (sq ft)		143.72	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	57.33	Top Width (ft)		57.33	
Vel Total (ft/s)	5.78	Avg. Vel. (ft/s)		5.78	
Max Chl Dpth (ft)	3.11	Hydr. Depth (ft)		2.51	
Conv. Total (cfs)	11146.8	Conv. (cfs)		11146.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		58.20	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		0.85	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.09	22.22	0.09
C & E Loss (ft)	0.14	Cum SA (acres)	0.09	10.08	0.09

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2817.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.035	
W.S. Elev (ft)	2817.53	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		100.76	
E.G. Slope (ft/ft)	0.005933	Area (sq ft)		100.76	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	51.68	Top Width (ft)		51.68	
Vel Total (ft/s)	5.06	Avg. Vel. (ft/s)		5.06	
Max Chl Dpth (ft)	2.32	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	6621.1	Conv. (cfs)		6621.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		52.33	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		0.71	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.05	16.45	0.05
C & E Loss (ft)	0.11	Cum SA (acres)	0.07	9.71	0.07

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8453

INPUT
Description: Boulder Stabilizer #10
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2830.4	116	2829.6	123.7	2829.3	144.4	2828.7	160	2828.3
168.6	2827.9	173	2827.1	175	2826.2	178	2825	179	2824.4
222	2810.2	257	2810.2	300	2824.4	301	2824.9	308.5	2825.2
331.3	2825.7	331.5	2825.7	344.5	2826.6	377.4	2827.1	415.9	2827.5
481.3	2828.2	482.2	2828.2	499.3	2828.9	508.7	2829.5	514	2830.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	178	.035	301	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
178	301	2	2	2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	178	2825	T
301	514	2825	T

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2821.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	2821.71	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		804.05	
E.G. Slope (ft/ft)	0.000407	Area (sq ft)		804.05	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	104.71	Top Width (ft)		104.71	
Vel Total (ft/s)	3.26	Avg. Vel. (ft/s)		3.26	
Max Chl Dpth (ft)	11.51	Hydr. Depth (ft)		7.68	
Conv. Total (cfs)	129821.0	Conv. (cfs)		129821.0	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		108.41	
Min Ch El (ft)	2810.20	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00

Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.54	48.77	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.52	11.42	0.20

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2821.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2821.82	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		815.02	
E.G. Slope (ft/ft)	0.000417	Area (sq ft)		815.02	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	105.34	Top Width (ft)		105.34	
Vel Total (ft/s)	3.31	Avg. Vel. (ft/s)		3.31	
Max Chl Dpth (ft)	11.61	Hydr. Depth (ft)		7.74	
Conv. Total (cfs)	132246.2	Conv. (cfs)		132246.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		109.08	
Min Ch El (ft)	2810.20	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.37	43.19	0.31
C & E Loss (ft)	0.00	Cum SA (acres)	0.39	11.14	0.17

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2820.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.035	
W.S. Elev (ft)	2820.01	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		634.82	
E.G. Slope (ft/ft)	0.000255	Area (sq ft)		634.82	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	94.42	Top Width (ft)		94.42	
Vel Total (ft/s)	2.36	Avg. Vel. (ft/s)		2.36	
Max Chl Dpth (ft)	9.81	Hydr. Depth (ft)		6.72	
Conv. Total (cfs)	93928.3	Conv. (cfs)		93928.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		97.57	
Min Ch El (ft)	2810.20	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	28.85	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	10.41	0.12

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2816.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	2816.66	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		352.21	
E.G. Slope (ft/ft)	0.000023	Area (sq ft)		352.21	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	74.10	Top Width (ft)		74.10	
Vel Total (ft/s)	0.57	Avg. Vel. (ft/s)		0.57	
Max Chl Dpth (ft)	6.46	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	41499.7	Conv. (cfs)		41499.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		76.18	
Min Ch El (ft)	2810.20	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	8.67	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	9.13	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2819.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	

W.S. Elev (ft)	2819.51	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		587.92	
E.G. Slope (ft/ft)	0.000212	Area (sq ft)		587.92	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	91.36	Top Width (ft)		91.36	
Vel Total (ft/s)	2.09	Avg. Vel. (ft/s)		2.09	
Max Chl Dpth (ft)	9.31	Hydr. Depth (ft)		6.44	
Conv. Total (cfs)	84520.6	Conv. (cfs)		84520.6	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		94.35	
Min Ch El (ft)	2810.20	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	28.97	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	10.43	0.12

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2818.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2818.64	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		511.06	
E.G. Slope (ft/ft)	0.000142	Area (sq ft)		511.06	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	86.11	Top Width (ft)		86.11	
Vel Total (ft/s)	1.62	Avg. Vel. (ft/s)		1.62	
Max Chl Dpth (ft)	8.44	Hydr. Depth (ft)		5.93	
Conv. Total (cfs)	69665.5	Conv. (cfs)		69665.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		88.83	
Min Ch El (ft)	2810.20	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.09	22.11	0.09
C & E Loss (ft)	0.00	Cum SA (acres)	0.09	10.05	0.09

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2817.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2817.78	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		439.47	
E.G. Slope (ft/ft)	0.000081	Area (sq ft)		439.47	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	80.92	Top Width (ft)		80.92	
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)		1.16	
Max Chl Dpth (ft)	7.58	Hydr. Depth (ft)		5.43	
Conv. Total (cfs)	56516.4	Conv. (cfs)		56516.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		83.36	
Min Ch El (ft)	2810.20	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.05	16.36	0.05
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	9.68	0.07

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8451

INPUT
Description: Boulder Stabilizer #10
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2830.4	116	2829.6	123.7	2829.3	144.4	2828.7	160	2828.3
168.6	2827.9	173	2827.1	175	2826.2	178	2825	179	2824.4

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     222  2810.2     257  2810.2     300  2824.4     301  2824.9   308.5  2825.2
   331.3  2825.7   331.5  2825.7   344.5  2826.6   377.4  2827.1   415.9  2827.5
   481.3  2828.2   482.2  2828.2   499.3  2828.9   508.7  2829.5     514  2830.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04     178    .035     301     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           178     301               15      15      15             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     178    2825       T
     301     514  2824.9       T

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2821.87    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.16    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2821.71    Reach Len. (ft)            15.00      15.00      15.00
  Crit W.S. (ft)                      Flow Area (sq ft)                    803.97
  E.G. Slope (ft/ft)      0.000407    Area (sq ft)                         803.97
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)            104.71    Top Width (ft)                       104.71
  Vel Total (ft/s)            3.26    Avg. Vel. (ft/s)                       3.26
  Max Chl Dpth (ft)          11.51    Hydr. Depth (ft)                       7.68
  Conv. Total (cfs)       129804.1    Conv. (cfs)                        129804.1
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                     108.41
  Min Ch El (ft)           2810.20    Shear (lb/sq ft)                       0.19
  Alpha                       1.00    Stream Power (lb/ft s)    514.00       0.00       0.00
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)        0.54      48.73       0.38
  C & E Loss (ft)             0.16    Cum SA (acres)              0.52      11.42       0.20


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2821.98    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.17    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2821.81    Reach Len. (ft)            15.00      15.00      15.00
  Crit W.S. (ft)                      Flow Area (sq ft)                    814.95
  E.G. Slope (ft/ft)      0.000417    Area (sq ft)                         814.95
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)            105.34    Top Width (ft)                       105.34
  Vel Total (ft/s)            3.31    Avg. Vel. (ft/s)                       3.31
  Max Chl Dpth (ft)          11.61    Hydr. Depth (ft)                       7.74
  Conv. Total (cfs)       132229.1    Conv. (cfs)                        132229.1
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                     109.07
  Min Ch El (ft)           2810.20    Shear (lb/sq ft)                       0.19
  Alpha                       1.00    Stream Power (lb/ft s)    514.00       0.00       0.00
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)        0.37      43.15       0.31
  C & E Loss (ft)             0.16    Cum SA (acres)              0.39      11.14       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
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CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2820.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.035	
W.S. Elev (ft)	2820.01	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		634.78	
E.G. Slope (ft/ft)	0.000255	Area (sq ft)		634.78	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	94.41	Top Width (ft)		94.41	
Vel Total (ft/s)	2.36	Avg. Vel. (ft/s)		2.36	
Max Chl Dpth (ft)	9.81	Hydr. Depth (ft)		6.72	
Conv. Total (cfs)	93918.9	Conv. (cfs)		93918.9	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		97.57	
Min Ch El (ft)	2810.20	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	28.82	0.15
C & E Loss (ft)	0.13	Cum SA (acres)	0.12	10.41	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2816.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	2816.66	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		352.21	
E.G. Slope (ft/ft)	0.000023	Area (sq ft)		352.21	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	74.10	Top Width (ft)		74.10	
Vel Total (ft/s)	0.57	Avg. Vel. (ft/s)		0.57	
Max Chl Dpth (ft)	6.46	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	41499.7	Conv. (cfs)		41499.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		76.18	
Min Ch El (ft)	2810.20	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.01	8.66	0.01
C & E Loss (ft)	0.04	Cum SA (acres)	0.03	9.13	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2819.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2819.51	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		587.88	
E.G. Slope (ft/ft)	0.000212	Area (sq ft)		587.88	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	91.36	Top Width (ft)		91.36	
Vel Total (ft/s)	2.09	Avg. Vel. (ft/s)		2.09	
Max Chl Dpth (ft)	9.31	Hydr. Depth (ft)		6.44	
Conv. Total (cfs)	84511.8	Conv. (cfs)		84511.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		94.35	
Min Ch El (ft)	2810.20	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	28.95	0.15
C & E Loss (ft)	0.12	Cum SA (acres)	0.14	10.42	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2818.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2818.64	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		511.04	
E.G. Slope (ft/ft)	0.000142	Area (sq ft)		511.04	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	86.11	Top Width (ft)		86.11	
Vel Total (ft/s)	1.62	Avg. Vel. (ft/s)		1.62	
Max Chl Dpth (ft)	8.44	Hydr. Depth (ft)		5.93	
Conv. Total (cfs)	69661.5	Conv. (cfs)		69661.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		88.83	
Min Ch El (ft)	2810.20	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.09	22.09	0.09
C & E Loss (ft)	0.10	Cum SA (acres)	0.09	10.05	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2817.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2817.78	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		439.45	
E.G. Slope (ft/ft)	0.000081	Area (sq ft)		439.45	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	80.92	Top Width (ft)		80.92	
Vel Total (ft/s)	1.16	Avg. Vel. (ft/s)		1.16	
Max Chl Dpth (ft)	7.58	Hydr. Depth (ft)		5.43	
Conv. Total (cfs)	56512.9	Conv. (cfs)		56512.9	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		83.36	
Min Ch El (ft)	2810.20	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.05	16.34	0.05
C & E Loss (ft)	0.07	Cum SA (acres)	0.07	9.68	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8436

INPUT

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Description: Boulder Stabilizer #10
Station Elevation Data    num=      24
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2830.4     116  2829.6   123.7  2829.3   144.4  2828.7     160  2828.3
   168.6  2827.9   182.5  2827.1   191.5  2826.2     194  2824.4     222  2815.2
     257  2815.2     295  2824.4     296  2824.9   308.5  2825.2   331.3  2825.7
   331.5  2825.7   344.5  2826.6   377.4  2827.1   415.9  2827.5   481.3  2828.2
   482.2  2828.2   499.3  2828.9   508.7  2829.5     514  2830.6

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04     194    .035     295     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           194     295             22.1    22.1    22.1             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2821.69    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.79    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2819.90    Reach Len. (ft)            22.10      22.10      22.10
  Crit W.S. (ft)           2819.90    Flow Area (sq ft)                    243.92
  E.G. Slope (ft/ft)      0.012129    Area (sq ft)                         243.92
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             68.74    Top Width (ft)                        68.74
  Vel Total (ft/s)           10.74    Avg. Vel. (ft/s)                      10.74
  Max Chl Dpth (ft)           4.70    Hydr. Depth (ft)                       3.55
  Conv. Total (cfs)        23789.8    Conv. (cfs)                         23789.8
  Length Wtd. (ft)           22.10    Wetted Per. (ft)                      70.05
  Min Ch El (ft)           2815.20    Shear (lb/sq ft)                       2.64
  Alpha                       1.00    Stream Power (lb/ft s)    514.00       0.00       0.00
  Frctn Loss (ft)             0.23    Cum Volume (acre-ft)        0.54      48.55       0.38
  C & E Loss (ft)             0.02    Cum SA (acres)              0.52      11.39       0.20


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2821.80    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.82    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2819.99    Reach Len. (ft)            22.10      22.10      22.10
  Crit W.S. (ft)           2819.99    Flow Area (sq ft)                    249.58
  E.G. Slope (ft/ft)      0.012071    Area (sq ft)                         249.58
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             69.32    Top Width (ft)                        69.32
  Vel Total (ft/s)           10.82    Avg. Vel. (ft/s)                      10.82
  Max Chl Dpth (ft)           4.78    Hydr. Depth (ft)                       3.60
  Conv. Total (cfs)        24574.7    Conv. (cfs)                         24574.7
  Length Wtd. (ft)           22.10    Wetted Per. (ft)                      70.66
  Min Ch El (ft)           2815.20    Shear (lb/sq ft)                       2.66
  Alpha                       1.00    Stream Power (lb/ft s)    514.00       0.00       0.00
  Frctn Loss (ft)             0.23    Cum Volume (acre-ft)        0.37      42.97       0.31
  C & E Loss (ft)             0.02    Cum SA (acres)              0.39      11.11       0.17


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
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for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2819.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.37	Wt. n-Val.		0.035	
W.S. Elev (ft)	2818.59	Reach Len. (ft)	22.10	22.10	22.10
Crit W.S. (ft)	2818.59	Flow Area (sq ft)		159.95	
E.G. Slope (ft/ft)	0.013281	Area (sq ft)		159.95	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	59.33	Top Width (ft)		59.33	
Vel Total (ft/s)	9.38	Avg. Vel. (ft/s)		9.38	
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)		2.70	
Conv. Total (cfs)	13016.0	Conv. (cfs)		13016.0	
Length Wtd. (ft)	22.10	Wetted Per. (ft)		60.28	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		2.20	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.15	28.68	0.15
C & E Loss (ft)	0.01	Cum SA (acres)	0.12	10.38	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2816.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.035	
W.S. Elev (ft)	2816.17	Reach Len. (ft)	22.10	22.10	22.10
Crit W.S. (ft)	2816.17	Flow Area (sq ft)		37.11	
E.G. Slope (ft/ft)	0.019124	Area (sq ft)		37.11	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	41.92	Top Width (ft)		41.92	
Vel Total (ft/s)	5.39	Avg. Vel. (ft/s)		5.39	
Max Chl Dpth (ft)	0.96	Hydr. Depth (ft)		0.89	
Conv. Total (cfs)	1446.2	Conv. (cfs)		1446.2	
Length Wtd. (ft)	22.10	Wetted Per. (ft)		42.19	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		1.05	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.01	8.59	0.01
C & E Loss (ft)	0.06	Cum SA (acres)	0.03	9.11	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2819.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.23	Wt. n-Val.		0.035	
W.S. Elev (ft)	2818.21	Reach Len. (ft)	22.10	22.10	22.10
Crit W.S. (ft)	2818.21	Flow Area (sq ft)		137.99	
E.G. Slope (ft/ft)	0.013706	Area (sq ft)		137.99	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	56.61	Top Width (ft)		56.61	
Vel Total (ft/s)	8.91	Avg. Vel. (ft/s)		8.91	
Max Chl Dpth (ft)	3.01	Hydr. Depth (ft)		2.44	
Conv. Total (cfs)	10506.3	Conv. (cfs)		10506.3	
Length Wtd. (ft)	22.10	Wetted Per. (ft)		57.45	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		2.06	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.15	28.82	0.15
C & E Loss (ft)	0.03	Cum SA (acres)	0.14	10.40	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2818.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.		0.035	
W.S. Elev (ft)	2817.57	Reach Len. (ft)	22.10	22.10	22.10
Crit W.S. (ft)	2817.57	Flow Area (sq ft)		103.03	
E.G. Slope (ft/ft)	0.014713	Area (sq ft)		103.03	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	51.99	Top Width (ft)		51.99	
Vel Total (ft/s)	8.06	Avg. Vel. (ft/s)		8.06	
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)		1.98	
Conv. Total (cfs)	6842.7	Conv. (cfs)		6842.7	
Length Wtd. (ft)	22.10	Wetted Per. (ft)		52.65	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)		1.80	
Alpha	1.00	Stream Power (lb/ft s)	514.00	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.09	21.98	0.09
C & E Loss (ft)	0.05	Cum SA (acres)	0.09	10.03	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2817.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.77	Wt. n-Val.		0.035	
W.S. Elev (ft)	2816.96	Reach Len. (ft)	22.10	22.10	22.10
Crit W.S. (ft)	2816.96	Flow Area (sq ft)		72.46	
E.G. Slope (ft/ft)	0.015909	Area (sq ft)		72.46	
Q Total (cfs)	510.00	Flow (cfs)		510.00	

Top Width (ft)	47.59	Top Width (ft)			47.59	
Vel Total (ft/s)	7.04	Avg. Vel. (ft/s)			7.04	
Max Chl Dpth (ft)	1.75	Hydr. Depth (ft)			1.52	
Conv. Total (cfs)	4043.4	Conv. (cfs)			4043.4	
Length Wtd. (ft)	22.10	Wetted Per. (ft)			48.08	
Min Ch El (ft)	2815.20	Shear (lb/sq ft)			1.50	
Alpha	1.00	Stream Power (lb/ft s)	514.00		0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.05		16.25	0.05
C & E Loss (ft)	0.06	Cum SA (acres)	0.07		9.66	0.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8413.9

INPUT
Description: Section 84+13.9
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2830	122.57	2829	157.17	2828	178.66	2827	187.75	2826
196	2824	215	2814.7	255	2814.7	274	2824	304.18	2824.5
326.76	2825	339.6	2826	410	2827	475.31	2828	501.44	2829
506.63	2830								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	196	.03	274	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
196	274	300	300	300	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2821.39	Element	Left OB	Channel	Right OB	
Vel Head (ft)	2.29	Wt. n-Val.		0.030		
W.S. Elev (ft)	2819.10	Reach Len. (ft)	300.00	300.00	300.00	
Crit W.S. (ft)	2819.38	Flow Area (sq ft)		215.52		
E.G. Slope (ft/ft)	0.010954	Area (sq ft)		215.52		
Q Total (cfs)	2620.00	Flow (cfs)		2620.00		
Top Width (ft)	57.98	Top Width (ft)		57.98		
Vel Total (ft/s)	12.16	Avg. Vel. (ft/s)		12.16		
Max Chl Dpth (ft)	4.40	Hydr. Depth (ft)		3.72		
Conv. Total (cfs)	25033.0	Conv. (cfs)		25033.0		
Length Wtd. (ft)	300.00	Wetted Per. (ft)		60.01		
Min Ch El (ft)	2814.70	Shear (lb/sq ft)		2.46		
Alpha	1.00	Stream Power (lb/ft s)	506.63	0.00	0.00	
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.54	48.43	0.38	
C & E Loss (ft)	0.05	Cum SA (acres)	0.52	11.36	0.20	

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2821.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.31	Wt. n-Val.		0.030	
W.S. Elev (ft)	2819.20	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2819.47	Flow Area (sq ft)		221.60	
E.G. Slope (ft/ft)	0.010715	Area (sq ft)		221.60	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	58.40	Top Width (ft)		58.40	
Vel Total (ft/s)	12.18	Avg. Vel. (ft/s)		12.18	
Max Chl Dpth (ft)	4.50	Hydr. Depth (ft)		3.79	
Conv. Total (cfs)	26083.6	Conv. (cfs)		26083.6	
Length Wtd. (ft)		Wetted Per. (ft)		60.49	
Min Ch El (ft)	2814.70	Shear (lb/sq ft)		2.45	
Alpha	1.00	Stream Power (lb/ft s)	506.63	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.37	42.85	0.31
C & E Loss (ft)	0.05	Cum SA (acres)	0.39	11.08	0.17

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2819.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.99	Wt. n-Val.		0.030	
W.S. Elev (ft)	2817.59	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2818.01	Flow Area (sq ft)		132.59	
E.G. Slope (ft/ft)	0.015414	Area (sq ft)		132.59	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	51.80	Top Width (ft)		51.80	
Vel Total (ft/s)	11.31	Avg. Vel. (ft/s)		11.31	
Max Chl Dpth (ft)	2.89	Hydr. Depth (ft)		2.56	
Conv. Total (cfs)	12081.7	Conv. (cfs)		12081.7	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		53.14	
Min Ch El (ft)	2814.70	Shear (lb/sq ft)		2.40	
Alpha	1.00	Stream Power (lb/ft s)	506.63	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.15	28.61	0.15
C & E Loss (ft)	0.06	Cum SA (acres)	0.12	10.35	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2816.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.030	
W.S. Elev (ft)	2815.84	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2815.61	Flow Area (sq ft)		48.29	
E.G. Slope (ft/ft)	0.006398	Area (sq ft)		48.29	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	44.66	Top Width (ft)		44.66	
Vel Total (ft/s)	4.14	Avg. Vel. (ft/s)		4.14	
Max Chl Dpth (ft)	1.14	Hydr. Depth (ft)		1.08	
Conv. Total (cfs)	2500.3	Conv. (cfs)		2500.3	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		45.19	
Min Ch El (ft)	2814.70	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)	506.63	0.00	0.00
Frctn Loss (ft)	2.75	Cum Volume (acre-ft)	0.01	8.57	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	9.08	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2819.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.85	Wt. n-Val.		0.030	
W.S. Elev (ft)	2817.20	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2817.62	Flow Area (sq ft)		112.73	
E.G. Slope (ft/ft)	0.017016	Area (sq ft)		112.73	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	50.21	Top Width (ft)		50.21	
Vel Total (ft/s)	10.91	Avg. Vel. (ft/s)		10.91	
Max Chl Dpth (ft)	2.50	Hydr. Depth (ft)		2.25	
Conv. Total (cfs)	9429.3	Conv. (cfs)		9429.3	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		51.37	
Min Ch El (ft)	2814.70	Shear (lb/sq ft)		2.33	
Alpha	1.00	Stream Power (lb/ft s)	506.63	0.00	0.00
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)	0.15	28.76	0.15
C & E Loss (ft)	0.06	Cum SA (acres)	0.14	10.37	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2818.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.55	Wt. n-Val.		0.030	
W.S. Elev (ft)	2816.60	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2816.97	Flow Area (sq ft)		83.14	
E.G. Slope (ft/ft)	0.019869	Area (sq ft)		83.14	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	47.74	Top Width (ft)		47.74	
Vel Total (ft/s)	9.98	Avg. Vel. (ft/s)		9.98	
Max Chl Dpth (ft)	1.90	Hydr. Depth (ft)		1.74	
Conv. Total (cfs)	5888.2	Conv. (cfs)		5888.2	
Length Wtd. (ft)		Wetted Per. (ft)		48.62	
Min Ch El (ft)	2814.70	Shear (lb/sq ft)		2.12	
Alpha	1.00	Stream Power (lb/ft s)	506.63	0.00	0.00
Frctn Loss (ft)	0.37	Cum Volume (acre-ft)	0.09	21.93	0.09
C & E Loss (ft)	0.05	Cum SA (acres)	0.09	10.00	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2817.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.030	
W.S. Elev (ft)	2816.05	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2816.36	Flow Area (sq ft)		57.88	
E.G. Slope (ft/ft)	0.023399	Area (sq ft)		57.88	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	45.53	Top Width (ft)		45.53	
Vel Total (ft/s)	8.81	Avg. Vel. (ft/s)		8.81	
Max Chl Dpth (ft)	1.35	Hydr. Depth (ft)		1.27	
Conv. Total (cfs)	3334.0	Conv. (cfs)		3334.0	
Length Wtd. (ft)	300.00	Wetted Per. (ft)		46.16	
Min Ch El (ft)	2814.70	Shear (lb/sq ft)		1.83	
Alpha	1.00	Stream Power (lb/ft s)	506.63	0.00	0.00
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	0.05	16.22	0.05
C & E Loss (ft)	0.04	Cum SA (acres)	0.07	9.63	0.07

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 8113.9

INPUT
Description: Section 81+13.9
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2826	103.75	2825	103.92	2822	134	2821	152	2812
192	2812	210	2821	217.09	2823	270.86	2824	289.26	2825
307.62	2826								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	134	.03	210	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
134	210	273.9	273.9	273.9	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2818.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.99	Wt. n-Val.		0.030	
W.S. Elev (ft)	2816.69	Reach Len. (ft)	273.90	273.90	273.90
Crit W.S. (ft)	2816.69	Flow Area (sq ft)		231.39	
E.G. Slope (ft/ft)	0.008826	Area (sq ft)		231.39	
Q Total (cfs)	2620.00	Flow (cfs)		2620.00	
Top Width (ft)	58.75	Top Width (ft)		58.75	
Vel Total (ft/s)	11.32	Avg. Vel. (ft/s)		11.32	
Max Chl Dpth (ft)	4.69	Hydr. Depth (ft)		3.94	
Conv. Total (cfs)	27888.0	Conv. (cfs)		27888.0	
Length Wtd. (ft)	273.90	Wetted Per. (ft)		60.96	
Min Ch El (ft)	2812.00	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00
Frctn Loss (ft)	0.88	Cum Volume (acre-ft)	0.54	46.90	0.38
C & E Loss (ft)	0.00	Cum SA (acres)	0.52	10.95	0.20

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2818.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2816.77	Reach Len. (ft)	273.90	273.90	273.90
Crit W.S. (ft)	2816.77	Flow Area (sq ft)		236.57	
E.G. Slope (ft/ft)	0.008782	Area (sq ft)		236.57	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	59.10	Top Width (ft)		59.10	
Vel Total (ft/s)	11.41	Avg. Vel. (ft/s)		11.41	

Max Chl Dpth (ft)	4.77	Hydr. Depth (ft)		4.00	
Conv. Total (cfs)	28812.3	Conv. (cfs)		28812.3	
Length Wtd. (ft)	273.90	Wetted Per. (ft)		61.35	
Min Ch El (ft)	2812.00	Shear (lb/sq ft)		2.11	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.37	41.27	0.31
C & E Loss (ft)		Cum SA (acres)	0.39	10.67	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2816.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.47	Wt. n-Val.		0.030	
W.S. Elev (ft)	2815.31	Reach Len. (ft)	273.90	273.90	273.90
Crit W.S. (ft)	2815.31	Flow Area (sq ft)		154.22	
E.G. Slope (ft/ft)	0.009703	Area (sq ft)		154.22	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	53.23	Top Width (ft)		53.23	
Vel Total (ft/s)	9.73	Avg. Vel. (ft/s)		9.73	
Max Chl Dpth (ft)	3.31	Hydr. Depth (ft)		2.90	
Conv. Total (cfs)	15227.7	Conv. (cfs)		15227.7	
Length Wtd. (ft)	273.90	Wetted Per. (ft)		54.80	
Min Ch El (ft)	2812.00	Shear (lb/sq ft)		1.70	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00
Frctn Loss (ft)	0.96	Cum Volume (acre-ft)	0.15	27.62	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.12	9.99	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2813.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.030	
W.S. Elev (ft)	2812.90	Reach Len. (ft)	273.90	273.90	273.90
Crit W.S. (ft)	2812.90	Flow Area (sq ft)		37.62	
E.G. Slope (ft/ft)	0.014213	Area (sq ft)		37.62	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	43.60	Top Width (ft)		43.60	
Vel Total (ft/s)	5.32	Avg. Vel. (ft/s)		5.32	
Max Chl Dpth (ft)	0.90	Hydr. Depth (ft)		0.86	
Conv. Total (cfs)	1677.6	Conv. (cfs)		1677.6	
Length Wtd. (ft)	273.90	Wetted Per. (ft)		44.02	
Min Ch El (ft)	2812.00	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00

Frctn Loss (ft)	1.42	Cum Volume (acre-ft)	0.01	8.27	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	8.78	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2816.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.31	Wt. n-Val.		0.030	
W.S. Elev (ft)	2814.92	Reach Len. (ft)	273.90	273.90	273.90
Crit W.S. (ft)	2814.92	Flow Area (sq ft)		133.87	
E.G. Slope (ft/ft)	0.010018	Area (sq ft)		133.87	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	51.68	Top Width (ft)		51.68	
Vel Total (ft/s)	9.19	Avg. Vel. (ft/s)		9.19	
Max Chl Dpth (ft)	2.92	Hydr. Depth (ft)		2.59	
Conv. Total (cfs)	12289.1	Conv. (cfs)		12289.1	
Length Wtd. (ft)	273.90	Wetted Per. (ft)		53.06	
Min Ch El (ft)	2812.00	Shear (lb/sq ft)		1.58	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00
Frctn Loss (ft)	1.00	Cum Volume (acre-ft)	0.15	27.91	0.15
C & E Loss (ft)	0.00	Cum SA (acres)	0.14	10.02	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2815.32	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2814.28	Reach Len. (ft)	273.90	273.90	273.90
Crit W.S. (ft)	2814.28	Flow Area (sq ft)		101.33	
E.G. Slope (ft/ft)	0.010711	Area (sq ft)		101.33	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	49.10	Top Width (ft)		49.10	
Vel Total (ft/s)	8.19	Avg. Vel. (ft/s)		8.19	
Max Chl Dpth (ft)	2.27	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	8019.7	Conv. (cfs)		8019.7	

Length Wtd. (ft)	273.90	Wetted Per. (ft)		50.17	
Min Ch El (ft)	2812.00	Shear (lb/sq ft)		1.35	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.09	21.30	0.09
C & E Loss (ft)		Cum SA (acres)	0.09	9.67	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2814.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.78	Wt. n-Val.		0.030	
W.S. Elev (ft)	2813.66	Reach Len. (ft)	273.90	273.90	273.90
Crit W.S. (ft)	2813.66	Flow Area (sq ft)		71.95	
E.G. Slope (ft/ft)	0.011748	Area (sq ft)		71.95	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	46.64	Top Width (ft)		46.64	
Vel Total (ft/s)	7.09	Avg. Vel. (ft/s)		7.09	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		1.54	
Conv. Total (cfs)	4705.4	Conv. (cfs)		4705.4	
Length Wtd. (ft)	273.90	Wetted Per. (ft)		47.43	
Min Ch El (ft)	2812.00	Shear (lb/sq ft)		1.11	
Alpha	1.00	Stream Power (lb/ft s)	307.62	0.00	0.00
Frctn Loss (ft)	1.17	Cum Volume (acre-ft)	0.05	15.77	0.05
C & E Loss (ft)	0.00	Cum SA (acres)	0.07	9.32	0.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7840

INPUT
Description: Section 78+40 (approach to Olalee Rd.)
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2825	109.97	2824	122.81	2823	139.34	2822	150.37	2821
167.82	2820	185.05	2819	213	2818	230	2809.65	270	2809.65
287	2818	380.71	2819	414.35	2820				

Manning's n Values num= 3

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     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     213    .013     287    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           213     287             78.9    78.9    78.9             .3       .5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2816.91    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               3.65    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2813.26    Reach Len. (ft)            78.90      78.90      78.90
  Crit W.S. (ft)           2814.33    Flow Area (sq ft)                    170.79
  E.G. Slope (ft/ft)      0.004108    Area (sq ft)                         170.79
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)             54.69    Top Width (ft)                        54.69
  Vel Total (ft/s)           15.34    Avg. Vel. (ft/s)                      15.34
  Max Chl Dpth (ft)           3.61    Hydr. Depth (ft)                       3.12
  Conv. Total (cfs)        40877.8    Conv. (cfs)                         40877.8
  Length Wtd. (ft)           78.90    Wetted Per. (ft)                      56.36
  Min Ch El (ft)           2809.65    Shear (lb/sq ft)                       0.78
  Alpha                       1.00    Stream Power (lb/ft s)    414.35       0.00       0.00
  Frctn Loss (ft)             1.59    Cum Volume (acre-ft)        0.54      45.63       0.38
  C & E Loss (ft)             0.17    Cum SA (acres)              0.52      10.60       0.20


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2817.04    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               3.71    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2813.33    Reach Len. (ft)            78.90      78.90      78.90
  Crit W.S. (ft)           2814.42    Flow Area (sq ft)                    174.66
  E.G. Slope (ft/ft)      0.004079    Area (sq ft)                         174.66
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             54.98    Top Width (ft)                        54.98
  Vel Total (ft/s)           15.46    Avg. Vel. (ft/s)                      15.46
  Max Chl Dpth (ft)           3.68    Hydr. Depth (ft)                       3.18
  Conv. Total (cfs)        42272.8    Conv. (cfs)                         42272.8
  Length Wtd. (ft)           78.90    Wetted Per. (ft)                      56.69
  Min Ch El (ft)           2809.65    Shear (lb/sq ft)                       0.78
  Alpha                       1.00    Stream Power (lb/ft s)    414.35       0.00       0.00
  Frctn Loss (ft)             1.58    Cum Volume (acre-ft)        0.37      39.98       0.31
  C & E Loss (ft)             0.17    Cum SA (acres)              0.39      10.31       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2814.88    Element                   Left OB    Channel   Right OB
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Vel Head (ft)	2.71	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.17	Reach Len. (ft)	78.90	78.90	78.90
Crit W.S. (ft)	2812.96	Flow Area (sq ft)		113.57	
E.G. Slope (ft/ft)	0.004642	Area (sq ft)		113.57	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	50.25	Top Width (ft)		50.25	
Vel Total (ft/s)	13.21	Avg. Vel. (ft/s)		13.21	
Max Chl Dpth (ft)	2.52	Hydr. Depth (ft)		2.26	
Conv. Total (cfs)	22016.7	Conv. (cfs)		22016.7	
Length Wtd. (ft)	78.90	Wetted Per. (ft)		51.42	
Min Ch El (ft)	2809.65	Shear (lb/sq ft)		0.64	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	1.77	Cum Volume (acre-ft)	0.15	26.78	0.15
C & E Loss (ft)	0.12	Cum SA (acres)	0.12	9.67	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2811.06	Element			
Vel Head (ft)	0.68	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.38	Reach Len. (ft)	78.90	78.90	78.90
Crit W.S. (ft)	2810.55	Flow Area (sq ft)		30.28	
E.G. Slope (ft/ft)	0.005379	Area (sq ft)		30.28	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	42.97	Top Width (ft)		42.97	
Vel Total (ft/s)	6.60	Avg. Vel. (ft/s)		6.60	
Max Chl Dpth (ft)	0.73	Hydr. Depth (ft)		0.70	
Conv. Total (cfs)	2726.9	Conv. (cfs)		2726.9	
Length Wtd. (ft)	78.90	Wetted Per. (ft)		43.31	
Min Ch El (ft)	2809.65	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	2.26	Cum Volume (acre-ft)	0.01	8.06	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	8.51	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2814.28	Element			
Vel Head (ft)	2.41	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.87	Reach Len. (ft)	78.90	78.90	78.90
Crit W.S. (ft)	2812.57	Flow Area (sq ft)		98.64	
E.G. Slope (ft/ft)	0.004817	Area (sq ft)		98.64	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	49.02	Top Width (ft)		49.02	
Vel Total (ft/s)	12.47	Avg. Vel. (ft/s)		12.47	
Max Chl Dpth (ft)	2.22	Hydr. Depth (ft)		2.01	
Conv. Total (cfs)	17722.5	Conv. (cfs)		17722.5	
Length Wtd. (ft)	78.90	Wetted Per. (ft)		50.05	
Min Ch El (ft)	2809.65	Shear (lb/sq ft)		0.59	

Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	1.84	Cum Volume (acre-ft)	0.15	27.18	0.15
C & E Loss (ft)	0.11	Cum SA (acres)	0.14	9.70	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2813.27	Element			
Vel Head (ft)	1.89	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.38	Reach Len. (ft)	78.90	78.90	78.90
Crit W.S. (ft)	2811.92	Flow Area (sq ft)		75.14	
E.G. Slope (ft/ft)	0.005114	Area (sq ft)		75.14	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	47.03	Top Width (ft)		47.03	
Vel Total (ft/s)	11.05	Avg. Vel. (ft/s)		11.05	
Max Chl Dpth (ft)	1.73	Hydr. Depth (ft)		1.60	
Conv. Total (cfs)	11606.8	Conv. (cfs)		11606.8	
Length Wtd. (ft)	78.90	Wetted Per. (ft)		47.83	
Min Ch El (ft)	2809.65	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	1.96	Cum Volume (acre-ft)	0.09	20.74	0.09
C & E Loss (ft)	0.09	Cum SA (acres)	0.09	9.37	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2812.29	Element			
Vel Head (ft)	1.36	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.93	Reach Len. (ft)	78.90	78.90	78.90
Crit W.S. (ft)	2811.31	Flow Area (sq ft)		54.40	
E.G. Slope (ft/ft)	0.005346	Area (sq ft)		54.40	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	45.20	Top Width (ft)		45.20	
Vel Total (ft/s)	9.37	Avg. Vel. (ft/s)		9.37	
Max Chl Dpth (ft)	1.28	Hydr. Depth (ft)		1.20	
Conv. Total (cfs)	6975.5	Conv. (cfs)		6975.5	
Length Wtd. (ft)	78.90	Wetted Per. (ft)		45.79	
Min Ch El (ft)	2809.65	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	414.35	0.00	0.00
Frctn Loss (ft)	2.09	Cum Volume (acre-ft)	0.05	15.37	0.05
C & E Loss (ft)	0.06	Cum SA (acres)	0.07	9.03	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

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          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 7761.1

INPUT
Description: Section 77+61.1 (u/s face of Olalee Rd.)
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2825  109.97    2824  122.81    2823  139.34    2822  150.37    2821
  167.82    2820  185.05    2819  204.33    2818     215    2806     285    2806
  326.19    2818  380.71    2819  414.35    2820  606.63    2825

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  204.33    .013  326.19    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        204.33  326.19             22.5    22.5    22.5             .3       .5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2815.04    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.17    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2814.87    Reach Len. (ft)            22.50      22.50      22.50
  Crit W.S. (ft)           2809.38    Flow Area (sq ft)                    791.08
  E.G. Slope (ft/ft)      0.000063    Area (sq ft)                         791.08
  Q Total (cfs)            2620.00    Flow (cfs)                          2620.00
  Top Width (ft)            108.34    Top Width (ft)                       108.34
  Vel Total (ft/s)            3.31    Avg. Vel. (ft/s)                       3.31
  Max Chl Dpth (ft)           8.87    Hydr. Depth (ft)                       7.30
  Conv. Total (cfs)       329756.9    Conv. (cfs)                        329756.9
  Length Wtd. (ft)           22.50    Wetted Per. (ft)                     113.59
  Min Ch El (ft)           2806.00    Shear (lb/sq ft)                       0.03
  Alpha                       1.00    Stream Power (lb/ft s)    606.63       0.00       0.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.54      44.76       0.38
  C & E Loss (ft)                     Cum SA (acres)              0.52      10.45       0.20


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2814.88    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.19    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2814.69    Reach Len. (ft)            22.50      22.50      22.50
  Crit W.S. (ft)           2809.45    Flow Area (sq ft)                    771.55
  E.G. Slope (ft/ft)      0.000072    Area (sq ft)                         771.55
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)            107.56    Top Width (ft)                       107.56
  Vel Total (ft/s)            3.50    Avg. Vel. (ft/s)                       3.50
  Max Chl Dpth (ft)           8.69    Hydr. Depth (ft)                       7.17
  Conv. Total (cfs)       317962.3    Conv. (cfs)                        317962.3
  Length Wtd. (ft)           22.50    Wetted Per. (ft)                     112.70
  Min Ch El (ft)           2806.00    Shear (lb/sq ft)                       0.03
  Alpha                       1.00    Stream Power (lb/ft s)    606.63       0.00       0.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.37      39.12       0.31
  C & E Loss (ft)                     Cum SA (acres)              0.39      10.17       0.17
```

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2812.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.92	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2808.35	Flow Area (sq ft)		490.03	
E.G. Slope (ft/ft)	0.000085	Area (sq ft)		490.03	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	95.58	Top Width (ft)		95.58	
Vel Total (ft/s)	3.06	Avg. Vel. (ft/s)		3.06	
Max Chl Dpth (ft)	5.92	Hydr. Depth (ft)		5.13	
Conv. Total (cfs)	162589.2	Conv. (cfs)		162589.2	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		99.08	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	26.23	0.15
C & E Loss (ft)		Cum SA (acres)	0.12	9.54	0.12

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2807.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.55	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2806.63	Flow Area (sq ft)		113.86	
E.G. Slope (ft/ft)	0.000142	Area (sq ft)		113.86	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	76.71	Top Width (ft)		76.71	
Vel Total (ft/s)	1.76	Avg. Vel. (ft/s)		1.76	
Max Chl Dpth (ft)	1.55	Hydr. Depth (ft)		1.48	
Conv. Total (cfs)	16801.7	Conv. (cfs)		16801.7	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		77.63	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	7.93	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	8.40	0.03

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2811.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	2811.39	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2808.07	Flow Area (sq ft)		439.61	
E.G. Slope (ft/ft)	0.000079	Area (sq ft)		439.61	
Q Total (cfs)	1230.00	Flow (cfs)		1230.00	
Top Width (ft)	93.27	Top Width (ft)		93.27	
Vel Total (ft/s)	2.80	Avg. Vel. (ft/s)		2.80	
Max Chl Dpth (ft)	5.39	Hydr. Depth (ft)		4.71	
Conv. Total (cfs)	138125.3	Conv. (cfs)		138125.3	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		96.46	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	26.69	0.15
C & E Loss (ft)		Cum SA (acres)	0.14	9.57	0.12

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2810.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.14	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2807.60	Flow Area (sq ft)		327.06	
E.G. Slope (ft/ft)	0.000089	Area (sq ft)		327.06	
Q Total (cfs)	830.00	Flow (cfs)		830.00	
Top Width (ft)	87.90	Top Width (ft)		87.90	
Vel Total (ft/s)	2.54	Avg. Vel. (ft/s)		2.54	
Max Chl Dpth (ft)	4.14	Hydr. Depth (ft)		3.72	
Conv. Total (cfs)	88133.0	Conv. (cfs)		88133.0	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		90.35	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.09	20.38	0.09
C & E Loss (ft)		Cum SA (acres)	0.09	9.24	0.09

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2809.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.00	Reach Len. (ft)	22.50	22.50	22.50
Crit W.S. (ft)	2807.17	Flow Area (sq ft)		229.47	
E.G. Slope (ft/ft)	0.000100	Area (sq ft)		229.47	
Q Total (cfs)	510.00	Flow (cfs)		510.00	
Top Width (ft)	82.97	Top Width (ft)		82.97	
Vel Total (ft/s)	2.22	Avg. Vel. (ft/s)		2.22	
Max Chl Dpth (ft)	3.00	Hydr. Depth (ft)		2.77	
Conv. Total (cfs)	50955.5	Conv. (cfs)		50955.5	
Length Wtd. (ft)	22.50	Wetted Per. (ft)		84.74	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.05	15.12	0.05
C & E Loss (ft)		Cum SA (acres)	0.07	8.91	0.07

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 7749.9

INPUT
Description: Olalee Road
Distance from Upstream XS = .4
Deck/Roadway Width = 22
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 6

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
120	2818		200	2818		215	2818	
285	2818		350	2818		530	2818	

Upstream Bridge Cross Section Data
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2825	109.97	2824	122.81	2823	139.34	2822	150.37	2821
167.82	2820	185.05	2819	204.33	2818	215	2806	285	2806

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  326.19    2818  380.71    2819  414.35    2820  606.63    2825

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  204.33    .013  326.19    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        204.33  326.19             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     120    2818             200    2818             215    2818
     285    2818             350    2818             530    2818

Downstream Bridge Cross Section Data
Station Elevation Data    num=      14
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2825  109.97    2824  122.81    2823  139.34    2822  150.37    2821
  167.82    2820  185.05    2819  204.33    2818     219    2806     312    2806
  326.19    2818  380.71    2819  414.35    2820  606.63    2825

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  204.33    .013  326.19    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        204.33  326.19             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       7      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .5      22     .013     .013        0                   .5                1
Number of Barrels =  3
Upstream   Elevation =  2806
Centerline Stations
    Sta.    Sta.    Sta.
     235     250     265
Downstream Elevation =  2806
Centerline Stations
    Sta.    Sta.    Sta.
     250     265     280

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2620.00    Culv Full Len (ft)         22.00
  # Barrels                      3    Culv Vel US (ft/s)          8.91
  Q Barrel (cfs)            873.33    Culv Vel DS (ft/s)          8.91
  E.G. US. (ft)            2815.04    Culv Inv El Up (ft)      2806.00
  W.S. US. (ft)            2814.87    Culv Inv El Dn (ft)      2806.00
  E.G. DS (ft)             2813.41    Culv Frctn Ls (ft)          0.04
  W.S. DS (ft)             2813.15    Culv Exit Loss (ft)         0.97
```

Delta EG (ft)	1.63	Culv Entr Loss (ft)	0.62
Delta WS (ft)	1.72	Q Weir (cfs)	
E.G. IC (ft)	2814.03	Weir Sta Lft (ft)	
E.G. OC (ft)	2815.04	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2813.00	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2813.00	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.94	Min El Weir Flow (ft)	2818.01

CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	2700.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	9.45
Q Barrel (cfs)	900.00	Culv Vel DS (ft/s)	9.52
E.G. US. (ft)	2814.88	Culv Inv El Up (ft)	2806.00
W.S. US. (ft)	2814.69	Culv Inv El Dn (ft)	2806.00
E.G. DS (ft)	2813.00	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	2812.76	Culv Exit Loss (ft)	1.16
Delta EG (ft)	1.89	Culv Entr Loss (ft)	0.69
Delta WS (ft)	1.94	Q Weir (cfs)	
E.G. IC (ft)	2814.20	Weir Sta Lft (ft)	
E.G. OC (ft)	2814.88	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2812.80	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2812.76	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.04	Min El Weir Flow (ft)	2818.01

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	1500.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	7.52
Q Barrel (cfs)	500.00	Culv Vel DS (ft/s)	7.58
E.G. US. (ft)	2812.07	Culv Inv El Up (ft)	2806.00
W.S. US. (ft)	2811.92	Culv Inv El Dn (ft)	2806.00
E.G. DS (ft)	2810.87	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2810.71	Culv Exit Loss (ft)	0.73
Delta EG (ft)	1.19	Culv Entr Loss (ft)	0.44
Delta WS (ft)	1.21	Q Weir (cfs)	
E.G. IC (ft)	2811.46	Weir Sta Lft (ft)	
E.G. OC (ft)	2812.07	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2810.75	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2810.71	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.41	Min El Weir Flow (ft)	2818.01

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	200.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	3.73
Q Barrel (cfs)	66.67	Culv Vel DS (ft/s)	3.83
E.G. US. (ft)	2807.60	Culv Inv El Up (ft)	2806.00
W.S. US. (ft)	2807.55	Culv Inv El Dn (ft)	2806.00
E.G. DS (ft)	2807.29	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2807.24	Culv Exit Loss (ft)	0.18
Delta EG (ft)	0.31	Culv Entr Loss (ft)	0.11
Delta WS (ft)	0.31	Q Weir (cfs)	
E.G. IC (ft)	2807.38	Weir Sta Lft (ft)	
E.G. OC (ft)	2807.60	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	

Culv WS Inlet (ft)	2807.28	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2807.24	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.89	Min El Weir Flow (ft)	2818.01

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	1230.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	6.45
Q Barrel (cfs)	410.00	Culv Vel DS (ft/s)	6.49
E.G. US. (ft)	2811.51	Culv Inv El Up (ft)	2806.00
W.S. US. (ft)	2811.39	Culv Inv El Dn (ft)	2806.00
E.G. DS (ft)	2810.67	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2810.51	Culv Exit Loss (ft)	0.50
Delta EG (ft)	0.84	Culv Entr Loss (ft)	0.32
Delta WS (ft)	0.87	Q Weir (cfs)	
E.G. IC (ft)	2810.77	Weir Sta Lft (ft)	
E.G. OC (ft)	2811.51	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2810.54	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2810.51	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.99	Min El Weir Flow (ft)	2818.01

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	830.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	5.64
Q Barrel (cfs)	276.67	Culv Vel DS (ft/s)	5.68
E.G. US. (ft)	2810.24	Culv Inv El Up (ft)	2806.00
W.S. US. (ft)	2810.14	Culv Inv El Dn (ft)	2806.00
E.G. DS (ft)	2809.60	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2809.48	Culv Exit Loss (ft)	0.38
Delta EG (ft)	0.65	Culv Entr Loss (ft)	0.25
Delta WS (ft)	0.66	Q Weir (cfs)	
E.G. IC (ft)	2809.64	Weir Sta Lft (ft)	
E.G. OC (ft)	2810.24	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2809.50	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2809.48	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.30	Min El Weir Flow (ft)	2818.01

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	510.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	4.76
Q Barrel (cfs)	170.00	Culv Vel DS (ft/s)	4.81
E.G. US. (ft)	2809.08	Culv Inv El Up (ft)	2806.00
W.S. US. (ft)	2809.00	Culv Inv El Dn (ft)	2806.00
E.G. DS (ft)	2808.61	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2808.53	Culv Exit Loss (ft)	0.27
Delta EG (ft)	0.47	Culv Entr Loss (ft)	0.18
Delta WS (ft)	0.47	Q Weir (cfs)	
E.G. IC (ft)	2808.61	Weir Sta Lft (ft)	
E.G. OC (ft)	2809.08	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2808.55	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2808.53	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.66	Min El Weir Flow (ft)	2818.01

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7738.6

INPUT
Description: Section 77+38.6 (d/s face of Olalee Rd.)
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2825	109.97	2824	122.81	2823	139.34	2822	150.37	2821
167.82	2820	185.05	2819	204.33	2818	219	2806	312	2806
326.19	2818	380.71	2819	414.35	2820	606.63	2825		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	204.33	.013	326.19	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
204.33	326.19	281.8	281.8	281.8	.3	.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2813.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.013	
W.S. Elev (ft)	2813.15	Reach Len. (ft)	281.80	281.80	281.80
Crit W.S. (ft)		Flow Area (sq ft)		726.52	
E.G. Slope (ft/ft)	0.000110	Area (sq ft)		726.52	
Q Total (cfs)	2970.00	Flow (cfs)		2970.00	
Top Width (ft)	110.20	Top Width (ft)		110.20	
Vel Total (ft/s)	4.09	Avg. Vel. (ft/s)		4.09	
Max Chl Dpth (ft)	7.15	Hydr. Depth (ft)		6.59	
Conv. Total (cfs)	283188.2	Conv. (cfs)		283188.2	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		115.37	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.54	44.70	0.38
C & E Loss (ft)	0.36	Cum SA (acres)	0.52	10.39	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2813.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.013	
W.S. Elev (ft)	2812.76	Reach Len. (ft)	281.80	281.80	281.80
Crit W.S. (ft)		Flow Area (sq ft)		683.07	
E.G. Slope (ft/ft)	0.000110	Area (sq ft)		683.07	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	109.25	Top Width (ft)		109.25	
Vel Total (ft/s)	3.95	Avg. Vel. (ft/s)		3.95	
Max Chl Dpth (ft)	6.75	Hydr. Depth (ft)		6.25	
Conv. Total (cfs)	257373.6	Conv. (cfs)		257373.6	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		114.13	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.37	39.06	0.31
C & E Loss (ft)	0.34	Cum SA (acres)	0.39	10.11	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2810.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.71	Reach Len. (ft)	281.80	281.80	281.80
Crit W.S. (ft)		Flow Area (sq ft)		464.93	
E.G. Slope (ft/ft)	0.000113	Area (sq ft)		464.93	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	104.33	Top Width (ft)		104.33	
Vel Total (ft/s)	3.23	Avg. Vel. (ft/s)		3.23	
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)		4.46	
Conv. Total (cfs)	140858.4	Conv. (cfs)		140858.4	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		107.74	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.15	26.19	0.15
C & E Loss (ft)	0.24	Cum SA (acres)	0.12	9.48	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2807.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.24	Reach Len. (ft)	281.80	281.80	281.80
Crit W.S. (ft)		Flow Area (sq ft)		117.47	
E.G. Slope (ft/ft)	0.000172	Area (sq ft)		117.47	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	95.99	Top Width (ft)		95.99	
Vel Total (ft/s)	1.70	Avg. Vel. (ft/s)		1.70	
Max Chl Dpth (ft)	1.24	Hydr. Depth (ft)		1.22	
Conv. Total (cfs)	15267.4	Conv. (cfs)		15267.4	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		96.89	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.01	7.92	0.01
C & E Loss (ft)	0.05	Cum SA (acres)	0.03	8.36	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2810.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.51	Reach Len. (ft)	281.80	281.80	281.80
Crit W.S. (ft)		Flow Area (sq ft)		444.17	
E.G. Slope (ft/ft)	0.000114	Area (sq ft)		444.17	
Q Total (cfs)	1400.00	Flow (cfs)		1400.00	
Top Width (ft)	103.85	Top Width (ft)		103.85	
Vel Total (ft/s)	3.15	Avg. Vel. (ft/s)		3.15	

Max Chl Dpth (ft)	4.51	Hydr. Depth (ft)		4.28	
Conv. Total (cfs)	131037.6	Conv. (cfs)		131037.6	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		107.12	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.15	26.65	0.15
C & E Loss (ft)	0.23	Cum SA (acres)	0.14	9.52	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2809.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.013	
W.S. Elev (ft)	2809.48	Reach Len. (ft)	281.80	281.80	281.80
Crit W.S. (ft)		Flow Area (sq ft)		338.00	
E.G. Slope (ft/ft)	0.000120	Area (sq ft)		338.00	
Q Total (cfs)	930.00	Flow (cfs)		930.00	
Top Width (ft)	101.36	Top Width (ft)		101.36	
Vel Total (ft/s)	2.75	Avg. Vel. (ft/s)		2.75	
Max Chl Dpth (ft)	3.48	Hydr. Depth (ft)		3.33	
Conv. Total (cfs)	84833.2	Conv. (cfs)		84833.2	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		103.88	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)	0.10	Cum Volume (acre-ft)	0.09	20.35	0.09
C & E Loss (ft)	0.17	Cum SA (acres)	0.09	9.19	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2808.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.53	Reach Len. (ft)	281.80	281.80	281.80
Crit W.S. (ft)		Flow Area (sq ft)		242.68	
E.G. Slope (ft/ft)	0.000131	Area (sq ft)		242.68	
Q Total (cfs)	570.00	Flow (cfs)		570.00	
Top Width (ft)	99.08	Top Width (ft)		99.08	
Vel Total (ft/s)	2.35	Avg. Vel. (ft/s)		2.35	
Max Chl Dpth (ft)	2.53	Hydr. Depth (ft)		2.45	
Conv. Total (cfs)	49791.6	Conv. (cfs)		49791.6	
Length Wtd. (ft)	281.80	Wetted Per. (ft)		100.90	
Min Ch El (ft)	2806.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	606.63	0.00	0.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.05	15.10	0.05
C & E Loss (ft)	0.12	Cum SA (acres)	0.07	8.87	0.07

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 7456.8

INPUT
Description: Section 74+56.8 (confluence w/trib.)
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2821  111.92    2820  119.07    2819   134.7    2818     147  2814.5
     165  2805.6     205  2805.6     223  2814.5   235.6    2817  289.47    2818
  368.26    2819   418.2    2820   461.9    2822

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     147     .03     223    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           147     223            109.8   109.8   109.8             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2812.95    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.47    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2811.49    Reach Len. (ft)           109.80     109.80     109.80
  Crit W.S. (ft)           2810.67    Flow Area (sq ft)                    305.43
  E.G. Slope (ft/ft)      0.005054    Area (sq ft)                         305.43
  Q Total (cfs)            2970.00    Flow (cfs)                          2970.00
  Top Width (ft)             63.80    Top Width (ft)                        63.80
  Vel Total (ft/s)            9.72    Avg. Vel. (ft/s)                       9.72
  Max Chl Dpth (ft)           5.88    Hydr. Depth (ft)                       4.79
  Conv. Total (cfs)        41777.6    Conv. (cfs)                         41777.6
  Length Wtd. (ft)          109.80    Wetted Per. (ft)                      66.55
  Min Ch El (ft)           2805.60    Shear (lb/sq ft)                       1.45
  Alpha                       1.00    Stream Power (lb/ft s)    461.90       0.00       0.00
  Frctn Loss (ft)             0.29    Cum Volume (acre-ft)        0.54      41.36       0.38
  C & E Loss (ft)             0.06    Cum SA (acres)              0.52       9.83       0.20


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2812.56    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.39    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2811.18    Reach Len. (ft)           109.80     109.80     109.80
  Crit W.S. (ft)           2810.38    Flow Area (sq ft)                    285.86
  E.G. Slope (ft/ft)      0.005063    Area (sq ft)                         285.86
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             62.55    Top Width (ft)                        62.55
  Vel Total (ft/s)            9.45    Avg. Vel. (ft/s)                       9.45
  Max Chl Dpth (ft)           5.57    Hydr. Depth (ft)                       4.57
  Conv. Total (cfs)        37944.7    Conv. (cfs)                         37944.7
  Length Wtd. (ft)          109.80    Wetted Per. (ft)                      65.16
  Min Ch El (ft)           2805.60    Shear (lb/sq ft)                       1.39
  Alpha                       1.00    Stream Power (lb/ft s)    461.90       0.00       0.00
  Frctn Loss (ft)             0.29    Cum Volume (acre-ft)        0.37      35.93       0.31
  C & E Loss (ft)             0.06    Cum SA (acres)              0.39       9.55       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
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Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2810.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.95	Wt. n-Val.		0.030	
W.S. Elev (ft)	2809.59	Reach Len. (ft)	109.80	109.80	109.80
Crit W.S. (ft)	2808.92	Flow Area (sq ft)		191.99	
E.G. Slope (ft/ft)	0.005046	Area (sq ft)		191.99	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	56.15	Top Width (ft)		56.15	
Vel Total (ft/s)	7.81	Avg. Vel. (ft/s)		7.81	
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)		3.42	
Conv. Total (cfs)	21116.4	Conv. (cfs)		21116.4	
Length Wtd. (ft)	109.80	Wetted Per. (ft)		58.02	
Min Ch El (ft)	2805.60	Shear (lb/sq ft)		1.04	
Alpha	1.00	Stream Power (lb/ft s)	461.90	0.00	0.00
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	0.15	24.06	0.15
C & E Loss (ft)	0.05	Cum SA (acres)	0.12	8.96	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2807.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.030	
W.S. Elev (ft)	2806.91	Reach Len. (ft)	109.80	109.80	109.80
Crit W.S. (ft)	2806.50	Flow Area (sq ft)		55.92	
E.G. Slope (ft/ft)	0.004010	Area (sq ft)		55.92	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	45.30	Top Width (ft)		45.30	
Vel Total (ft/s)	3.58	Avg. Vel. (ft/s)		3.58	
Max Chl Dpth (ft)	1.31	Hydr. Depth (ft)		1.23	
Conv. Total (cfs)	3158.5	Conv. (cfs)		3158.5	
Length Wtd. (ft)	109.80	Wetted Per. (ft)		45.92	
Min Ch El (ft)	2805.60	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)	461.90	0.00	0.00
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.01	7.36	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	7.90	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2810.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.		0.030	
W.S. Elev (ft)	2809.44	Reach Len. (ft)	109.80	109.80	109.80
Crit W.S. (ft)	2808.77	Flow Area (sq ft)		183.39	
E.G. Slope (ft/ft)	0.005040	Area (sq ft)		183.39	
Q Total (cfs)	1400.00	Flow (cfs)		1400.00	
Top Width (ft)	55.53	Top Width (ft)		55.53	
Vel Total (ft/s)	7.63	Avg. Vel. (ft/s)		7.63	
Max Chl Dpth (ft)	3.84	Hydr. Depth (ft)		3.30	
Conv. Total (cfs)	19720.9	Conv. (cfs)		19720.9	
Length Wtd. (ft)	109.80	Wetted Per. (ft)		57.32	
Min Ch El (ft)	2805.60	Shear (lb/sq ft)		1.01	
Alpha	1.00	Stream Power (lb/ft s)	461.90	0.00	0.00
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	0.15	24.62	0.15
C & E Loss (ft)	0.05	Cum SA (acres)	0.14	9.01	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2809.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.		0.030	
W.S. Elev (ft)	2808.65	Reach Len. (ft)	109.80	109.80	109.80
Crit W.S. (ft)	2808.04	Flow Area (sq ft)		140.64	
E.G. Slope (ft/ft)	0.004943	Area (sq ft)		140.64	
Q Total (cfs)	930.00	Flow (cfs)		930.00	
Top Width (ft)	52.32	Top Width (ft)		52.32	
Vel Total (ft/s)	6.61	Avg. Vel. (ft/s)		6.61	
Max Chl Dpth (ft)	3.05	Hydr. Depth (ft)		2.69	
Conv. Total (cfs)	13227.3	Conv. (cfs)		13227.3	
Length Wtd. (ft)	109.80	Wetted Per. (ft)		53.75	
Min Ch El (ft)	2805.60	Shear (lb/sq ft)		0.81	
Alpha	1.00	Stream Power (lb/ft s)	461.90	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.09	18.80	0.09
C & E Loss (ft)	0.04	Cum SA (acres)	0.09	8.70	0.09

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2808.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.030	
W.S. Elev (ft)	2807.92	Reach Len. (ft)	109.80	109.80	109.80
Crit W.S. (ft)	2807.38	Flow Area (sq ft)		103.63	
E.G. Slope (ft/ft)	0.004725	Area (sq ft)		103.63	
Q Total (cfs)	570.00	Flow (cfs)		570.00	
Top Width (ft)	49.38	Top Width (ft)		49.38	
Vel Total (ft/s)	5.50	Avg. Vel. (ft/s)		5.50	
Max Chl Dpth (ft)	2.32	Hydr. Depth (ft)		2.10	
Conv. Total (cfs)	8292.6	Conv. (cfs)		8292.6	
Length Wtd. (ft)	109.80	Wetted Per. (ft)		50.46	
Min Ch El (ft)	2805.60	Shear (lb/sq ft)		0.61	
Alpha	1.00	Stream Power (lb/ft s)	461.90	0.00	0.00
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	0.05	13.98	0.05
C & E Loss (ft)	0.04	Cum SA (acres)	0.07	8.39	0.07

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7347

INPUT
Description: Section 73+47 (approach to Kasota Rd.)
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2821	113.66	2820	128.71	2819	142.71	2818	156.74	2817
171.18	2816	187.84	2815	203.47	2814	221.76	2813	249	2812
262	2805.4	302	2805.4	315	2812	378.86	2813	475.16	2814
550.51	2815	637.31	2816						

```
Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     249    .013     315    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           249     315               80      80      80             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     249  2813.5       T
     315  637.31  2813.5       T
Left Levee      Station=     249      Elevation=  2813.5
Right Levee     Station=     315      Elevation=  2813.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2812.60    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               2.10    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2810.51    Reach Len. (ft)             80.00      80.00      80.00
  Crit W.S. (ft)           2810.51    Flow Area (sq ft)                     255.53
  E.G. Slope (ft/ft)      0.001583    Area (sq ft)                          255.53
  Q Total (cfs)            2970.00    Flow (cfs)                           2970.00
  Top Width (ft)             60.11    Top Width (ft)                         60.11
  Vel Total (ft/s)           11.62    Avg. Vel. (ft/s)                       11.62
  Max Chl Dpth (ft)           5.10    Hydr. Depth (ft)                        4.25
  Conv. Total (cfs)        74637.1    Conv. (cfs)                         74637.1
  Length Wtd. (ft)           80.00    Wetted Per. (ft)                       62.55
  Min Ch El (ft)           2805.40    Shear (lb/sq ft)                        0.40
  Alpha                       1.00    Stream Power (lb/ft s)    637.31     249.00     315.00
  Frctn Loss (ft)             0.03    Cum Volume (acre-ft)        0.54      40.66       0.38
  C & E Loss (ft)             0.84    Cum SA (acres)              0.52       9.68       0.20


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2812.21    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               2.00    Wt. n-Val.                             0.013
  W.S. Elev (ft)           2810.21    Reach Len. (ft)             80.00      80.00      80.00
  Crit W.S. (ft)           2810.21    Flow Area (sq ft)                     238.10
  E.G. Slope (ft/ft)      0.001611    Area (sq ft)                          238.10
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             58.96    Top Width (ft)                         58.96
  Vel Total (ft/s)           11.34    Avg. Vel. (ft/s)                       11.34
  Max Chl Dpth (ft)           4.81    Hydr. Depth (ft)                        4.04
  Conv. Total (cfs)        67278.3    Conv. (cfs)                         67278.3
  Length Wtd. (ft)           80.00    Wetted Per. (ft)                       61.26
  Min Ch El (ft)           2805.40    Shear (lb/sq ft)                        0.39
```

Alpha	1.00	Stream Power (lb/ft s)	637.31	249.00	315.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.37	35.27	0.31
C & E Loss (ft)	0.80	Cum SA (acres)	0.39	9.40	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2810.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.44	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.74	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)	2808.74	Flow Area (sq ft)		155.53	
E.G. Slope (ft/ft)	0.001770	Area (sq ft)		155.53	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	53.15	Top Width (ft)		53.15	
Vel Total (ft/s)	9.64	Avg. Vel. (ft/s)		9.64	
Max Chl Dpth (ft)	3.34	Hydr. Depth (ft)		2.93	
Conv. Total (cfs)	35655.1	Conv. (cfs)		35655.1	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		54.75	
Min Ch El (ft)	2805.40	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	637.31	249.00	315.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.15	23.63	0.15
C & E Loss (ft)	0.58	Cum SA (acres)	0.12	8.83	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2806.74	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.43	Wt. n-Val.		0.013	
W.S. Elev (ft)	2806.31	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)	2806.31	Flow Area (sq ft)		38.09	
E.G. Slope (ft/ft)	0.002560	Area (sq ft)		38.09	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	43.59	Top Width (ft)		43.59	
Vel Total (ft/s)	5.25	Avg. Vel. (ft/s)		5.25	
Max Chl Dpth (ft)	0.91	Hydr. Depth (ft)		0.87	
Conv. Total (cfs)	3953.2	Conv. (cfs)		3953.2	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		44.03	
Min Ch El (ft)	2805.40	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	637.31	249.00	315.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01	7.24	0.01
C & E Loss (ft)	0.18	Cum SA (acres)	0.03	7.79	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2809.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.39	Wt. n-Val.		0.013	
W.S. Elev (ft)	2808.60	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)	2808.60	Flow Area (sq ft)		148.04	
E.G. Slope (ft/ft)	0.001790	Area (sq ft)		148.04	
Q Total (cfs)	1400.00	Flow (cfs)		1400.00	
Top Width (ft)	52.60	Top Width (ft)		52.60	
Vel Total (ft/s)	9.46	Avg. Vel. (ft/s)		9.46	
Max Chl Dpth (ft)	3.20	Hydr. Depth (ft)		2.81	
Conv. Total (cfs)	33093.0	Conv. (cfs)		33093.0	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		54.13	
Min Ch El (ft)	2805.40	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	637.31	249.00	315.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.15	24.20	0.15
C & E Loss (ft)	0.56	Cum SA (acres)	0.14	8.87	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2808.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.10	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.87	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)	2807.87	Flow Area (sq ft)		110.61	
E.G. Slope (ft/ft)	0.001922	Area (sq ft)		110.61	
Q Total (cfs)	930.00	Flow (cfs)		930.00	
Top Width (ft)	49.71	Top Width (ft)		49.71	
Vel Total (ft/s)	8.41	Avg. Vel. (ft/s)		8.41	
Max Chl Dpth (ft)	2.47	Hydr. Depth (ft)		2.22	
Conv. Total (cfs)	21212.5	Conv. (cfs)		21212.5	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		50.89	
Min Ch El (ft)	2805.40	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)	637.31	249.00	315.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.09	18.49	0.09
C & E Loss (ft)	0.45	Cum SA (acres)	0.09	8.57	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2808.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.82	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.20	Reach Len. (ft)	80.00	80.00	80.00
Crit W.S. (ft)	2807.20	Flow Area (sq ft)		78.26	
E.G. Slope (ft/ft)	0.002113	Area (sq ft)		78.26	
Q Total (cfs)	570.00	Flow (cfs)		570.00	
Top Width (ft)	47.08	Top Width (ft)		47.08	
Vel Total (ft/s)	7.28	Avg. Vel. (ft/s)		7.28	
Max Chl Dpth (ft)	1.80	Hydr. Depth (ft)		1.66	
Conv. Total (cfs)	12401.1	Conv. (cfs)		12401.1	
Length Wtd. (ft)	80.00	Wetted Per. (ft)		47.94	
Min Ch El (ft)	2805.40	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	637.31	249.00	315.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.05	13.75	0.05
C & E Loss (ft)	0.34	Cum SA (acres)	0.07	8.26	0.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth

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         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 7267

INPUT
Description: Section 72+67 (u/s face Kasota Rd.)
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2821  113.66    2820  128.71    2819  142.71    2818  156.74    2817
  171.18    2816  187.84    2815  203.47    2814  221.76    2814  244.87    2814
     253    2802     311    2802  319.45    2814  378.86    2813  475.16    2814
  550.51    2815  637.31    2816     720    2817

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  244.87    .013  319.45    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        244.87  319.45             35.7    35.7    35.7             .3       .5
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
   319.5     720    2814       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2811.38    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.41    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2810.96    Reach Len. (ft)            35.70      35.70      35.70
  Crit W.S. (ft)           2806.28    Flow Area (sq ft)                    575.34
  E.G. Slope (ft/ft)      0.000146    Area (sq ft)                         575.34
  Q Total (cfs)            2970.00    Flow (cfs)                          2970.00
  Top Width (ft)             70.38    Top Width (ft)                        70.38
  Vel Total (ft/s)            5.16    Avg. Vel. (ft/s)                       5.16
  Max Chl Dpth (ft)           8.96    Hydr. Depth (ft)                       8.17
  Conv. Total (cfs)       245455.4    Conv. (cfs)                        245455.4
  Length Wtd. (ft)           35.70    Wetted Per. (ft)                      79.79
  Min Ch El (ft)           2802.00    Shear (lb/sq ft)                       0.07
  Alpha                       1.00    Stream Power (lb/ft s)    720.00       0.00       0.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.54      39.89       0.38
  C & E Loss (ft)                     Cum SA (acres)              0.52       9.56       0.20


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
```

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2810.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2810.36	Reach Len. (ft)	35.70	35.70	35.70
Crit W.S. (ft)	2806.02	Flow Area (sq ft)		533.37	
E.G. Slope (ft/ft)	0.000152	Area (sq ft)		533.37	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	69.55	Top Width (ft)		69.55	
Vel Total (ft/s)	5.06	Avg. Vel. (ft/s)		5.06	
Max Chl Dpth (ft)	8.36	Hydr. Depth (ft)		7.67	
Conv. Total (cfs)	219020.6	Conv. (cfs)		219020.6	
Length Wtd. (ft)	35.70	Wetted Per. (ft)		78.33	
Min Ch El (ft)	2802.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	720.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.37	34.56	0.31
C & E Loss (ft)		Cum SA (acres)	0.39	9.28	0.17

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2807.99	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.71	Reach Len. (ft)	35.70	35.70	35.70
Crit W.S. (ft)	2804.73	Flow Area (sq ft)		353.72	
E.G. Slope (ft/ft)	0.000164	Area (sq ft)		353.72	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	65.89	Top Width (ft)		65.89	
Vel Total (ft/s)	4.24	Avg. Vel. (ft/s)		4.24	
Max Chl Dpth (ft)	5.71	Hydr. Depth (ft)		5.37	
Conv. Total (cfs)	116968.6	Conv. (cfs)		116968.6	
Length Wtd. (ft)	35.70	Wetted Per. (ft)		71.88	
Min Ch El (ft)	2802.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	720.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	23.16	0.15
C & E Loss (ft)		Cum SA (acres)	0.12	8.72	0.12

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2805.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.09	Wt. n-Val.		0.013	
W.S. Elev (ft)	2802.24	Reach Len. (ft)	35.70	35.70	35.70
Crit W.S. (ft)	2802.72	Flow Area (sq ft)		14.19	
E.G. Slope (ft/ft)	0.100795	Area (sq ft)		14.19	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	58.34	Top Width (ft)		58.34	
Vel Total (ft/s)	14.10	Avg. Vel. (ft/s)		14.10	
Max Chl Dpth (ft)	0.24	Hydr. Depth (ft)		0.24	
Conv. Total (cfs)	630.0	Conv. (cfs)		630.0	
Length Wtd. (ft)	35.70	Wetted Per. (ft)		58.59	
Min Ch El (ft)	2802.00	Shear (lb/sq ft)		1.52	
Alpha	1.00	Stream Power (lb/ft s)	720.00	0.00	0.00
Frctn Loss (ft)	0.61	Cum Volume (acre-ft)	0.01	7.19	0.01
C & E Loss (ft)	0.80	Cum SA (acres)	0.03	7.69	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2807.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.		0.013	
W.S. Elev (ft)	2807.53	Reach Len. (ft)	35.70	35.70	35.70
Crit W.S. (ft)	2804.61	Flow Area (sq ft)		341.55	
E.G. Slope (ft/ft)	0.000160	Area (sq ft)		341.55	
Q Total (cfs)	1400.00	Flow (cfs)		1400.00	
Top Width (ft)	65.63	Top Width (ft)		65.63	
Vel Total (ft/s)	4.10	Avg. Vel. (ft/s)		4.10	
Max Chl Dpth (ft)	5.53	Hydr. Depth (ft)		5.20	
Conv. Total (cfs)	110801.3	Conv. (cfs)		110801.3	
Length Wtd. (ft)	35.70	Wetted Per. (ft)		71.43	
Min Ch El (ft)	2802.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	720.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	23.76	0.15
C & E Loss (ft)		Cum SA (acres)	0.14	8.76	0.12

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2806.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.013	
W.S. Elev (ft)	2806.26	Reach Len. (ft)	35.70	35.70	35.70
Crit W.S. (ft)	2803.97	Flow Area (sq ft)		259.57	
E.G. Slope (ft/ft)	0.000166	Area (sq ft)		259.57	
Q Total (cfs)	930.00	Flow (cfs)		930.00	
Top Width (ft)	63.88	Top Width (ft)		63.88	
Vel Total (ft/s)	3.58	Avg. Vel. (ft/s)		3.58	
Max Chl Dpth (ft)	4.26	Hydr. Depth (ft)		4.06	
Conv. Total (cfs)	72216.3	Conv. (cfs)		72216.3	
Length Wtd. (ft)	35.70	Wetted Per. (ft)		68.35	
Min Ch El (ft)	2802.00	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	720.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.09	18.15	0.09
C & E Loss (ft)		Cum SA (acres)	0.09	8.46	0.09

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2805.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2805.12	Reach Len. (ft)	35.70	35.70	35.70
Crit W.S. (ft)	2803.43	Flow Area (sq ft)		187.81	

E.G. Slope (ft/ft)	0.000173	Area (sq ft)		187.81	
Q Total (cfs)	570.00	Flow (cfs)		570.00	
Top Width (ft)	62.31	Top Width (ft)		62.31	
Vel Total (ft/s)	3.03	Avg. Vel. (ft/s)		3.03	
Max Chl Dpth (ft)	3.12	Hydr. Depth (ft)		3.01	
Conv. Total (cfs)	43288.7	Conv. (cfs)		43288.7	
Length Wtd. (ft)	35.70	Wetted Per. (ft)		65.59	
Min Ch El (ft)	2802.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	720.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.05	13.50	0.05
C & E Loss (ft)		Cum SA (acres)	0.07	8.16	0.07

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CULVERT

RIVER: Desert Knolls Wa
REACH: Main RS: 7246.1

INPUT
Description: Kasota Road
Distance from Upstream XS = .6
Deck/Roadway Width = 35
Weir Coefficient = 2.6
Upstream Deck/Roadway Coordinates
num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
142	2815		180	2815		245	2815	
250	2815		315	2815		320	2815	
551	2815							

Upstream Bridge Cross Section Data
Station Elevation Data num= 18

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2821	113.66	2820	128.71	2819	142.71	2818	156.74	2817
171.18	2816	187.84	2815	203.47	2814	221.76	2814	244.87	2814
253	2802	311	2802	319.45	2814	378.86	2813	475.16	2814
550.51	2815	637.31	2816	720	2817				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	244.87	.013	319.45	.035

Bank Sta: Left	Right	Coeff Contr.	Expan.
244.87	319.45	.3	.5

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
319.5	720	2814	F

Downstream Deck/Roadway Coordinates
num= 7

Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord	Sta	Hi Cord	Lo Cord
142	2815		180	2815		245	2815	
250	2815		315	2815		320	2815	
551	2815							

Downstream Bridge Cross Section Data
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2821	113.66	2820	128.71	2819	142.71	2818	156.74	2817
171.18	2816	187.84	2815	203.47	2814	221.76	2813	244.87	2812

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     253    2802     311    2802  319.45    2812     3222812.043  378.86    2813
  475.16    2814  550.51    2815  637.31    2816     720    2817

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  244.87    .013     322    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        244.87     322             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       8      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .7      35     .013     .013        0                   .5                1
Number of Barrels =  3
Upstream   Elevation =  2802
Centerline Stations
    Sta.    Sta.    Sta.
     267     282     297
Downstream Elevation =  2802
Centerline Stations
    Sta.    Sta.    Sta.
     267     282     297

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2970.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         10.10
  Q Barrel (cfs)            990.00    Culv Vel DS (ft/s)         10.25
  E.G. US. (ft)            2811.38    Culv Inv El Up (ft)      2802.00
  W.S. US. (ft)            2810.96    Culv Inv El Dn (ft)      2802.00
  E.G. DS (ft)             2809.70    Culv Frctn Ls (ft)          0.05
  W.S. DS (ft)             2808.90    Culv Exit Loss (ft)         0.83
  Delta EG (ft)               1.68    Culv Entr Loss (ft)         0.79
  Delta WS (ft)               2.06    Q Weir (cfs)
  E.G. IC (ft)             2810.71    Weir Sta Lft (ft)
  E.G. OC (ft)             2811.38    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2809.00    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2808.90    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.38    Min El Weir Flow (ft)    2815.01


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2700.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          9.98
  Q Barrel (cfs)            900.00    Culv Vel DS (ft/s)         10.15
  E.G. US. (ft)            2810.76    Culv Inv El Up (ft)      2802.00
  W.S. US. (ft)            2810.36    Culv Inv El Dn (ft)      2802.00
  E.G. DS (ft)             2809.04    Culv Frctn Ls (ft)          0.05
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W.S. DS (ft)	2808.33	Culv Exit Loss (ft)	0.89
Delta EG (ft)	1.72	Culv Entr Loss (ft)	0.77
Delta WS (ft)	2.03	Q Weir (cfs)	
E.G. IC (ft)	2810.16	Weir Sta Lft (ft)	
E.G. OC (ft)	2810.76	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2808.44	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2808.33	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.04	Min El Weir Flow (ft)	2815.01

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	1500.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	7.79
Q Barrel (cfs)	500.00	Culv Vel DS (ft/s)	7.92
E.G. US. (ft)	2808.00	Culv Inv El Up (ft)	2802.00
W.S. US. (ft)	2807.71	Culv Inv El Dn (ft)	2802.00
E.G. DS (ft)	2806.96	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2806.51	Culv Exit Loss (ft)	0.52
Delta EG (ft)	1.04	Culv Entr Loss (ft)	0.47
Delta WS (ft)	1.20	Q Weir (cfs)	
E.G. IC (ft)	2807.44	Weir Sta Lft (ft)	
E.G. OC (ft)	2808.00	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2806.59	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2806.51	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.41	Min El Weir Flow (ft)	2815.01

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	200.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	11.19
Q Barrel (cfs)	66.67	Culv Vel DS (ft/s)	3.61
E.G. US. (ft)	2805.33	Culv Inv El Up (ft)	2802.00
W.S. US. (ft)	2802.24	Culv Inv El Dn (ft)	2802.00
E.G. DS (ft)	2803.42	Culv Frctn Ls (ft)	0.85
W.S. DS (ft)	2803.32	Culv Exit Loss (ft)	0.10
Delta EG (ft)	1.91	Culv Entr Loss (ft)	0.96
Delta WS (ft)	1.07	Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2802.43	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2803.32	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.89	Min El Weir Flow (ft)	2815.01

Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	1400.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	7.35
Q Barrel (cfs)	466.67	Culv Vel DS (ft/s)	7.45
E.G. US. (ft)	2807.79	Culv Inv El Up (ft)	2802.00
W.S. US. (ft)	2807.53	Culv Inv El Dn (ft)	2802.00
E.G. DS (ft)	2806.92	Culv Frctn Ls (ft)	0.04
W.S. DS (ft)	2806.47	Culv Exit Loss (ft)	0.42
Delta EG (ft)	0.87	Culv Entr Loss (ft)	0.42
Delta WS (ft)	1.05	Q Weir (cfs)	

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  E.G. IC (ft)             2807.19    Weir Sta Lft (ft)
  E.G. OC (ft)             2807.79    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2806.54    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2806.47    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.26    Min El Weir Flow (ft)    2815.01


CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        930.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          6.21
  Q Barrel (cfs)            310.00    Culv Vel DS (ft/s)          6.30
  E.G. US. (ft)            2806.47    Culv Inv El Up (ft)      2802.00
  W.S. US. (ft)            2806.26    Culv Inv El Dn (ft)      2802.00
  E.G. DS (ft)             2805.85    Culv Frctn Ls (ft)          0.03
  W.S. DS (ft)             2805.52    Culv Exit Loss (ft)         0.28
  Delta EG (ft)               0.62    Culv Entr Loss (ft)         0.30
  Delta WS (ft)               0.74    Q Weir (cfs)
  E.G. IC (ft)             2805.92    Weir Sta Lft (ft)
  E.G. OC (ft)             2806.47    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2805.57    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2805.52    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         2.48    Min El Weir Flow (ft)    2815.01


CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        570.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          5.09
  Q Barrel (cfs)            190.00    Culv Vel DS (ft/s)          5.17
  E.G. US. (ft)            2805.27    Culv Inv El Up (ft)      2802.00
  W.S. US. (ft)            2805.12    Culv Inv El Dn (ft)      2802.00
  E.G. DS (ft)             2804.85    Culv Frctn Ls (ft)          0.03
  W.S. DS (ft)             2804.62    Culv Exit Loss (ft)         0.18
  Delta EG (ft)               0.41    Culv Entr Loss (ft)         0.20
  Delta WS (ft)               0.50    Q Weir (cfs)
  E.G. IC (ft)             2804.81    Weir Sta Lft (ft)
  E.G. OC (ft)             2805.27    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2804.67    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2804.62    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         1.79    Min El Weir Flow (ft)    2815.01


CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 7231.3

INPUT
Description: Section 72+31.3 (d/s face Kasota Rd.)
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2821  113.66    2820  128.71    2819  142.71    2818  156.74    2817
  171.18    2816  187.84    2815  203.47    2814  221.76    2813  244.87    2812
     253    2802     311    2802  319.45    2812     3222812.043  378.86    2813
  475.16    2814  550.51    2815  637.31    2816     720    2817

Manning's n Values        num=       3
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     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  244.87    .013     322    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        244.87     322            221.1   221.1   221.1             .3       .5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2809.70    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.80    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2808.90    Reach Len. (ft)           221.10     221.10     221.10
  Crit W.S. (ft)                      Flow Area (sq ft)                    439.73
  E.G. Slope (ft/ft)      0.000378    Area (sq ft)                         439.73
  Q Total (cfs)            3150.00    Flow (cfs)                          3150.00
  Top Width (ft)             69.44    Top Width (ft)                        69.44
  Vel Total (ft/s)            7.16    Avg. Vel. (ft/s)                       7.16
  Max Chl Dpth (ft)           6.90    Hydr. Depth (ft)                       6.33
  Conv. Total (cfs)       162090.9    Conv. (cfs)                       162090.9
  Length Wtd. (ft)          221.10    Wetted Per. (ft)                      75.93
  Min Ch El (ft)           2802.00    Shear (lb/sq ft)                       0.14
  Alpha                       1.00    Stream Power (lb/ft s)    720.00       0.00       0.00
  Frctn Loss (ft)             0.20    Cum Volume (acre-ft)        0.54      39.80       0.38
  C & E Loss (ft)             0.20    Cum SA (acres)              0.52       9.50       0.20


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2809.04    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.71    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2808.33    Reach Len. (ft)           221.10     221.10     221.10
  Crit W.S. (ft)                      Flow Area (sq ft)                    400.55
  E.G. Slope (ft/ft)      0.000369    Area (sq ft)                         400.55
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             68.50    Top Width (ft)                        68.50
  Vel Total (ft/s)            6.74    Avg. Vel. (ft/s)                       6.74
  Max Chl Dpth (ft)           6.33    Hydr. Depth (ft)                       5.85
  Conv. Total (cfs)       140568.2    Conv. (cfs)                       140568.2
  Length Wtd. (ft)          221.10    Wetted Per. (ft)                      74.45
  Min Ch El (ft)           2802.00    Shear (lb/sq ft)                       0.12
  Alpha                       1.00    Stream Power (lb/ft s)    720.00       0.00       0.00
  Frctn Loss (ft)             0.20    Cum Volume (acre-ft)        0.37      34.48       0.31
  C & E Loss (ft)             0.18    Cum SA (acres)              0.39       9.23       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2806.96    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.45    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2806.51    Reach Len. (ft)           221.10     221.10     221.10
  Crit W.S. (ft)                      Flow Area (sq ft)                    278.51
  E.G. Slope (ft/ft)      0.000350    Area (sq ft)                         278.51
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
  Top Width (ft)             65.48    Top Width (ft)                        65.48
```

Vel Total (ft/s)	5.39	Avg. Vel. (ft/s)		5.39	
Max Chl Dpth (ft)	4.51	Hydr. Depth (ft)		4.25	
Conv. Total (cfs)	80144.7	Conv. (cfs)		80144.7	
Length Wtd. (ft)	221.10	Wetted Per. (ft)		69.72	
Min Ch El (ft)	2802.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	720.00	0.00	0.00
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.15	23.10	0.15
C & E Loss (ft)	0.13	Cum SA (acres)	0.12	8.66	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2803.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.10	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.32	Reach Len. (ft)	221.10	221.10	221.10
Crit W.S. (ft)		Flow Area (sq ft)		77.94	
E.G. Slope (ft/ft)	0.000367	Area (sq ft)		77.94	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	60.19	Top Width (ft)		60.19	
Vel Total (ft/s)	2.57	Avg. Vel. (ft/s)		2.57	
Max Chl Dpth (ft)	1.32	Hydr. Depth (ft)		1.29	
Conv. Total (cfs)	10440.1	Conv. (cfs)		10440.1	
Length Wtd. (ft)	221.10	Wetted Per. (ft)		61.43	
Min Ch El (ft)	2802.00	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	720.00	0.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.01	7.19	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	7.64	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2806.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.013	
W.S. Elev (ft)	2806.47	Reach Len. (ft)	221.10	221.10	221.10
Crit W.S. (ft)		Flow Area (sq ft)		276.08	
E.G. Slope (ft/ft)	0.000350	Area (sq ft)		276.08	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	65.42	Top Width (ft)		65.42	
Vel Total (ft/s)	5.36	Avg. Vel. (ft/s)		5.36	
Max Chl Dpth (ft)	4.47	Hydr. Depth (ft)		4.22	
Conv. Total (cfs)	79056.1	Conv. (cfs)		79056.1	
Length Wtd. (ft)	221.10	Wetted Per. (ft)		69.62	
Min Ch El (ft)	2802.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	720.00	0.00	0.00
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.15	23.70	0.15
C & E Loss (ft)	0.13	Cum SA (acres)	0.14	8.71	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2805.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.		0.013	
W.S. Elev (ft)	2805.52	Reach Len. (ft)	221.10	221.10	221.10

Crit W.S. (ft)		Flow Area (sq ft)		214.21		
E.G. Slope (ft/ft)	0.000348	Area (sq ft)		214.21		
Q Total (cfs)	990.00	Flow (cfs)		990.00		
Top Width (ft)	63.83	Top Width (ft)		63.83		
Vel Total (ft/s)	4.62	Avg. Vel. (ft/s)		4.62		
Max Chl Dpth (ft)	3.52	Hydr. Depth (ft)		3.36		
Conv. Total (cfs)	53067.7	Conv. (cfs)		53067.7		
Length Wtd. (ft)	221.10	Wetted Per. (ft)		67.14		
Min Ch El (ft)	2802.00	Shear (lb/sq ft)		0.07		
Alpha	1.00	Stream Power (lb/ft s)	720.00	0.00	0.00	
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.09	18.10	0.09	
C & E Loss (ft)	0.10	Cum SA (acres)	0.09	8.41	0.09	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2804.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.62	Reach Len. (ft)	221.10	221.10	221.10
Crit W.S. (ft)		Flow Area (sq ft)		157.81	
E.G. Slope (ft/ft)	0.000349	Area (sq ft)		157.81	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	62.35	Top Width (ft)		62.35	
Vel Total (ft/s)	3.87	Avg. Vel. (ft/s)		3.87	
Max Chl Dpth (ft)	2.62	Hydr. Depth (ft)		2.53	
Conv. Total (cfs)	32646.3	Conv. (cfs)		32646.3	
Length Wtd. (ft)	221.10	Wetted Per. (ft)		64.81	
Min Ch El (ft)	2802.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	720.00	0.00	0.00
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.05	13.47	0.05
C & E Loss (ft)	0.07	Cum SA (acres)	0.07	8.11	0.07

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 7010.2

INPUT
Description: Section 70+10.2
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2818	143.65	2815	157.36	2814	169.08	2813	185.55	2812
201.42	2811	205	2811	207	2810	224	2801.65	264	2801.65
281	2810	283	2811	337.57	2811	374.35	2812	399.85	2814

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	205	.03	283	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
205	283	130.2	130.2	130.2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	205	2811	T
283	399.85	2811	T

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2809.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.45	Wt. n-Val.		0.030	
W.S. Elev (ft)	2807.85	Reach Len. (ft)	130.20	130.20	130.20
Crit W.S. (ft)	2806.89	Flow Area (sq ft)		326.30	
E.G. Slope (ft/ft)	0.004705	Area (sq ft)		326.30	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	65.25	Top Width (ft)		65.25	
Vel Total (ft/s)	9.65	Avg. Vel. (ft/s)		9.65	
Max Chl Dpth (ft)	6.20	Hydr. Depth (ft)		5.00	
Conv. Total (cfs)	45922.3	Conv. (cfs)		45922.3	
Length Wtd. (ft)	130.20	Wetted Per. (ft)		68.13	
Min Ch El (ft)	2801.65	Shear (lb/sq ft)		1.41	
Alpha	1.00	Stream Power (lb/ft s)	399.85	0.00	0.00
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	0.54	37.86	0.38
C & E Loss (ft)	0.07	Cum SA (acres)	0.52	9.16	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2808.66	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.31	Wt. n-Val.		0.030	
W.S. Elev (ft)	2807.35	Reach Len. (ft)	130.20	130.20	130.20
Crit W.S. (ft)	2806.42	Flow Area (sq ft)		293.94	
E.G. Slope (ft/ft)	0.004679	Area (sq ft)		293.94	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	63.20	Top Width (ft)		63.20	
Vel Total (ft/s)	9.19	Avg. Vel. (ft/s)		9.19	
Max Chl Dpth (ft)	5.70	Hydr. Depth (ft)		4.65	
Conv. Total (cfs)	39473.4	Conv. (cfs)		39473.4	
Length Wtd. (ft)	130.20	Wetted Per. (ft)		65.84	
Min Ch El (ft)	2801.65	Shear (lb/sq ft)		1.30	
Alpha	1.00	Stream Power (lb/ft s)	399.85	0.00	0.00
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	0.37	32.72	0.31
C & E Loss (ft)	0.07	Cum SA (acres)	0.39	8.89	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2806.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.89	Wt. n-Val.		0.030	
W.S. Elev (ft)	2805.75	Reach Len. (ft)	130.20	130.20	130.20
Crit W.S. (ft)	2804.96	Flow Area (sq ft)		198.30	
E.G. Slope (ft/ft)	0.004592	Area (sq ft)		198.30	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	56.70	Top Width (ft)		56.70	
Vel Total (ft/s)	7.56	Avg. Vel. (ft/s)		7.56	
Max Chl Dpth (ft)	4.10	Hydr. Depth (ft)		3.50	
Conv. Total (cfs)	22136.7	Conv. (cfs)		22136.7	
Length Wtd. (ft)	130.20	Wetted Per. (ft)		58.61	
Min Ch El (ft)	2801.65	Shear (lb/sq ft)		0.97	

Alpha	1.00	Stream Power (lb/ft s)	399.85	0.00	0.00
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.15	21.89	0.15
C & E Loss (ft)	0.06	Cum SA (acres)	0.12	8.35	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2803.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.030	
W.S. Elev (ft)	2803.04	Reach Len. (ft)	130.20	130.20	130.20
Crit W.S. (ft)	2802.56	Flow Area (sq ft)		59.56	
E.G. Slope (ft/ft)	0.003286	Area (sq ft)		59.56	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	45.66	Top Width (ft)		45.66	
Vel Total (ft/s)	3.36	Avg. Vel. (ft/s)		3.36	
Max Chl Dpth (ft)	1.39	Hydr. Depth (ft)		1.30	
Conv. Total (cfs)	3489.1	Conv. (cfs)		3489.1	
Length Wtd. (ft)	130.20	Wetted Per. (ft)		46.31	
Min Ch El (ft)	2801.65	Shear (lb/sq ft)		0.26	
Alpha	1.00	Stream Power (lb/ft s)	399.85	0.00	0.00
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	0.01	6.84	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	7.38	0.03

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2806.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.88	Wt. n-Val.		0.030	
W.S. Elev (ft)	2805.72	Reach Len. (ft)	130.20	130.20	130.20
Crit W.S. (ft)	2804.93	Flow Area (sq ft)		196.27	
E.G. Slope (ft/ft)	0.004609	Area (sq ft)		196.27	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	56.55	Top Width (ft)		56.55	
Vel Total (ft/s)	7.54	Avg. Vel. (ft/s)		7.54	
Max Chl Dpth (ft)	4.07	Hydr. Depth (ft)		3.47	
Conv. Total (cfs)	21800.3	Conv. (cfs)		21800.3	
Length Wtd. (ft)	130.20	Wetted Per. (ft)		58.44	
Min Ch El (ft)	2801.65	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)	399.85	0.00	0.00
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.15	22.50	0.15
C & E Loss (ft)	0.05	Cum SA (acres)	0.14	8.40	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2805.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.030	
W.S. Elev (ft)	2804.90	Reach Len. (ft)	130.20	130.20	130.20
Crit W.S. (ft)	2804.19	Flow Area (sq ft)		151.22	
E.G. Slope (ft/ft)	0.004505	Area (sq ft)		151.22	
Q Total (cfs)	990.00	Flow (cfs)		990.00	

Top Width (ft)	53.21	Top Width (ft)			53.21	
Vel Total (ft/s)	6.55	Avg. Vel. (ft/s)			6.55	
Max Chl Dpth (ft)	3.24	Hydr. Depth (ft)			2.84	
Conv. Total (cfs)	14749.9	Conv. (cfs)			14749.9	
Length Wtd. (ft)	130.20	Wetted Per. (ft)			54.72	
Min Ch El (ft)	2801.65	Shear (lb/sq ft)			0.78	
Alpha	1.00	Stream Power (lb/ft s)	399.85		0.00	0.00
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	0.09		17.17	0.09
C & E Loss (ft)	0.05	Cum SA (acres)	0.09		8.11	0.09

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2804.60	Element	Left OB	Channel	Right OB	
Vel Head (ft)	0.46	Wt. n-Val.		0.030		
W.S. Elev (ft)	2804.14	Reach Len. (ft)	130.20	130.20	130.20	
Crit W.S. (ft)	2803.52	Flow Area (sq ft)		112.39		
E.G. Slope (ft/ft)	0.004221	Area (sq ft)		112.39		
Q Total (cfs)	610.00	Flow (cfs)		610.00		
Top Width (ft)	50.15	Top Width (ft)		50.15		
Vel Total (ft/s)	5.43	Avg. Vel. (ft/s)		5.43		
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)		2.24		
Conv. Total (cfs)	9389.3	Conv. (cfs)		9389.3		
Length Wtd. (ft)	130.20	Wetted Per. (ft)		51.31		
Min Ch El (ft)	2801.65	Shear (lb/sq ft)		0.58		
Alpha	1.00	Stream Power (lb/ft s)	399.85	0.00	0.00	
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	0.05	12.78	0.05	
C & E Loss (ft)	0.04	Cum SA (acres)	0.07	7.83	0.07	

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6880

INPUT
Description: Section 68+80 (inlet to Tuscola Rd.)
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2815	112.62	2814	127.02	2813	144.82	2812	158.44	2811
178.09	2810	211	2809	226	2801.45	266	2801.45	281	2809
299.76	2809	328.63	2809	363.4	2810	396.13	2810.5	435.17	2811
550.8	2813	633.9	2815						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	211	.013	281	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
211	281	78.4	78.4	78.4	.3	.5

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	211	2810	T
281	633.9	2810	T

Left Levee Station= 211 Elevation= 2810
Right Levee Station= 281 Elevation= 2810

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2808.90	Element	Left OB	Channel	Right OB	

Vel Head (ft)	2.16	Wt. n-Val.		0.013	
W.S. Elev (ft)	2806.74	Reach Len. (ft)	78.40	78.40	78.40
Crit W.S. (ft)	2806.74	Flow Area (sq ft)		267.26	
E.G. Slope (ft/ft)	0.001566	Area (sq ft)		267.26	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	61.02	Top Width (ft)		61.02	
Vel Total (ft/s)	11.79	Avg. Vel. (ft/s)		11.79	
Max Chl Dpth (ft)	5.29	Hydr. Depth (ft)		4.38	
Conv. Total (cfs)	79601.8	Conv. (cfs)		79601.8	
Length Wtd. (ft)	78.40	Wetted Per. (ft)		63.54	
Min Ch El (ft)	2801.45	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)	633.90	211.00	281.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.54	36.97	0.38
C & E Loss (ft)	0.88	Cum SA (acres)	0.52	8.97	0.20

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2808.25	Element			
Vel Head (ft)	1.99	Wt. n-Val.		0.013	
W.S. Elev (ft)	2806.26	Reach Len. (ft)	78.40	78.40	78.40
Crit W.S. (ft)	2806.26	Flow Area (sq ft)		238.59	
E.G. Slope (ft/ft)	0.001605	Area (sq ft)		238.59	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	59.13	Top Width (ft)		59.13	
Vel Total (ft/s)	11.32	Avg. Vel. (ft/s)		11.32	
Max Chl Dpth (ft)	4.81	Hydr. Depth (ft)		4.04	
Conv. Total (cfs)	67393.2	Conv. (cfs)		67393.2	
Length Wtd. (ft)	78.40	Wetted Per. (ft)		61.41	
Min Ch El (ft)	2801.45	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)	633.90	211.00	281.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.37	31.92	0.31
C & E Loss (ft)	0.82	Cum SA (acres)	0.39	8.71	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2806.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.45	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.78	Reach Len. (ft)	78.40	78.40	78.40
Crit W.S. (ft)	2804.78	Flow Area (sq ft)		155.14	
E.G. Slope (ft/ft)	0.001787	Area (sq ft)		155.14	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	53.23	Top Width (ft)		53.23	
Vel Total (ft/s)	9.67	Avg. Vel. (ft/s)		9.67	
Max Chl Dpth (ft)	3.33	Hydr. Depth (ft)		2.91	
Conv. Total (cfs)	35486.1	Conv. (cfs)		35486.1	
Length Wtd. (ft)	78.40	Wetted Per. (ft)		54.81	
Min Ch El (ft)	2801.45	Shear (lb/sq ft)		0.32	
Alpha	1.00	Stream Power (lb/ft s)	633.90	211.00	281.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.15	21.36	0.15
C & E Loss (ft)	0.61	Cum SA (acres)	0.12	8.19	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2802.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.		0.013	
W.S. Elev (ft)	2802.33	Reach Len. (ft)	78.40	78.40	78.40
Crit W.S. (ft)	2802.33	Flow Area (sq ft)		36.83	
E.G. Slope (ft/ft)	0.002855	Area (sq ft)		36.83	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	43.50	Top Width (ft)		43.50	
Vel Total (ft/s)	5.43	Avg. Vel. (ft/s)		5.43	
Max Chl Dpth (ft)	0.88	Hydr. Depth (ft)		0.85	
Conv. Total (cfs)	3743.1	Conv. (cfs)		3743.1	
Length Wtd. (ft)	78.40	Wetted Per. (ft)		43.92	
Min Ch El (ft)	2801.45	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	633.90	211.00	281.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.01	6.69	0.01
C & E Loss (ft)	0.20	Cum SA (acres)	0.03	7.24	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2806.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.43	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.76	Reach Len. (ft)	78.40	78.40	78.40
Crit W.S. (ft)	2804.76	Flow Area (sq ft)		154.17	
E.G. Slope (ft/ft)	0.001773	Area (sq ft)		154.17	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	53.15	Top Width (ft)		53.15	
Vel Total (ft/s)	9.60	Avg. Vel. (ft/s)		9.60	
Max Chl Dpth (ft)	3.31	Hydr. Depth (ft)		2.90	
Conv. Total (cfs)	35150.4	Conv. (cfs)		35150.4	
Length Wtd. (ft)	78.40	Wetted Per. (ft)		54.72	
Min Ch El (ft)	2801.45	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	633.90	211.00	281.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.15	21.98	0.15
C & E Loss (ft)	0.61	Cum SA (acres)	0.14	8.24	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2805.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2804.02	Reach Len. (ft)	78.40	78.40	78.40
Crit W.S. (ft)	2804.02	Flow Area (sq ft)		115.68	
E.G. Slope (ft/ft)	0.001901	Area (sq ft)		115.68	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	50.19	Top Width (ft)		50.19	
Vel Total (ft/s)	8.56	Avg. Vel. (ft/s)		8.56	

Max Chl Dpth (ft)	2.57	Hydr. Depth (ft)		2.30	
Conv. Total (cfs)	22704.6	Conv. (cfs)		22704.6	
Length Wtd. (ft)	78.40	Wetted Per. (ft)		51.41	
Min Ch El (ft)	2801.45	Shear (lb/sq ft)		0.27	
Alpha	1.00	Stream Power (lb/ft s)	633.90	211.00	281.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.09	16.78	0.09
C & E Loss (ft)	0.49	Cum SA (acres)	0.09	7.96	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2804.19	Element			
Vel Head (ft)	0.86	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.32	Reach Len. (ft)	78.40	78.40	78.40
Crit W.S. (ft)	2803.32	Flow Area (sq ft)		81.90	
E.G. Slope (ft/ft)	0.002102	Area (sq ft)		81.90	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	47.44	Top Width (ft)		47.44	
Vel Total (ft/s)	7.45	Avg. Vel. (ft/s)		7.45	
Max Chl Dpth (ft)	1.87	Hydr. Depth (ft)		1.73	
Conv. Total (cfs)	13306.4	Conv. (cfs)		13306.4	
Length Wtd. (ft)	78.40	Wetted Per. (ft)		48.33	
Min Ch El (ft)	2801.45	Shear (lb/sq ft)		0.22	
Alpha	1.00	Stream Power (lb/ft s)	633.90	211.00	281.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.05	12.49	0.05
C & E Loss (ft)	0.37	Cum SA (acres)	0.07	7.68	0.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6801.6

INPUT
Description: Section 68+01.6 (U/S face of Tuscola Rd.)
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2815	112.62	2814	127.02	2813	144.82	2812	158.44	2811
178.09	2810	212.6	2809.5	212.64	2796.65	235.16	2796.65	253.99	2796.65
279.9	2796.65	280	2809.5	299.76	2809	328.63	2809	363.4	2810
396.13	2810.5	435.17	2811	550.8	2813	633.9	2815		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	212.6	.013	280	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
212.6	280	31.8	31.8	31.8	.3	.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2806.36	Element			
Vel Head (ft)	0.39	Wt. n-Val.		0.013	
W.S. Elev (ft)	2805.97	Reach Len. (ft)	31.80	31.80	31.80
Crit W.S. (ft)	2800.72	Flow Area (sq ft)		627.28	
E.G. Slope (ft/ft)	0.000136	Area (sq ft)		627.28	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	67.36	Top Width (ft)		67.36	
Vel Total (ft/s)	5.02	Avg. Vel. (ft/s)		5.02	
Max Chl Dpth (ft)	9.32	Hydr. Depth (ft)		9.31	
Conv. Total (cfs)	269868.2	Conv. (cfs)		269868.2	
Length Wtd. (ft)	31.80	Wetted Per. (ft)		85.90	
Min Ch El (ft)	2796.65	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.54	36.17	0.38
C & E Loss (ft)		Cum SA (acres)	0.52	8.85	0.20

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2805.48	Element			
Vel Head (ft)	0.35	Wt. n-Val.		0.013	
W.S. Elev (ft)	2805.13	Reach Len. (ft)	31.80	31.80	31.80
Crit W.S. (ft)	2800.32	Flow Area (sq ft)		570.62	
E.G. Slope (ft/ft)	0.000134	Area (sq ft)		570.62	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	67.35	Top Width (ft)		67.35	
Vel Total (ft/s)	4.73	Avg. Vel. (ft/s)		4.73	
Max Chl Dpth (ft)	8.48	Hydr. Depth (ft)		8.47	
Conv. Total (cfs)	233547.7	Conv. (cfs)		233547.7	
Length Wtd. (ft)	31.80	Wetted Per. (ft)		84.21	
Min Ch El (ft)	2796.65	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.37	31.19	0.31
C & E Loss (ft)		Cum SA (acres)	0.39	8.59	0.17

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2802.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.013	
W.S. Elev (ft)	2802.55	Reach Len. (ft)	31.80	31.80	31.80
Crit W.S. (ft)	2799.13	Flow Area (sq ft)		396.98	
E.G. Slope (ft/ft)	0.000127	Area (sq ft)		396.98	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	67.32	Top Width (ft)		67.32	
Vel Total (ft/s)	3.78	Avg. Vel. (ft/s)		3.78	
Max Chl Dpth (ft)	5.90	Hydr. Depth (ft)		5.90	
Conv. Total (cfs)	133061.1	Conv. (cfs)		133061.1	
Length Wtd. (ft)	31.80	Wetted Per. (ft)		79.06	
Min Ch El (ft)	2796.65	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	20.87	0.15
C & E Loss (ft)		Cum SA (acres)	0.12	8.08	0.12

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2800.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2796.83	Reach Len. (ft)	31.80	31.80	31.80
Crit W.S. (ft)	2797.30	Flow Area (sq ft)		12.25	
E.G. Slope (ft/ft)	0.199036	Area (sq ft)		12.25	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	67.26	Top Width (ft)		67.26	
Vel Total (ft/s)	16.33	Avg. Vel. (ft/s)		16.33	
Max Chl Dpth (ft)	0.18	Hydr. Depth (ft)		0.18	
Conv. Total (cfs)	448.3	Conv. (cfs)		448.3	
Length Wtd. (ft)	31.80	Wetted Per. (ft)		67.62	
Min Ch El (ft)	2796.65	Shear (lb/sq ft)		2.25	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	0.01	6.65	0.01
C & E Loss (ft)	1.10	Cum SA (acres)	0.03	7.14	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2802.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.22	Wt. n-Val.		0.013	
W.S. Elev (ft)	2802.50	Reach Len. (ft)	31.80	31.80	31.80
Crit W.S. (ft)	2799.11	Flow Area (sq ft)		393.70	
E.G. Slope (ft/ft)	0.000127	Area (sq ft)		393.70	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	67.32	Top Width (ft)		67.32	
Vel Total (ft/s)	3.76	Avg. Vel. (ft/s)		3.76	
Max Chl Dpth (ft)	5.85	Hydr. Depth (ft)		5.85	
Conv. Total (cfs)	131336.3	Conv. (cfs)		131336.3	
Length Wtd. (ft)	31.80	Wetted Per. (ft)		78.96	
Min Ch El (ft)	2796.65	Shear (lb/sq ft)		0.04	

```
  Alpha                        1.00    Stream Power (lb/ft s)    633.90       0.00       0.00
  Frctn Loss (ft)                      Cum Volume (acre-ft)        0.15      21.48       0.15
  C & E Loss (ft)                      Cum SA (acres)              0.14       8.13       0.12


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #5-yr SBCFCD

  E.G. Elev (ft)           2801.37    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.16    Wt. n-Val.                           0.013
  W.S. Elev (ft)           2801.21    Reach Len. (ft)            31.80      31.80      31.80
  Crit W.S. (ft)           2798.53    Flow Area (sq ft)                    306.64
  E.G. Slope (ft/ft)      0.000125    Area (sq ft)                         306.64
  Q Total (cfs)             990.00    Flow (cfs)                           990.00
  Top Width (ft)             67.31    Top Width (ft)                        67.31
  Vel Total (ft/s)            3.23    Avg. Vel. (ft/s)                       3.23
  Max Chl Dpth (ft)           4.56    Hydr. Depth (ft)                       4.56
  Conv. Total (cfs)        88540.2    Conv. (cfs)                         88540.2
  Length Wtd. (ft)           31.80    Wetted Per. (ft)                      76.37
  Min Ch El (ft)           2796.65    Shear (lb/sq ft)                       0.03
  Alpha                       1.00    Stream Power (lb/ft s)    633.90       0.00       0.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.09      16.40       0.09
  C & E Loss (ft)                     Cum SA (acres)              0.09       7.85       0.09


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2800.13    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.11    Wt. n-Val.                           0.013
  W.S. Elev (ft)           2800.02    Reach Len. (ft)            31.80      31.80      31.80
  Crit W.S. (ft)           2798.01    Flow Area (sq ft)                    226.44
  E.G. Slope (ft/ft)      0.000125    Area (sq ft)                         226.44
  Q Total (cfs)             610.00    Flow (cfs)                           610.00
  Top Width (ft)             67.30    Top Width (ft)                        67.30
  Vel Total (ft/s)            2.69    Avg. Vel. (ft/s)                       2.69
  Max Chl Dpth (ft)           3.37    Hydr. Depth (ft)                       3.36
  Conv. Total (cfs)        54559.1    Conv. (cfs)                         54559.1
  Length Wtd. (ft)           31.80    Wetted Per. (ft)                      73.99
  Min Ch El (ft)           2796.65    Shear (lb/sq ft)                       0.02
  Alpha                       1.00    Stream Power (lb/ft s)    633.90       0.00       0.00
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.05      12.22       0.05
  C & E Loss (ft)                     Cum SA (acres)              0.07       7.58       0.07


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CULVERT


RIVER: Desert Knolls Wa
REACH: Main               RS: 6785.6

INPUT
Description: Tuscola Road
Distance from Upstream XS =      .2
Deck/Roadway Width        =    31.5
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     112    2810             200    2810             280    2810
     333    2810             400    2810             600    2810
```

```
Upstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2815  112.62    2814  127.02    2813  144.82    2812  158.44    2811
  178.09    2810   212.6  2809.5  212.64 2796.65  235.16 2796.65  253.99 2796.65
   279.9 2796.65     280  2809.5  299.76    2809  328.63    2809   363.4    2810
  396.13  2810.5  435.17    2811   550.8    2813   633.9    2815

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035   212.6    .013     280    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
         212.6     280             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       6
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     112    2810             200    2810             280    2810
     333    2810             400    2810             600    2810

Downstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2815  112.62    2814  127.02    2813  144.82    2812  158.44    2811
  178.09    2810   212.6    2809  212.64 2796.55  235.16 2796.55  253.99 2796.55
   279.9 2796.55     280    2808  299.76    2808  328.63    2809   363.4    2810
  396.13  2810.5  435.17    2811   550.8    2813   633.9    2815

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035   212.6    .013     280    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
         212.6     280             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       9      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .8      31     .013     .013        0                   .5                1
Number of Barrels =  3
Upstream   Elevation =  2796.55
Centerline Stations
    Sta.    Sta.    Sta.
     227     246     265
Downstream Elevation =  2796.55
Centerline Stations
    Sta.    Sta.    Sta.
     227     246     265

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1
```

```
  Q Culv Group (cfs)       3150.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         10.03
  Q Barrel (cfs)           1050.00    Culv Vel DS (ft/s)         10.13
  E.G. US. (ft)            2806.37    Culv Inv El Up (ft)      2796.55
  W.S. US. (ft)            2805.97    Culv Inv El Dn (ft)      2796.55
  E.G. DS (ft)             2804.57    Culv Frctn Ls (ft)          0.04
  W.S. DS (ft)             2803.95    Culv Exit Loss (ft)         0.97
  Delta EG (ft)               1.80    Culv Entr Loss (ft)         0.78
  Delta WS (ft)               2.02    Q Weir (cfs)
  E.G. IC (ft)             2805.59    Weir Sta Lft (ft)
  E.G. OC (ft)             2806.37    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2804.03    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2803.95    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.59    Min El Weir Flow (ft)    2810.01


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2700.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          9.28
  Q Barrel (cfs)            900.00    Culv Vel DS (ft/s)          9.37
  E.G. US. (ft)            2805.48    Culv Inv El Up (ft)      2796.55
  W.S. US. (ft)            2805.13    Culv Inv El Dn (ft)      2796.55
  E.G. DS (ft)             2803.95    Culv Frctn Ls (ft)          0.04
  W.S. DS (ft)             2803.41    Culv Exit Loss (ft)         0.83
  Delta EG (ft)               1.54    Culv Entr Loss (ft)         0.67
  Delta WS (ft)               1.71    Q Weir (cfs)
  E.G. IC (ft)             2804.67    Weir Sta Lft (ft)
  E.G. OC (ft)             2805.48    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2803.48    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2803.41    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.04    Min El Weir Flow (ft)    2810.01


CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1500.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          7.04
  Q Barrel (cfs)            500.00    Culv Vel DS (ft/s)          7.10
  E.G. US. (ft)            2802.78    Culv Inv El Up (ft)      2796.55
  W.S. US. (ft)            2802.55    Culv Inv El Dn (ft)      2796.55
  E.G. DS (ft)             2801.89    Culv Frctn Ls (ft)          0.03
  W.S. DS (ft)             2801.58    Culv Exit Loss (ft)         0.48
  Delta EG (ft)               0.89    Culv Entr Loss (ft)         0.39
  Delta WS (ft)               0.97    Q Weir (cfs)
  E.G. IC (ft)             2801.97    Weir Sta Lft (ft)
  E.G. OC (ft)             2802.78    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2801.62    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2801.58    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.41    Min El Weir Flow (ft)    2810.01


CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)        200.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         13.22
  Q Barrel (cfs)             66.67    Culv Vel DS (ft/s)          3.04
  E.G. US. (ft)            2800.97    Culv Inv El Up (ft)      2796.55
```

W.S. US. (ft)	2796.83	Culv Inv El Dn (ft)	2796.55
E.G. DS (ft)	2798.17	Culv Frctn Ls (ft)	1.37
W.S. DS (ft)	2798.12	Culv Exit Loss (ft)	0.09
Delta EG (ft)	2.80	Culv Entr Loss (ft)	1.35
Delta WS (ft)	1.28	Q Weir (cfs)	
E.G. IC (ft)		Weir Sta Lft (ft)	
E.G. OC (ft)		Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2796.91	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2798.12	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.89	Min El Weir Flow (ft)	2810.01

Note: During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	1480.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	7.00
Q Barrel (cfs)	493.33	Culv Vel DS (ft/s)	7.06
E.G. US. (ft)	2802.73	Culv Inv El Up (ft)	2796.55
W.S. US. (ft)	2802.50	Culv Inv El Dn (ft)	2796.55
E.G. DS (ft)	2801.84	Culv Frctn Ls (ft)	0.03
W.S. DS (ft)	2801.54	Culv Exit Loss (ft)	0.47
Delta EG (ft)	0.88	Culv Entr Loss (ft)	0.38
Delta WS (ft)	0.96	Q Weir (cfs)	
E.G. IC (ft)	2801.92	Weir Sta Lft (ft)	
E.G. OC (ft)	2802.73	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2801.58	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2801.54	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.38	Min El Weir Flow (ft)	2810.01

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	990.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	5.86
Q Barrel (cfs)	330.00	Culv Vel DS (ft/s)	5.91
E.G. US. (ft)	2801.37	Culv Inv El Up (ft)	2796.55
W.S. US. (ft)	2801.21	Culv Inv El Dn (ft)	2796.55
E.G. DS (ft)	2800.75	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2800.54	Culv Exit Loss (ft)	0.33
Delta EG (ft)	0.62	Culv Entr Loss (ft)	0.27
Delta WS (ft)	0.67	Q Weir (cfs)	
E.G. IC (ft)	2800.63	Weir Sta Lft (ft)	
E.G. OC (ft)	2801.37	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2800.57	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2800.54	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.58	Min El Weir Flow (ft)	2810.01

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	610.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	4.76
Q Barrel (cfs)	203.33	Culv Vel DS (ft/s)	4.80
E.G. US. (ft)	2800.13	Culv Inv El Up (ft)	2796.55
W.S. US. (ft)	2800.02	Culv Inv El Dn (ft)	2796.55
E.G. DS (ft)	2799.72	Culv Frctn Ls (ft)	0.02
W.S. DS (ft)	2799.58	Culv Exit Loss (ft)	0.22

Delta EG (ft)	0.41	Culv Entr Loss (ft)	0.18
Delta WS (ft)	0.44	Q Weir (cfs)	
E.G. IC (ft)	2799.48	Weir Sta Lft (ft)	
E.G. OC (ft)	2800.13	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2799.60	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2799.58	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.87	Min El Weir Flow (ft)	2810.01

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6769.7

INPUT
Description: Section 67+69.7 (D/S face of Tuscola Rd.)
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2815	112.62	2814	127.02	2813	144.82	2812	158.44	2811
178.09	2810	212.6	2809	212.64	2796.55	235.16	2796.55	253.99	2796.55
279.9	2796.55	280	2808	299.76	2808	328.63	2809	363.4	2810
396.13	2810.5	435.17	2811	550.8	2813	633.9	2815		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	212.6	.013	280	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
212.6	280	79.7	79.7	79.7	.3	.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2804.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.95	Reach Len. (ft)	79.70	79.70	79.70
Crit W.S. (ft)		Flow Area (sq ft)		498.08	
E.G. Slope (ft/ft)	0.000277	Area (sq ft)		498.08	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	67.35	Top Width (ft)		67.35	
Vel Total (ft/s)	6.32	Avg. Vel. (ft/s)		6.32	
Max Chl Dpth (ft)	7.40	Hydr. Depth (ft)		7.40	
Conv. Total (cfs)	189432.7	Conv. (cfs)		189432.7	
Length Wtd. (ft)	79.70	Wetted Per. (ft)		82.06	
Min Ch El (ft)	2796.55	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.54	36.08	0.38
C & E Loss (ft)	0.16	Cum SA (acres)	0.52	8.80	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2803.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.41	Reach Len. (ft)	79.70	79.70	79.70
Crit W.S. (ft)		Flow Area (sq ft)		461.97	
E.G. Slope (ft/ft)	0.000257	Area (sq ft)		461.97	

Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	67.34	Top Width (ft)		67.34	
Vel Total (ft/s)	5.84	Avg. Vel. (ft/s)		5.84	
Max Chl Dpth (ft)	6.86	Hydr. Depth (ft)		6.86	
Conv. Total (cfs)	168573.8	Conv. (cfs)		168573.8	
Length Wtd. (ft)	79.70	Wetted Per. (ft)		80.99	
Min Ch El (ft)	2796.55	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.37	31.11	0.31
C & E Loss (ft)	0.14	Cum SA (acres)	0.39	8.55	0.17

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2801.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.013	
W.S. Elev (ft)	2801.58	Reach Len. (ft)	79.70	79.70	79.70
Crit W.S. (ft)		Flow Area (sq ft)		338.42	
E.G. Slope (ft/ft)	0.000210	Area (sq ft)		338.42	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	67.32	Top Width (ft)		67.32	
Vel Total (ft/s)	4.43	Avg. Vel. (ft/s)		4.43	
Max Chl Dpth (ft)	5.03	Hydr. Depth (ft)		5.03	
Conv. Total (cfs)	103505.6	Conv. (cfs)		103505.6	
Length Wtd. (ft)	79.70	Wetted Per. (ft)		77.32	
Min Ch El (ft)	2796.55	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.15	20.81	0.15
C & E Loss (ft)	0.11	Cum SA (acres)	0.12	8.03	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2798.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2798.12	Reach Len. (ft)	79.70	79.70	79.70
Crit W.S. (ft)		Flow Area (sq ft)		105.27	
E.G. Slope (ft/ft)	0.000162	Area (sq ft)		105.27	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	67.28	Top Width (ft)		67.28	
Vel Total (ft/s)	1.90	Avg. Vel. (ft/s)		1.90	
Max Chl Dpth (ft)	1.56	Hydr. Depth (ft)		1.56	
Conv. Total (cfs)	15736.6	Conv. (cfs)		15736.6	
Length Wtd. (ft)	79.70	Wetted Per. (ft)		70.39	
Min Ch El (ft)	2796.55	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.01	6.64	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	7.09	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2801.84	Element	Left OB	Channel	Right OB

Vel Head (ft)	0.30	Wt. n-Val.		0.013	
W.S. Elev (ft)	2801.54	Reach Len. (ft)	79.70	79.70	79.70
Crit W.S. (ft)		Flow Area (sq ft)		335.91	
E.G. Slope (ft/ft)	0.000209	Area (sq ft)		335.91	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	67.32	Top Width (ft)		67.32	
Vel Total (ft/s)	4.41	Avg. Vel. (ft/s)		4.41	
Max Chl Dpth (ft)	4.99	Hydr. Depth (ft)		4.99	
Conv. Total (cfs)	102290.7	Conv. (cfs)		102290.7	
Length Wtd. (ft)	79.70	Wetted Per. (ft)		77.25	
Min Ch El (ft)	2796.55	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.15	21.42	0.15
C & E Loss (ft)	0.10	Cum SA (acres)	0.14	8.08	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2800.75	Element			
Vel Head (ft)	0.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2800.54	Reach Len. (ft)	79.70	79.70	79.70
Crit W.S. (ft)		Flow Area (sq ft)		268.48	
E.G. Slope (ft/ft)	0.000191	Area (sq ft)		268.48	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	67.31	Top Width (ft)		67.31	
Vel Total (ft/s)	3.69	Avg. Vel. (ft/s)		3.69	
Max Chl Dpth (ft)	3.99	Hydr. Depth (ft)		3.99	
Conv. Total (cfs)	71658.3	Conv. (cfs)		71658.3	
Length Wtd. (ft)	79.70	Wetted Per. (ft)		75.24	
Min Ch El (ft)	2796.55	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.09	16.35	0.09
C & E Loss (ft)	0.08	Cum SA (acres)	0.09	7.81	0.09

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2799.72	Element			
Vel Head (ft)	0.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2799.58	Reach Len. (ft)	79.70	79.70	79.70
Crit W.S. (ft)		Flow Area (sq ft)		203.69	
E.G. Slope (ft/ft)	0.000176	Area (sq ft)		203.69	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	67.30	Top Width (ft)		67.30	
Vel Total (ft/s)	2.99	Avg. Vel. (ft/s)		2.99	
Max Chl Dpth (ft)	3.03	Hydr. Depth (ft)		3.03	
Conv. Total (cfs)	46012.2	Conv. (cfs)		46012.2	
Length Wtd. (ft)	79.70	Wetted Per. (ft)		73.32	
Min Ch El (ft)	2796.55	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.05	12.18	0.05
C & E Loss (ft)	0.06	Cum SA (acres)	0.07	7.53	0.07

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6690

INPUT
Description: Section 66+90 (Tuscola Rd. exit section)
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2815	112.62	2814	127.02	2813	144.82	2812	158.44	2811
178.09	2810	201	2809	226	2796.45	266	2796.45	291	2808
299.76	2808	328.63	2809	363.4	2810	396.13	2810.5	435.17	2811
550.8	2813	633.9	2815						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	201	.013	291	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
201	291	134.2	134.2	134.2	.3	.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2804.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2803.24	Reach Len. (ft)	134.20	134.20	134.20
Crit W.S. (ft)		Flow Area (sq ft)		367.47	
E.G. Slope (ft/ft)	0.000632	Area (sq ft)		367.47	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	68.23	Top Width (ft)		68.23	
Vel Total (ft/s)	8.57	Avg. Vel. (ft/s)		8.57	
Max Chl Dpth (ft)	6.79	Hydr. Depth (ft)		5.39	
Conv. Total (cfs)	125289.3	Conv. (cfs)		125289.3	
Length Wtd. (ft)	134.20	Wetted Per. (ft)		71.33	
Min Ch El (ft)	2796.45	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)	0.54	35.29	0.38
C & E Loss (ft)	0.01	Cum SA (acres)	0.52	8.68	0.20

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2803.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2802.77	Reach Len. (ft)	134.20	134.20	134.20
Crit W.S. (ft)		Flow Area (sq ft)		335.48	
E.G. Slope (ft/ft)	0.000603	Area (sq ft)		335.48	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	66.25	Top Width (ft)		66.25	
Vel Total (ft/s)	8.05	Avg. Vel. (ft/s)		8.05	
Max Chl Dpth (ft)	6.31	Hydr. Depth (ft)		5.06	
Conv. Total (cfs)	109908.6	Conv. (cfs)		109908.6	
Length Wtd. (ft)	134.20	Wetted Per. (ft)		69.13	
Min Ch El (ft)	2796.45	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.37	30.38	0.31
C & E Loss (ft)	0.00	Cum SA (acres)	0.39	8.42	0.17

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2801.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.013	
W.S. Elev (ft)	2801.10	Reach Len. (ft)	134.20	134.20	134.20
Crit W.S. (ft)		Flow Area (sq ft)		230.74	
E.G. Slope (ft/ft)	0.000554	Area (sq ft)		230.74	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	59.31	Top Width (ft)		59.31	
Vel Total (ft/s)	6.50	Avg. Vel. (ft/s)		6.50	
Max Chl Dpth (ft)	4.65	Hydr. Depth (ft)		3.89	
Conv. Total (cfs)	63725.7	Conv. (cfs)		63725.7	
Length Wtd. (ft)	134.20	Wetted Per. (ft)		61.44	
Min Ch El (ft)	2796.45	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.15	20.29	0.15
C & E Loss (ft)	0.01	Cum SA (acres)	0.12	7.92	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2798.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2797.98	Reach Len. (ft)	134.20	134.20	134.20
Crit W.S. (ft)	2797.35	Flow Area (sq ft)		66.25	
E.G. Slope (ft/ft)	0.000442	Area (sq ft)		66.25	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	46.38	Top Width (ft)		46.38	
Vel Total (ft/s)	3.02	Avg. Vel. (ft/s)		3.02	
Max Chl Dpth (ft)	1.53	Hydr. Depth (ft)		1.43	
Conv. Total (cfs)	9508.9	Conv. (cfs)		9508.9	
Length Wtd. (ft)	134.20	Wetted Per. (ft)		47.08	
Min Ch El (ft)	2796.45	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	633.90	0.00	0.00
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.01	6.48	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	6.99	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2801.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.013	
W.S. Elev (ft)	2801.06	Reach Len. (ft)	134.20	134.20	134.20
Crit W.S. (ft)		Flow Area (sq ft)		228.72	
E.G. Slope (ft/ft)	0.000554	Area (sq ft)		228.72	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	59.17	Top Width (ft)		59.17	
Vel Total (ft/s)	6.47	Avg. Vel. (ft/s)		6.47	
Max Chl Dpth (ft)	4.61	Hydr. Depth (ft)		3.87	
Conv. Total (cfs)	62904.1	Conv. (cfs)		62904.1	
Length Wtd. (ft)	134.20	Wetted Per. (ft)		61.28	
Min Ch El (ft)	2796.45	Shear (lb/sq ft)		0.13	

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  Alpha                        1.00    Stream Power (lb/ft s)    633.90       0.00       0.00
  Frctn Loss (ft)              0.14    Cum Volume (acre-ft)        0.15      20.91       0.15
  C & E Loss (ft)              0.01    Cum SA (acres)              0.14       7.96       0.12


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #5-yr SBCFCD

  E.G. Elev (ft)           2800.65    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.49    Wt. n-Val.                           0.013
  W.S. Elev (ft)           2800.16    Reach Len. (ft)           134.20     134.20     134.20
  Crit W.S. (ft)                      Flow Area (sq ft)                    176.92
  E.G. Slope (ft/ft)      0.000531    Area (sq ft)                         176.92
  Q Total (cfs)             990.00    Flow (cfs)                           990.00
  Top Width (ft)             55.41    Top Width (ft)                        55.41
  Vel Total (ft/s)            5.60    Avg. Vel. (ft/s)                       5.60
  Max Chl Dpth (ft)           3.71    Hydr. Depth (ft)                       3.19
  Conv. Total (cfs)        42975.6    Conv. (cfs)                         42975.6
  Length Wtd. (ft)          134.20    Wetted Per. (ft)                      57.11
  Min Ch El (ft)           2796.45    Shear (lb/sq ft)                       0.10
  Alpha                       1.00    Stream Power (lb/ft s)    633.90       0.00       0.00
  Frctn Loss (ft)             0.14    Cum Volume (acre-ft)        0.09      15.94       0.09
  C & E Loss (ft)             0.01    Cum SA (acres)              0.09       7.69       0.09


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2799.64    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.34    Wt. n-Val.                           0.013
  W.S. Elev (ft)           2799.30    Reach Len. (ft)           134.20     134.20     134.20
  Crit W.S. (ft)                      Flow Area (sq ft)                    130.72
  E.G. Slope (ft/ft)      0.000502    Area (sq ft)                         130.72
  Q Total (cfs)             610.00    Flow (cfs)                           610.00
  Top Width (ft)             51.83    Top Width (ft)                        51.83
  Vel Total (ft/s)            4.67    Avg. Vel. (ft/s)                       4.67
  Max Chl Dpth (ft)           2.85    Hydr. Depth (ft)                       2.52
  Conv. Total (cfs)        27230.1    Conv. (cfs)                         27230.1
  Length Wtd. (ft)          134.20    Wetted Per. (ft)                      53.13
  Min Ch El (ft)           2796.45    Shear (lb/sq ft)                       0.08
  Alpha                       1.00    Stream Power (lb/ft s)    633.90       0.00       0.00
  Frctn Loss (ft)             0.13    Cum Volume (acre-ft)        0.05      11.87       0.05
  C & E Loss (ft)             0.01    Cum SA (acres)              0.07       7.42       0.07


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 6555.8

INPUT
Description: Section 65+55.8
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
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     100    2812  112.03    2811  131.49    2810  145.36    2809  163.67    2808
  183.39    2807  202.14    2806   222.5    2805     240 2796.25     280 2796.25
   297.5    2805  317.76    2805  361.83    2806  376.02    2807  385.24    2808
  423.52    2809

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035   222.5     .03   297.5    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         222.5   297.5            155.8   155.8   155.8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100   222.5  2806.5       T
     298  423.52  2806.5       T
Left Levee      Station=   222.5      Elevation=  2806.5
Right Levee     Station=   297.5      Elevation=  2806.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2804.21    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               1.16    Wt. n-Val.                             0.030
  W.S. Elev (ft)           2803.05    Reach Len. (ft)            155.80     155.80     155.80
  Crit W.S. (ft)           2801.53    Flow Area (sq ft)                     364.53
  E.G. Slope (ft/ft)      0.003399    Area (sq ft)                          364.53
  Q Total (cfs)            3150.00    Flow (cfs)                           3150.00
  Top Width (ft)             67.20    Top Width (ft)                         67.20
  Vel Total (ft/s)            8.64    Avg. Vel. (ft/s)                        8.64
  Max Chl Dpth (ft)           6.80    Hydr. Depth (ft)                        5.42
  Conv. Total (cfs)        54033.3    Conv. (cfs)                         54033.3
  Length Wtd. (ft)          155.80    Wetted Per. (ft)                       70.41
  Min Ch El (ft)           2796.25    Shear (lb/sq ft)                        1.10
  Alpha                       1.00    Stream Power (lb/ft s)     423.52     222.50     297.50
  Frctn Loss (ft)             0.80    Cum Volume (acre-ft)         0.54      34.16       0.38
  C & E Loss (ft)             0.08    Cum SA (acres)               0.52       8.47       0.20


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2803.61    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               1.01    Wt. n-Val.                             0.030
  W.S. Elev (ft)           2802.60    Reach Len. (ft)            155.80     155.80     155.80
  Crit W.S. (ft)           2801.06    Flow Area (sq ft)                     334.76
  E.G. Slope (ft/ft)      0.003191    Area (sq ft)                          334.76
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             65.41    Top Width (ft)                         65.41
  Vel Total (ft/s)            8.07    Avg. Vel. (ft/s)                        8.07
  Max Chl Dpth (ft)           6.35    Hydr. Depth (ft)                        5.12
  Conv. Total (cfs)        47794.0    Conv. (cfs)                         47794.0
  Length Wtd. (ft)          155.80    Wetted Per. (ft)                       68.41
  Min Ch El (ft)           2796.25    Shear (lb/sq ft)                        0.98
  Alpha                       1.00    Stream Power (lb/ft s)     423.52     222.50     297.50
  Frctn Loss (ft)             0.78    Cum Volume (acre-ft)         0.37      29.35       0.31
  C & E Loss (ft)             0.08    Cum SA (acres)               0.39       8.22       0.17
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Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2801.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.030	
W.S. Elev (ft)	2800.96	Reach Len. (ft)	155.80	155.80	155.80
Crit W.S. (ft)	2799.58	Flow Area (sq ft)		232.67	
E.G. Slope (ft/ft)	0.002846	Area (sq ft)		232.67	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	58.83	Top Width (ft)		58.83	
Vel Total (ft/s)	6.45	Avg. Vel. (ft/s)		6.45	
Max Chl Dpth (ft)	4.71	Hydr. Depth (ft)		3.95	
Conv. Total (cfs)	28115.2	Conv. (cfs)		28115.2	
Length Wtd. (ft)	155.80	Wetted Per. (ft)		61.06	
Min Ch El (ft)	2796.25	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)	423.52	222.50	297.50
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)	0.15	19.57	0.15
C & E Loss (ft)	0.08	Cum SA (acres)	0.12	7.73	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2798.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.030	
W.S. Elev (ft)	2797.88	Reach Len. (ft)	155.80	155.80	155.80
Crit W.S. (ft)	2797.13	Flow Area (sq ft)		70.69	
E.G. Slope (ft/ft)	0.001910	Area (sq ft)		70.69	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	46.54	Top Width (ft)		46.54	
Vel Total (ft/s)	2.83	Avg. Vel. (ft/s)		2.83	
Max Chl Dpth (ft)	1.63	Hydr. Depth (ft)		1.52	
Conv. Total (cfs)	4576.4	Conv. (cfs)		4576.4	
Length Wtd. (ft)	155.80	Wetted Per. (ft)		47.31	
Min Ch El (ft)	2796.25	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	423.52	222.50	297.50
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)	0.01	6.27	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.03	6.85	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2801.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.030	
W.S. Elev (ft)	2800.92	Reach Len. (ft)	155.80	155.80	155.80

Crit W.S. (ft)	2799.56	Flow Area (sq ft)		230.67	
E.G. Slope (ft/ft)	0.002842	Area (sq ft)		230.67	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	58.70	Top Width (ft)		58.70	
Vel Total (ft/s)	6.42	Avg. Vel. (ft/s)		6.42	
Max Chl Dpth (ft)	4.67	Hydr. Depth (ft)		3.93	
Conv. Total (cfs)	27760.8	Conv. (cfs)		27760.8	
Length Wtd. (ft)	155.80	Wetted Per. (ft)		60.90	
Min Ch El (ft)	2796.25	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)	423.52	222.50	297.50
Frctn Loss (ft)	0.74	Cum Volume (acre-ft)	0.15	20.20	0.15
C & E Loss (ft)	0.08	Cum SA (acres)	0.14	7.78	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2800.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.47	Wt. n-Val.		0.030	
W.S. Elev (ft)	2800.03	Reach Len. (ft)	155.80	155.80	155.80
Crit W.S. (ft)	2798.81	Flow Area (sq ft)		179.79	
E.G. Slope (ft/ft)	0.002666	Area (sq ft)		179.79	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	55.12	Top Width (ft)		55.12	
Vel Total (ft/s)	5.51	Avg. Vel. (ft/s)		5.51	
Max Chl Dpth (ft)	3.78	Hydr. Depth (ft)		3.26	
Conv. Total (cfs)	19174.3	Conv. (cfs)		19174.3	
Length Wtd. (ft)	155.80	Wetted Per. (ft)		56.91	
Min Ch El (ft)	2796.25	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)	423.52	222.50	297.50
Frctn Loss (ft)	0.73	Cum Volume (acre-ft)	0.09	15.39	0.09
C & E Loss (ft)	0.07	Cum SA (acres)	0.09	7.52	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2799.50	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.32	Wt. n-Val.		0.030	
W.S. Elev (ft)	2799.18	Reach Len. (ft)	155.80	155.80	155.80
Crit W.S. (ft)	2798.12	Flow Area (sq ft)		134.29	
E.G. Slope (ft/ft)	0.002441	Area (sq ft)		134.29	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	51.71	Top Width (ft)		51.71	
Vel Total (ft/s)	4.54	Avg. Vel. (ft/s)		4.54	
Max Chl Dpth (ft)	2.93	Hydr. Depth (ft)		2.60	
Conv. Total (cfs)	12347.3	Conv. (cfs)		12347.3	
Length Wtd. (ft)	155.80	Wetted Per. (ft)		53.10	
Min Ch El (ft)	2796.25	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)	423.52	222.50	297.50
Frctn Loss (ft)	0.71	Cum Volume (acre-ft)	0.05	11.47	0.05

C & E Loss (ft)	0.05	Cum SA (acres)	0.07	7.26	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6400

INPUT
Description: Section 64+00 Approach
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2809	113.35	2808	128.27	2807	143	2806	161.01	2805
179.93	2804.5	199.29	2804.5	226.76	2804.5	255	2800	263	2796
303	2796	311	2800	338.79	2804.5	369.58	2804.5	484.52	2804.5
535.5	2804.5	564.5	2805						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	226.76	.03	338.79	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
226.76	338.79	55.3	55.3	55.3	.3	.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2803.33	Element			
Vel Head (ft)	1.94	Wt. n-Val.		0.030	
W.S. Elev (ft)	2801.39	Reach Len. (ft)	55.30	55.30	55.30
Crit W.S. (ft)	2801.39	Flow Area (sq ft)		281.86	
E.G. Slope (ft/ft)	0.008778	Area (sq ft)		281.86	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	73.31	Top Width (ft)		73.31	
Vel Total (ft/s)	11.18	Avg. Vel. (ft/s)		11.18	
Max Chl Dpth (ft)	5.39	Hydr. Depth (ft)		3.85	
Conv. Total (cfs)	33621.9	Conv. (cfs)		33621.9	
Length Wtd. (ft)	55.30	Wetted Per. (ft)		75.42	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		2.05	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.54	33.00	0.38
C & E Loss (ft)	0.90	Cum SA (acres)	0.52	8.22	0.20

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2802.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.86	Wt. n-Val.		0.030	
W.S. Elev (ft)	2800.89	Reach Len. (ft)	55.30	55.30	55.30
Crit W.S. (ft)	2800.89	Flow Area (sq ft)		247.01	
E.G. Slope (ft/ft)	0.008920	Area (sq ft)		247.01	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	67.13	Top Width (ft)		67.13	
Vel Total (ft/s)	10.93	Avg. Vel. (ft/s)		10.93	
Max Chl Dpth (ft)	4.89	Hydr. Depth (ft)		3.68	
Conv. Total (cfs)	28587.3	Conv. (cfs)		28587.3	
Length Wtd. (ft)	55.30	Wetted Per. (ft)		69.16	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		1.99	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.37	28.31	0.31
C & E Loss (ft)	0.87	Cum SA (acres)	0.39	7.98	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2800.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.46	Wt. n-Val.		0.030	
W.S. Elev (ft)	2799.32	Reach Len. (ft)	55.30	55.30	55.30
Crit W.S. (ft)	2799.32	Flow Area (sq ft)		154.56	
E.G. Slope (ft/ft)	0.009639	Area (sq ft)		154.56	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	53.26	Top Width (ft)		53.26	
Vel Total (ft/s)	9.70	Avg. Vel. (ft/s)		9.70	
Max Chl Dpth (ft)	3.31	Hydr. Depth (ft)		2.90	
Conv. Total (cfs)	15278.0	Conv. (cfs)		15278.0	
Length Wtd. (ft)	55.30	Wetted Per. (ft)		54.82	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		1.70	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	18.88	0.15
C & E Loss (ft)	0.69	Cum SA (acres)	0.12	7.53	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2797.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.030	
W.S. Elev (ft)	2796.90	Reach Len. (ft)	55.30	55.30	55.30
Crit W.S. (ft)	2796.90	Flow Area (sq ft)		37.64	
E.G. Slope (ft/ft)	0.014187	Area (sq ft)		37.64	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	43.60	Top Width (ft)		43.60	
Vel Total (ft/s)	5.31	Avg. Vel. (ft/s)		5.31	
Max Chl Dpth (ft)	0.90	Hydr. Depth (ft)		0.86	
Conv. Total (cfs)	1679.1	Conv. (cfs)		1679.1	
Length Wtd. (ft)	55.30	Wetted Per. (ft)		44.03	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.01	6.08	0.01
C & E Loss (ft)	0.21	Cum SA (acres)	0.03	6.69	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2800.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.45	Wt. n-Val.		0.030	
W.S. Elev (ft)	2799.29	Reach Len. (ft)	55.30	55.30	55.30
Crit W.S. (ft)	2799.29	Flow Area (sq ft)		153.17	
E.G. Slope (ft/ft)	0.009643	Area (sq ft)		153.17	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	53.15	Top Width (ft)		53.15	
Vel Total (ft/s)	9.66	Avg. Vel. (ft/s)		9.66	
Max Chl Dpth (ft)	3.29	Hydr. Depth (ft)		2.88	
Conv. Total (cfs)	15071.2	Conv. (cfs)		15071.2	
Length Wtd. (ft)	55.30	Wetted Per. (ft)		54.71	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		1.69	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	19.51	0.15
C & E Loss (ft)	0.68	Cum SA (acres)	0.14	7.58	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2799.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.16	Wt. n-Val.		0.030	
W.S. Elev (ft)	2798.55	Reach Len. (ft)	55.30	55.30	55.30
Crit W.S. (ft)	2798.55	Flow Area (sq ft)		114.77	
E.G. Slope (ft/ft)	0.010386	Area (sq ft)		114.77	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	50.18	Top Width (ft)		50.18	
Vel Total (ft/s)	8.63	Avg. Vel. (ft/s)		8.63	
Max Chl Dpth (ft)	2.55	Hydr. Depth (ft)		2.29	
Conv. Total (cfs)	9714.1	Conv. (cfs)		9714.1	
Length Wtd. (ft)	55.30	Wetted Per. (ft)		51.38	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		1.45	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.09	14.87	0.09
C & E Loss (ft)	0.55	Cum SA (acres)	0.09	7.33	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2798.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.		0.030	
W.S. Elev (ft)	2797.86	Reach Len. (ft)	55.30	55.30	55.30
Crit W.S. (ft)	2797.86	Flow Area (sq ft)		81.52	
E.G. Slope (ft/ft)	0.011369	Area (sq ft)		81.52	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	47.46	Top Width (ft)		47.46	
Vel Total (ft/s)	7.48	Avg. Vel. (ft/s)		7.48	
Max Chl Dpth (ft)	1.86	Hydr. Depth (ft)		1.72	
Conv. Total (cfs)	5721.0	Conv. (cfs)		5721.0	

Length Wtd. (ft)	55.30	Wetted Per. (ft)		48.34	
Min Ch El (ft)	2796.00	Shear (lb/sq ft)		1.20	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.05	11.08	0.05
C & E Loss (ft)	0.41	Cum SA (acres)	0.07	7.08	0.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6344.7

INPUT
Description: Section 63+44.7 (U/S face of Quantico Rd.)
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2809	113.35	2808	128.27	2807	143	2806	161.01	2805
179.93	2804.5	226.76	2804.5	227	2792	338	2792	338.79	2804.5
484.52	2804.5	535.5	2804	564.5	2805				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	226.76	.013	338.79	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
226.76	338.79	32	32	32	.3	.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2801.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.013	
W.S. Elev (ft)	2801.47	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2794.92	Flow Area (sq ft)		1055.03	
E.G. Slope (ft/ft)	0.000042	Area (sq ft)		1055.03	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	111.78	Top Width (ft)		111.78	
Vel Total (ft/s)	2.99	Avg. Vel. (ft/s)		2.99	
Max Chl Dpth (ft)	9.47	Hydr. Depth (ft)		9.44	
Conv. Total (cfs)	487089.8	Conv. (cfs)		487089.8	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		129.96	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.54	32.16	0.38
C & E Loss (ft)		Cum SA (acres)	0.52	8.10	0.20

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2800.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.013	
W.S. Elev (ft)	2800.54	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2794.63	Flow Area (sq ft)		951.39	
E.G. Slope (ft/ft)	0.000043	Area (sq ft)		951.39	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	111.70	Top Width (ft)		111.70	
Vel Total (ft/s)	2.84	Avg. Vel. (ft/s)		2.84	
Max Chl Dpth (ft)	8.54	Hydr. Depth (ft)		8.52	
Conv. Total (cfs)	413934.8	Conv. (cfs)		413934.8	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		128.11	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.37	27.55	0.31
C & E Loss (ft)		Cum SA (acres)	0.39	7.87	0.17

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2797.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2797.77	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2793.78	Flow Area (sq ft)		641.76	
E.G. Slope (ft/ft)	0.000046	Area (sq ft)		641.76	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	111.48	Top Width (ft)		111.48	
Vel Total (ft/s)	2.34	Avg. Vel. (ft/s)		2.34	
Max Chl Dpth (ft)	5.77	Hydr. Depth (ft)		5.76	
Conv. Total (cfs)	221206.1	Conv. (cfs)		221206.1	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		122.55	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	18.37	0.15
C & E Loss (ft)		Cum SA (acres)	0.12	7.43	0.12

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2793.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.013	
W.S. Elev (ft)	2793.52	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2792.47	Flow Area (sq ft)		168.33	
E.G. Slope (ft/ft)	0.000064	Area (sq ft)		168.33	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	111.12	Top Width (ft)		111.12	
Vel Total (ft/s)	1.19	Avg. Vel. (ft/s)		1.19	
Max Chl Dpth (ft)	1.52	Hydr. Depth (ft)		1.51	
Conv. Total (cfs)	24943.6	Conv. (cfs)		24943.6	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		114.03	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	5.95	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	6.59	0.03

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2797.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.013	
W.S. Elev (ft)	2797.72	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2793.76	Flow Area (sq ft)		635.99	
E.G. Slope (ft/ft)	0.000046	Area (sq ft)		635.99	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	111.47	Top Width (ft)		111.47	
Vel Total (ft/s)	2.33	Avg. Vel. (ft/s)		2.33	
Max Chl Dpth (ft)	5.72	Hydr. Depth (ft)		5.71	
Conv. Total (cfs)	218025.1	Conv. (cfs)		218025.1	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		122.45	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	19.01	0.15
C & E Loss (ft)		Cum SA (acres)	0.14	7.48	0.12

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2796.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2796.37	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2793.35	Flow Area (sq ft)		486.09	
E.G. Slope (ft/ft)	0.000049	Area (sq ft)		486.09	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	111.36	Top Width (ft)		111.36	
Vel Total (ft/s)	2.04	Avg. Vel. (ft/s)		2.04	
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)		4.36	
Conv. Total (cfs)	141379.0	Conv. (cfs)		141379.0	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		119.75	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.09	14.48	0.09
C & E Loss (ft)		Cum SA (acres)	0.09	7.23	0.09

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2795.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2795.17	Reach Len. (ft)	32.00	32.00	32.00
Crit W.S. (ft)	2792.98	Flow Area (sq ft)		351.95	
E.G. Slope (ft/ft)	0.000053	Area (sq ft)		351.95	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	111.26	Top Width (ft)		111.26	
Vel Total (ft/s)	1.73	Avg. Vel. (ft/s)		1.73	
Max Chl Dpth (ft)	3.17	Hydr. Depth (ft)		3.16	
Conv. Total (cfs)	83666.6	Conv. (cfs)		83666.6	
Length Wtd. (ft)	32.00	Wetted Per. (ft)		117.34	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.01	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.05	10.81	0.05
C & E Loss (ft)		Cum SA (acres)	0.07	6.98	0.07

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CULVERT

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 6328.7

INPUT
Description: Quantico Road
Distance from Upstream XS =      .5
Deck/Roadway Width        =      30
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100  2804.5             242  2804.5             262  2804.5
     296  2804.5             580  2804.5

Upstream Bridge Cross Section Data
Station Elevation Data    num=      13
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2809  113.35    2808  128.27    2807     143    2806  161.01    2805
  179.93  2804.5  226.76  2804.5     227    2792     338    2792  338.79  2804.5
  484.52  2804.5   535.5    2804   564.5    2805

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  226.76    .013  338.79    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        226.76  338.79             .3       .5

Downstream  Deck/Roadway Coordinates
    num=       5
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     100  2804.5             242  2804.5             262  2804.5
     296  2804.5             580  2804.5

Downstream Bridge Cross Section Data
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2809  113.35    2808  128.27    2807     143    2806  161.01    2805
  179.93    2804  199.29    2803  226.76    2802     227    2792     338    2792
  338.79    2802  369.58    2802  484.52    2803   535.5    2804   564.5    2805

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  226.76    .013  338.79    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        226.76  338.79             .3       .5

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  1

Culvert Name     Shape      Rise    Span
Culvert #1           Box       9      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                  0      32     .013     .013        0                   .5                 1
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```
Number of Barrels =  3
Upstream   Elevation =  2792
Centerline Stations
    Sta.    Sta.    Sta.
     267   282.5     298
Downstream Elevation =  2792
Centerline Stations
    Sta.    Sta.    Sta.
     267   282.5     298

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)       3150.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         12.14
  Q Barrel (cfs)           1050.00    Culv Vel DS (ft/s)         13.42
  E.G. US. (ft)            2801.61    Culv Inv El Up (ft)      2792.00
  W.S. US. (ft)            2801.47    Culv Inv El Dn (ft)      2792.00
  E.G. DS (ft)             2797.58    Culv Frctn Ls (ft)          0.08
  W.S. DS (ft)             2797.10    Culv Exit Loss (ft)         2.81
  Delta EG (ft)               4.03    Culv Entr Loss (ft)         1.14
  Delta WS (ft)               4.37    Q Weir (cfs)
  E.G. IC (ft)             2801.04    Weir Sta Lft (ft)
  E.G. OC (ft)             2801.61    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2798.18    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2797.59    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.59    Min El Weir Flow (ft)    2804.51


CULVERT OUTPUT  Profile #100-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       2700.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)         11.49
  Q Barrel (cfs)            900.00    Culv Vel DS (ft/s)         12.74
  E.G. US. (ft)            2800.67    Culv Inv El Up (ft)      2792.00
  W.S. US. (ft)            2800.54    Culv Inv El Dn (ft)      2792.00
  E.G. DS (ft)             2796.68    Culv Frctn Ls (ft)          0.08
  W.S. DS (ft)             2796.15    Culv Exit Loss (ft)         2.88
  Delta EG (ft)               3.99    Culv Entr Loss (ft)         1.03
  Delta WS (ft)               4.39    Q Weir (cfs)
  E.G. IC (ft)             2800.12    Weir Sta Lft (ft)
  E.G. OC (ft)             2800.67    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2797.59    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2797.04    Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         5.04    Min El Weir Flow (ft)    2804.51


CULVERT OUTPUT  Profile #50-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)       1500.00    Culv Full Len (ft)
  # Barrels                      3    Culv Vel US (ft/s)          9.30
  Q Barrel (cfs)            500.00    Culv Vel DS (ft/s)         10.48
  E.G. US. (ft)            2797.86    Culv Inv El Up (ft)      2792.00
  W.S. US. (ft)            2797.77    Culv Inv El Dn (ft)      2792.00
  E.G. DS (ft)             2794.67    Culv Frctn Ls (ft)          0.07
  W.S. DS (ft)             2793.78    Culv Exit Loss (ft)         2.44
  Delta EG (ft)               3.18    Culv Entr Loss (ft)         0.67
  Delta WS (ft)               3.99    Q Weir (cfs)
  E.G. IC (ft)             2797.42    Weir Sta Lft (ft)
  E.G. OC (ft)             2797.86    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2795.84    Weir Max Depth (ft)
```

Culv WS Outlet (ft)	2795.41	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.41	Min El Weir Flow (ft)	2804.51

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	200.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	4.30
Q Barrel (cfs)	66.67	Culv Vel DS (ft/s)	5.35
E.G. US. (ft)	2793.54	Culv Inv El Up (ft)	2792.00
W.S. US. (ft)	2793.52	Culv Inv El Dn (ft)	2792.00
E.G. DS (ft)	2792.70	Culv Frctn Ls (ft)	0.06
W.S. DS (ft)	2792.47	Culv Exit Loss (ft)	0.64
Delta EG (ft)	0.84	Culv Entr Loss (ft)	0.14
Delta WS (ft)	1.05	Q Weir (cfs)	
E.G. IC (ft)	2793.38	Weir Sta Lft (ft)	
E.G. OC (ft)	2793.54	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2793.11	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2792.89	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	0.89	Min El Weir Flow (ft)	2804.51

CULVERT OUTPUT Profile #10-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	1480.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	9.25
Q Barrel (cfs)	493.33	Culv Vel DS (ft/s)	10.43
E.G. US. (ft)	2797.80	Culv Inv El Up (ft)	2792.00
W.S. US. (ft)	2797.72	Culv Inv El Dn (ft)	2792.00
E.G. DS (ft)	2794.65	Culv Frctn Ls (ft)	0.07
W.S. DS (ft)	2793.76	Culv Exit Loss (ft)	2.42
Delta EG (ft)	3.15	Culv Entr Loss (ft)	0.66
Delta WS (ft)	3.95	Q Weir (cfs)	
E.G. IC (ft)	2797.37	Weir Sta Lft (ft)	
E.G. OC (ft)	2797.80	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2795.81	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2795.38	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.38	Min El Weir Flow (ft)	2804.51

CULVERT OUTPUT Profile #5-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	990.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	7.98
Q Barrel (cfs)	330.00	Culv Vel DS (ft/s)	9.12
E.G. US. (ft)	2796.44	Culv Inv El Up (ft)	2792.00
W.S. US. (ft)	2796.37	Culv Inv El Dn (ft)	2792.00
E.G. DS (ft)	2794.03	Culv Frctn Ls (ft)	0.07
W.S. DS (ft)	2793.35	Culv Exit Loss (ft)	1.85
Delta EG (ft)	2.41	Culv Entr Loss (ft)	0.49
Delta WS (ft)	3.02	Q Weir (cfs)	
E.G. IC (ft)	2796.08	Weir Sta Lft (ft)	
E.G. OC (ft)	2796.44	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2794.96	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2794.58	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	2.58	Min El Weir Flow (ft)	2804.51

CULVERT OUTPUT Profile #2-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	610.00	Culv Full Len (ft)	
# Barrels	3	Culv Vel US (ft/s)	6.65
Q Barrel (cfs)	203.33	Culv Vel DS (ft/s)	7.76
E.G. US. (ft)	2795.21	Culv Inv El Up (ft)	2792.00
W.S. US. (ft)	2795.17	Culv Inv El Dn (ft)	2792.00
E.G. DS (ft)	2793.47	Culv Frctn Ls (ft)	0.06
W.S. DS (ft)	2792.98	Culv Exit Loss (ft)	1.34
Delta EG (ft)	1.75	Culv Entr Loss (ft)	0.34
Delta WS (ft)	2.19	Q Weir (cfs)	
E.G. IC (ft)	2794.93	Weir Sta Lft (ft)	
E.G. OC (ft)	2795.21	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2794.18	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2793.87	Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	1.87	Min El Weir Flow (ft)	2804.51

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6312.5

INPUT
Description: Section 63+12.5 (D/S face of Quantico Rd.)
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2809	113.35	2808	128.27	2807	143	2806	161.01	2805
179.93	2804	199.29	2803	226.76	2802	227	2792	338	2792
338.79	2802	369.58	2802	484.52	2803	535.5	2804	564.5	2805

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	226.76	.013	338.79	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
226.76	338.79	312.5	312.5	312.5	.3	.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2797.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.48	Wt. n-Val.		0.013	
W.S. Elev (ft)	2797.10	Reach Len. (ft)	312.50	312.50	312.50
Crit W.S. (ft)		Flow Area (sq ft)		567.15	
E.G. Slope (ft/ft)	0.000302	Area (sq ft)		567.15	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	111.53	Top Width (ft)		111.53	
Vel Total (ft/s)	5.55	Avg. Vel. (ft/s)		5.55	
Max Chl Dpth (ft)	5.10	Hydr. Depth (ft)		5.09	
Conv. Total (cfs)	181350.3	Conv. (cfs)		181350.3	
Length Wtd. (ft)	312.50	Wetted Per. (ft)		121.21	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.19	Cum Volume (acre-ft)	0.54	32.09	0.38
C & E Loss (ft)	0.72	Cum SA (acres)	0.52	8.02	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2796.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.53	Wt. n-Val.		0.013	
W.S. Elev (ft)	2796.15	Reach Len. (ft)	312.50	312.50	312.50
Crit W.S. (ft)		Flow Area (sq ft)		461.63	
E.G. Slope (ft/ft)	0.000431	Area (sq ft)		461.63	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	111.43	Top Width (ft)		111.43	
Vel Total (ft/s)	5.85	Avg. Vel. (ft/s)		5.85	
Max Chl Dpth (ft)	4.15	Hydr. Depth (ft)		4.14	
Conv. Total (cfs)	130042.3	Conv. (cfs)		130042.3	
Length Wtd. (ft)	312.50	Wetted Per. (ft)		119.32	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.10	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.37	27.49	0.31
C & E Loss (ft)	0.62	Cum SA (acres)	0.39	7.79	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2794.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.		0.013	
W.S. Elev (ft)	2793.78	Reach Len. (ft)	312.50	312.50	312.50
Crit W.S. (ft)	2793.78	Flow Area (sq ft)		197.42	
E.G. Slope (ft/ft)	0.002139	Area (sq ft)		197.42	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	111.18	Top Width (ft)		111.18	
Vel Total (ft/s)	7.60	Avg. Vel. (ft/s)		7.60	
Max Chl Dpth (ft)	1.78	Hydr. Depth (ft)		1.78	
Conv. Total (cfs)	32435.3	Conv. (cfs)		32435.3	
Length Wtd. (ft)	312.50	Wetted Per. (ft)		114.56	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)	0.15	18.34	0.15
C & E Loss (ft)	0.25	Cum SA (acres)	0.12	7.35	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2792.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.23	Wt. n-Val.		0.013	
W.S. Elev (ft)	2792.47	Reach Len. (ft)	312.50	312.50	312.50
Crit W.S. (ft)	2792.47	Flow Area (sq ft)		51.77	

E.G. Slope (ft/ft)	0.003194	Area (sq ft)		51.77	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	111.05	Top Width (ft)		111.05	
Vel Total (ft/s)	3.86	Avg. Vel. (ft/s)		3.86	
Max Chl Dpth (ft)	0.47	Hydr. Depth (ft)		0.47	
Conv. Total (cfs)	3539.1	Conv. (cfs)		3539.1	
Length Wtd. (ft)	312.50	Wetted Per. (ft)		111.93	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	0.01	5.94	0.01
C & E Loss (ft)	0.07	Cum SA (acres)	0.03	6.51	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2794.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.89	Wt. n-Val.		0.013	
W.S. Elev (ft)	2793.76	Reach Len. (ft)	312.50	312.50	312.50
Crit W.S. (ft)	2793.76	Flow Area (sq ft)		195.95	
E.G. Slope (ft/ft)	0.002134	Area (sq ft)		195.95	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	111.18	Top Width (ft)		111.18	
Vel Total (ft/s)	7.55	Avg. Vel. (ft/s)		7.55	
Max Chl Dpth (ft)	1.76	Hydr. Depth (ft)		1.76	
Conv. Total (cfs)	32039.8	Conv. (cfs)		32039.8	
Length Wtd. (ft)	312.50	Wetted Per. (ft)		114.53	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.64	Cum Volume (acre-ft)	0.15	18.98	0.15
C & E Loss (ft)	0.25	Cum SA (acres)	0.14	7.39	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2794.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.		0.013	
W.S. Elev (ft)	2793.35	Reach Len. (ft)	312.50	312.50	312.50
Crit W.S. (ft)	2793.35	Flow Area (sq ft)		149.93	
E.G. Slope (ft/ft)	0.002308	Area (sq ft)		149.93	

Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	111.14	Top Width (ft)		111.14	
Vel Total (ft/s)	6.60	Avg. Vel. (ft/s)		6.60	
Max Chl Dpth (ft)	1.35	Hydr. Depth (ft)		1.35	
Conv. Total (cfs)	20606.5	Conv. (cfs)		20606.5	
Length Wtd. (ft)	312.50	Wetted Per. (ft)		113.70	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.69	Cum Volume (acre-ft)	0.09	14.45	0.09
C & E Loss (ft)	0.20	Cum SA (acres)	0.09	7.15	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2793.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.49	Wt. n-Val.		0.013	
W.S. Elev (ft)	2792.98	Reach Len. (ft)	312.50	312.50	312.50
Crit W.S. (ft)	2792.98	Flow Area (sq ft)		108.64	
E.G. Slope (ft/ft)	0.002542	Area (sq ft)		108.64	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	111.10	Top Width (ft)		111.10	
Vel Total (ft/s)	5.62	Avg. Vel. (ft/s)		5.62	
Max Chl Dpth (ft)	0.98	Hydr. Depth (ft)		0.98	
Conv. Total (cfs)	12098.6	Conv. (cfs)		12098.6	
Length Wtd. (ft)	312.50	Wetted Per. (ft)		112.96	
Min Ch El (ft)	2792.00	Shear (lb/sq ft)		0.15	
Alpha	1.00	Stream Power (lb/ft s)	564.50	0.00	0.00
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)	0.05	10.78	0.05
C & E Loss (ft)	0.14	Cum SA (acres)	0.07	6.90	0.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 6000

INPUT
Description: Section 60+00

```
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
   63.47    2805     100    2801  113.58    2800  130.47    2799     186    2796
     186    2788     226    2788     226    2796  281.14    2799  318.31    2800
  355.07  2800.8  427.93    2800  453.87    2799   479.4    2800  511.41    2802
  609.54    2803

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
   63.47    .035     186    .013     226    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           186     226            239.9   239.9   239.9             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
   63.47     186  2799.5       T
     226  609.54  2799.5       T
Left Levee      Station=     186      Elevation=  2799.5
Right Levee     Station=     226      Elevation=  2799.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2796.66    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               2.88    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2793.78    Reach Len. (ft)            239.90     239.90     239.90
  Crit W.S. (ft)           2793.78    Flow Area (sq ft)                     231.38
  E.G. Slope (ft/ft)      0.001917    Area (sq ft)                          231.38
  Q Total (cfs)            3150.00    Flow (cfs)                           3150.00
  Top Width (ft)             40.00    Top Width (ft)                         40.00
  Vel Total (ft/s)           13.61    Avg. Vel. (ft/s)                       13.61
  Max Chl Dpth (ft)           5.78    Hydr. Depth (ft)                        5.78
  Conv. Total (cfs)        71943.9    Conv. (cfs)                          71943.9
  Length Wtd. (ft)          239.90    Wetted Per. (ft)                       51.57
  Min Ch El (ft)           2788.00    Shear (lb/sq ft)                        0.54
  Alpha                       1.00    Stream Power (lb/ft s)     609.54     186.00     226.00
  Frctn Loss (ft)             0.72    Cum Volume (acre-ft)         0.54      29.23       0.38
  C & E Loss (ft)             0.31    Cum SA (acres)               0.52       7.48       0.20


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2795.82    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               2.59    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2793.23    Reach Len. (ft)            239.90     239.90     239.90
  Crit W.S. (ft)           2793.23    Flow Area (sq ft)                     209.08
  E.G. Slope (ft/ft)      0.001918    Area (sq ft)                          209.08
```

Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	12.91	Avg. Vel. (ft/s)		12.91	
Max Chl Dpth (ft)	5.23	Hydr. Depth (ft)		5.23	
Conv. Total (cfs)	61657.0	Conv. (cfs)		61657.0	
Length Wtd. (ft)	239.90	Wetted Per. (ft)		50.45	
Min Ch El (ft)	2788.00	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	609.54	186.00	226.00
Frctn Loss (ft)	0.82	Cum Volume (acre-ft)	0.37	25.09	0.31
C & E Loss (ft)	0.10	Cum SA (acres)	0.39	7.25	0.17

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2793.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.39	Wt. n-Val.		0.013	
W.S. Elev (ft)	2791.02	Reach Len. (ft)	239.90	239.90	239.90
Crit W.S. (ft)	2791.55	Flow Area (sq ft)		120.94	
E.G. Slope (ft/ft)	0.003249	Area (sq ft)		120.94	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	12.40	Avg. Vel. (ft/s)		12.40	
Max Chl Dpth (ft)	3.02	Hydr. Depth (ft)		3.02	
Conv. Total (cfs)	26314.0	Conv. (cfs)		26314.0	
Length Wtd. (ft)	239.90	Wetted Per. (ft)		46.05	
Min Ch El (ft)	2788.00	Shear (lb/sq ft)		0.53	
Alpha	1.00	Stream Power (lb/ft s)	609.54	186.00	226.00
Frctn Loss (ft)	0.81	Cum Volume (acre-ft)	0.15	17.19	0.15
C & E Loss (ft)	0.45	Cum SA (acres)	0.12	6.80	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2790.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.67	Wt. n-Val.		0.013	
W.S. Elev (ft)	2788.48	Reach Len. (ft)	239.90	239.90	239.90
Crit W.S. (ft)	2788.93	Flow Area (sq ft)		19.27	
E.G. Slope (ft/ft)	0.022546	Area (sq ft)		19.27	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	

Vel Total (ft/s)	10.38	Avg. Vel. (ft/s)		10.38	
Max Chl Dpth (ft)	0.48	Hydr. Depth (ft)		0.48	
Conv. Total (cfs)	1332.0	Conv. (cfs)		1332.0	
Length Wtd. (ft)	239.90	Wetted Per. (ft)		40.96	
Min Ch El (ft)	2788.00	Shear (lb/sq ft)		0.66	
Alpha	1.00	Stream Power (lb/ft s)	609.54	186.00	226.00
Frctn Loss (ft)	2.11	Cum Volume (acre-ft)	0.01	5.68	0.01
C & E Loss (ft)	0.43	Cum SA (acres)	0.03	5.96	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2793.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.40	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.98	Reach Len. (ft)	239.90	239.90	239.90
Crit W.S. (ft)	2791.51	Flow Area (sq ft)		119.12	
E.G. Slope (ft/ft)	0.003318	Area (sq ft)		119.12	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	12.42	Avg. Vel. (ft/s)		12.42	
Max Chl Dpth (ft)	2.98	Hydr. Depth (ft)		2.98	
Conv. Total (cfs)	25692.4	Conv. (cfs)		25692.4	
Length Wtd. (ft)	239.90	Wetted Per. (ft)		45.96	
Min Ch El (ft)	2788.00	Shear (lb/sq ft)		0.54	
Alpha	1.00	Stream Power (lb/ft s)	609.54	186.00	226.00
Frctn Loss (ft)	0.82	Cum Volume (acre-ft)	0.15	17.84	0.15
C & E Loss (ft)	0.45	Cum SA (acres)	0.14	6.85	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2792.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.46	Wt. n-Val.		0.013	
W.S. Elev (ft)	2789.97	Reach Len. (ft)	239.90	239.90	239.90
Crit W.S. (ft)	2790.67	Flow Area (sq ft)		78.70	
E.G. Slope (ft/ft)	0.005567	Area (sq ft)		78.70	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	12.58	Avg. Vel. (ft/s)		12.58	
Max Chl Dpth (ft)	1.97	Hydr. Depth (ft)		1.97	
Conv. Total (cfs)	13268.2	Conv. (cfs)		13268.2	
Length Wtd. (ft)	239.90	Wetted Per. (ft)		43.94	
Min Ch El (ft)	2788.00	Shear (lb/sq ft)		0.62	
Alpha	1.00	Stream Power (lb/ft s)	609.54	186.00	226.00
Frctn Loss (ft)	1.07	Cum Volume (acre-ft)	0.09	13.63	0.09
C & E Loss (ft)	0.53	Cum SA (acres)	0.09	6.61	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2791.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.31	Wt. n-Val.		0.013	
W.S. Elev (ft)	2789.25	Reach Len. (ft)	239.90	239.90	239.90
Crit W.S. (ft)	2789.93	Flow Area (sq ft)		50.01	
E.G. Slope (ft/ft)	0.009167	Area (sq ft)		50.01	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	40.00	Top Width (ft)		40.00	
Vel Total (ft/s)	12.20	Avg. Vel. (ft/s)		12.20	
Max Chl Dpth (ft)	1.25	Hydr. Depth (ft)		1.25	
Conv. Total (cfs)	6371.1	Conv. (cfs)		6371.1	
Length Wtd. (ft)	239.90	Wetted Per. (ft)		42.50	
Min Ch El (ft)	2788.00	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)	609.54	186.00	226.00
Frctn Loss (ft)	1.36	Cum Volume (acre-ft)	0.05	10.21	0.05
C & E Loss (ft)	0.55	Cum SA (acres)	0.07	6.36	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 5778.8

INPUT
Description: Section 57+78.8
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2796	113.5	2796	115.73	2795	125.22	2790	127.87	2789
132.24	2785	143.27	2785	155	2785	157.68	2789	160.37	2790
170.77	2795	173	2796	178.84	2796	193.9	2796	268.57	2796.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	113.5	.03	173	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
113.5	173	36.8	36.8	36.8	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2795.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.03	Wt. n-Val.		0.030	
W.S. Elev (ft)	2791.52	Reach Len. (ft)	36.80	36.80	36.80
Crit W.S. (ft)	2792.54	Flow Area (sq ft)		195.62	
E.G. Slope (ft/ft)	0.015325	Area (sq ft)		195.62	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	41.19	Top Width (ft)		41.19	
Vel Total (ft/s)	16.10	Avg. Vel. (ft/s)		16.10	
Max Chl Dpth (ft)	6.52	Hydr. Depth (ft)		4.75	
Conv. Total (cfs)	25445.2	Conv. (cfs)		25445.2	
Length Wtd. (ft)	36.80	Wetted Per. (ft)		45.97	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		4.07	
Alpha	1.00	Stream Power (lb/ft s)	268.57	0.00	0.00
Frctn Loss (ft)	1.00	Cum Volume (acre-ft)	0.54	28.05	0.38
C & E Loss (ft)	0.11	Cum SA (acres)	0.52	7.25	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2794.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.70	Wt. n-Val.		0.030	
W.S. Elev (ft)	2791.00	Reach Len. (ft)	36.80	36.80	36.80
Crit W.S. (ft)	2791.92	Flow Area (sq ft)		174.85	
E.G. Slope (ft/ft)	0.015284	Area (sq ft)		174.85	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	39.14	Top Width (ft)		39.14	
Vel Total (ft/s)	15.44	Avg. Vel. (ft/s)		15.44	
Max Chl Dpth (ft)	6.00	Hydr. Depth (ft)		4.47	
Conv. Total (cfs)	21839.5	Conv. (cfs)		21839.5	
Length Wtd. (ft)	36.80	Wetted Per. (ft)		43.67	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		3.82	
Alpha	1.00	Stream Power (lb/ft s)	268.57	0.00	0.00
Frctn Loss (ft)	1.00	Cum Volume (acre-ft)	0.37	24.03	0.31
C & E Loss (ft)	0.11	Cum SA (acres)	0.39	7.03	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2791.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.64	Wt. n-Val.		0.030	
W.S. Elev (ft)	2789.33	Reach Len. (ft)	36.80	36.80	36.80
Crit W.S. (ft)	2789.89	Flow Area (sq ft)		115.14	

E.G. Slope (ft/ft)	0.014333	Area (sq ft)		115.14	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	31.55	Top Width (ft)		31.55	
Vel Total (ft/s)	13.03	Avg. Vel. (ft/s)		13.03	
Max Chl Dpth (ft)	4.33	Hydr. Depth (ft)		3.65	
Conv. Total (cfs)	12529.3	Conv. (cfs)		12529.3	
Length Wtd. (ft)	36.80	Wetted Per. (ft)		35.36	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		2.91	
Alpha	1.00	Stream Power (lb/ft s)	268.57	0.00	0.00
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)	0.15	16.54	0.15
C & E Loss (ft)	0.02	Cum SA (acres)	0.12	6.61	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2786.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.030	
W.S. Elev (ft)	2786.31	Reach Len. (ft)	36.80	36.80	36.80
Crit W.S. (ft)	2786.31	Flow Area (sq ft)		31.41	
E.G. Slope (ft/ft)	0.013034	Area (sq ft)		31.41	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	25.07	Top Width (ft)		25.07	
Vel Total (ft/s)	6.37	Avg. Vel. (ft/s)		6.37	
Max Chl Dpth (ft)	1.31	Hydr. Depth (ft)		1.25	
Conv. Total (cfs)	1751.8	Conv. (cfs)		1751.8	
Length Wtd. (ft)	36.80	Wetted Per. (ft)		26.29	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)	268.57	0.00	0.00
Frctn Loss (ft)	0.07	Cum Volume (acre-ft)	0.01	5.54	0.01
C & E Loss (ft)	0.13	Cum SA (acres)	0.03	5.78	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2791.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.62	Wt. n-Val.		0.030	
W.S. Elev (ft)	2789.29	Reach Len. (ft)	36.80	36.80	36.80
Crit W.S. (ft)	2789.85	Flow Area (sq ft)		113.99	
E.G. Slope (ft/ft)	0.014315	Area (sq ft)		113.99	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	31.35	Top Width (ft)		31.35	
Vel Total (ft/s)	12.98	Avg. Vel. (ft/s)		12.98	
Max Chl Dpth (ft)	4.29	Hydr. Depth (ft)		3.64	
Conv. Total (cfs)	12369.8	Conv. (cfs)		12369.8	
Length Wtd. (ft)	36.80	Wetted Per. (ft)		35.15	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		2.90	

Alpha	1.00	Stream Power (lb/ft s)	268.57	0.00	0.00
Frctn Loss (ft)	1.45	Cum Volume (acre-ft)	0.15	17.20	0.15
C & E Loss (ft)	0.02	Cum SA (acres)	0.14	6.66	0.12

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2790.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.82	Wt. n-Val.		0.030	
W.S. Elev (ft)	2788.53	Reach Len. (ft)	36.80	36.80	36.80
Crit W.S. (ft)	2788.69	Flow Area (sq ft)		91.36	
E.G. Slope (ft/ft)	0.011936	Area (sq ft)		91.36	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	28.98	Top Width (ft)		28.98	
Vel Total (ft/s)	10.84	Avg. Vel. (ft/s)		10.84	
Max Chl Dpth (ft)	3.53	Hydr. Depth (ft)		3.15	
Conv. Total (cfs)	9061.5	Conv. (cfs)		9061.5	
Length Wtd. (ft)	36.80	Wetted Per. (ft)		32.24	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		2.11	
Alpha	1.00	Stream Power (lb/ft s)	268.57	0.00	0.00
Frctn Loss (ft)	1.89	Cum Volume (acre-ft)	0.09	13.17	0.09
C & E Loss (ft)	0.19	Cum SA (acres)	0.09	6.42	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2788.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.25	Wt. n-Val.		0.030	
W.S. Elev (ft)	2787.71	Reach Len. (ft)	36.80	36.80	36.80
Crit W.S. (ft)	2787.71	Flow Area (sq ft)		68.04	
E.G. Slope (ft/ft)	0.011006	Area (sq ft)		68.04	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	27.53	Top Width (ft)		27.53	
Vel Total (ft/s)	8.96	Avg. Vel. (ft/s)		8.96	
Max Chl Dpth (ft)	2.71	Hydr. Depth (ft)		2.47	
Conv. Total (cfs)	5814.6	Conv. (cfs)		5814.6	
Length Wtd. (ft)	36.80	Wetted Per. (ft)		30.03	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		1.56	
Alpha	1.00	Stream Power (lb/ft s)	268.57	0.00	0.00
Frctn Loss (ft)	0.06	Cum Volume (acre-ft)	0.05	9.89	0.05
C & E Loss (ft)	0.26	Cum SA (acres)	0.07	6.17	0.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

```
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 5742

INPUT
Description: Section 57+42 (U/S of Apple Valley Road)
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2797  138.63    2797  197.15    2796  207.41    2796  228.76    2795
     238    2790     238    2785     285    2785     285    2790  288.85    2794
  326.77    2795  403.98    2796

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  228.76    .013  288.85    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        228.76  288.85            132.4   132.4   132.4             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100  228.76  2797.5       T
  288.85  403.98  2797.5       T
Left Levee      Station=  228.76      Elevation=  2797.5
Right Levee     Station=  288.85      Elevation=  2797.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2795.06    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.71    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2794.35    Reach Len. (ft)           132.40     132.40     132.40
  Crit W.S. (ft)           2790.18    Flow Area (sq ft)                    465.82
  E.G. Slope (ft/ft)      0.000291    Area (sq ft)                         465.82
  Q Total (cfs)            3150.00    Flow (cfs)                          3150.00
  Top Width (ft)             58.88    Top Width (ft)                        58.88
  Vel Total (ft/s)            6.76    Avg. Vel. (ft/s)                       6.76
  Max Chl Dpth (ft)           9.35    Hydr. Depth (ft)                       7.91
  Conv. Total (cfs)       184807.2    Conv. (cfs)                       184807.2
  Length Wtd. (ft)          132.40    Wetted Per. (ft)                      72.03
  Min Ch El (ft)           2785.00    Shear (lb/sq ft)                       0.12
  Alpha                       1.00    Stream Power (lb/ft s)    403.98     228.76     288.85
  Frctn Loss (ft)                     Cum Volume (acre-ft)        0.54      27.77       0.38
  C & E Loss (ft)                     Cum SA (acres)              0.52       7.21       0.20


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2793.94    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.70    Wt. n-Val.                            0.013
  W.S. Elev (ft)           2793.24    Reach Len. (ft)           132.40     132.40     132.40
  Crit W.S. (ft)           2789.70    Flow Area (sq ft)                    402.14
```

E.G. Slope (ft/ft)	0.000325	Area (sq ft)		402.14	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	56.11	Top Width (ft)		56.11	
Vel Total (ft/s)	6.71	Avg. Vel. (ft/s)		6.71	
Max Chl Dpth (ft)	8.24	Hydr. Depth (ft)		7.17	
Conv. Total (cfs)	149859.9	Conv. (cfs)		149859.9	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		68.31	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	288.85
Frctn Loss (ft)		Cum Volume (acre-ft)	0.37	23.79	0.31
C & E Loss (ft)		Cum SA (acres)	0.39	6.99	0.17

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2790.86	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.30	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2788.16	Flow Area (sq ft)		249.05	
E.G. Slope (ft/ft)	0.000398	Area (sq ft)		249.05	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	47.83	Top Width (ft)		47.83	
Vel Total (ft/s)	6.02	Avg. Vel. (ft/s)		6.02	
Max Chl Dpth (ft)	5.30	Hydr. Depth (ft)		5.21	
Conv. Total (cfs)	75176.9	Conv. (cfs)		75176.9	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		58.03	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	288.85
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	16.39	0.15
C & E Loss (ft)		Cum SA (acres)	0.12	6.57	0.12

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2786.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.24	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2785.83	Flow Area (sq ft)		58.28	
E.G. Slope (ft/ft)	0.000725	Area (sq ft)		58.28	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	47.00	Top Width (ft)		47.00	
Vel Total (ft/s)	3.43	Avg. Vel. (ft/s)		3.43	
Max Chl Dpth (ft)	1.24	Hydr. Depth (ft)		1.24	
Conv. Total (cfs)	7429.5	Conv. (cfs)		7429.5	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		49.48	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	288.85
Frctn Loss (ft)		Cum Volume (acre-ft)	0.01	5.51	0.01
C & E Loss (ft)		Cum SA (acres)	0.03	5.75	0.03

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2790.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.24	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2788.13	Flow Area (sq ft)		246.40	
E.G. Slope (ft/ft)	0.000400	Area (sq ft)		246.40	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	47.68	Top Width (ft)		47.68	
Vel Total (ft/s)	6.01	Avg. Vel. (ft/s)		6.01	
Max Chl Dpth (ft)	5.24	Hydr. Depth (ft)		5.17	
Conv. Total (cfs)	74009.5	Conv. (cfs)		74009.5	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		57.84	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.11	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	288.85
Frctn Loss (ft)		Cum Volume (acre-ft)	0.15	17.05	0.15
C & E Loss (ft)		Cum SA (acres)	0.14	6.62	0.12

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2789.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.34	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.44	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2787.41	Flow Area (sq ft)		67.49	
E.G. Slope (ft/ft)	0.011001	Area (sq ft)		67.49	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	47.00	Top Width (ft)		47.00	
Vel Total (ft/s)	14.67	Avg. Vel. (ft/s)		14.67	
Max Chl Dpth (ft)	1.44	Hydr. Depth (ft)		1.44	
Conv. Total (cfs)	9438.8	Conv. (cfs)		9438.8	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		49.87	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.93	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	288.85
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	0.09	13.10	0.09
C & E Loss (ft)	0.15	Cum SA (acres)	0.09	6.39	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2788.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.38	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.05	Reach Len. (ft)	132.40	132.40	132.40
Crit W.S. (ft)	2786.73	Flow Area (sq ft)		49.31	
E.G. Slope (ft/ft)	0.011649	Area (sq ft)		49.31	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	47.00	Top Width (ft)		47.00	
Vel Total (ft/s)	12.37	Avg. Vel. (ft/s)		12.37	
Max Chl Dpth (ft)	1.05	Hydr. Depth (ft)		1.05	
Conv. Total (cfs)	5651.7	Conv. (cfs)		5651.7	
Length Wtd. (ft)	132.40	Wetted Per. (ft)		49.10	
Min Ch El (ft)	2785.00	Shear (lb/sq ft)		0.73	
Alpha	1.00	Stream Power (lb/ft s)	403.98	228.76	288.85
Frctn Loss (ft)	0.42	Cum Volume (acre-ft)	0.05	9.84	0.05
C & E Loss (ft)	0.11	Cum SA (acres)	0.07	6.14	0.07

```
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, water surface was used.

CULVERT


RIVER: Desert Knolls Wa
REACH: Main               RS: 5679.8

INPUT
Description: Apple Valley Road
Distance from Upstream XS =      .5
Deck/Roadway Width        =   131.5
Weir Coefficient          =     2.6
Upstream  Deck/Roadway Coordinates
    num=       9
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     119  2798.2          135.81  2797.5          159.24  2797.5
  177.08  2797.5          227.59  2797.5          268.39  2797.5
  334.53  2797.5          413.82  2797.5             455    2799

Upstream Bridge Cross Section Data
Station Elevation Data    num=      12
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2797  138.63    2797  197.15    2796  207.41    2796  228.76    2795
     238    2790     238    2785     285    2785     285    2790  288.85    2794
  326.77    2795  403.98    2796

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  228.76    .013  288.85    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
        228.76  288.85             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100  228.76  2797.5       T
  288.85  403.98  2797.5       T
Left Levee      Station=  228.76      Elevation=  2797.5
Right Levee     Station=  288.85      Elevation=  2797.5

Downstream  Deck/Roadway Coordinates
    num=       9
     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord     Sta Hi Cord Lo Cord
     119    2798          135.81    2797          159.24    2797
  177.08    2797          227.59    2797          268.39    2797
  334.53    2797          413.82    2797             455    2797

Downstream Bridge Cross Section Data
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2806  163.43    2803  186.22    2801  189.43    2800   193.6    2799
  220.14    2798  225.96    2797  235.64    2796  243.21    2795  252.32    2794
  265.12    2793     273    2792     273    2784     319    2784     319    2792
  340.05    2793  406.62    2794  422.95    2794  454.77    2795

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     273    .013     319    .035

Bank Sta: Left   Right    Coeff Contr.   Expan.
           273     319             .3       .5
Ineffective Flow     num=       2
```

```
   Sta L   Sta R    Elev  Permanent
     100     273    2797       T
     319  454.77    2797       T
Left Levee      Station=     273      Elevation=    2797
Right Levee     Station=     319      Elevation=    2797

Upstream Embankment side slope              =       0 horiz. to 1.0 vertical
Downstream Embankment side slope            =       0 horiz. to 1.0 vertical
Maximum allowable submergence for weir flow =     .98
Elevation at which weir flow begins         =
Energy head used in spillway design         =
Spillway height used in design              =
Weir crest shape                            = Broad Crested

Number of Culverts =  2

Culvert Name     Shape      Rise    Span
Culvert #3           Box       9       7
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .3     132     .013     .013        0                   .2                1
Number of Barrels =  2
Upstream   Elevation =  2785
Centerline Stations
    Sta.    Sta.
     242   280.5
Downstream Elevation =  2784
Centerline Stations
    Sta.    Sta.
     277   314.5

Culvert Name     Shape      Rise    Span
Culvert #1           Box       9      14
FHWA Chart # 8 - flared wingwalls
FHWA Scale # 1 - Wingwall flared 30 to 75 deg.
Solution Criteria = Highest U.S. EG
Culvert Upstrm Dist  Length    Top n  Bottom n  Depth Blocked  Entrance Loss Coef   Exit Loss Coef
                 .3     132     .013     .013        0                   .2                1
Number of Barrels =  2
Upstream   Elevation =  2785
Centerline Stations
    Sta.    Sta.
   253.5     269
Downstream Elevation =  2784
Centerline Stations
    Sta.    Sta.
     288     303

CULVERT OUTPUT  Profile #100-yr SBCFCD  Culv Group:  Culvert #3

  Q Culv Group (cfs)       1033.03    Culv Full Len (ft)         99.94
  # Barrels                      2    Culv Vel US (ft/s)          8.44
  Q Barrel (cfs)            516.51    Culv Vel DS (ft/s)          8.20
  E.G. US. (ft)            2795.06    Culv Inv El Up (ft)      2785.00
  W.S. US. (ft)            2794.35    Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)             2794.35    Culv Frctn Ls (ft)          0.26
  W.S. DS (ft)             2793.55    Culv Exit Loss (ft)         0.25
  Delta EG (ft)               0.71    Culv Entr Loss (ft)         0.22
  Delta WS (ft)               0.80    Q Weir (cfs)
  E.G. IC (ft)             2793.90    Weir Sta Lft (ft)
  E.G. OC (ft)             2795.07    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2793.75    Weir Max Depth (ft)
```

Culv WS Outlet (ft)	2793.00	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	4.67	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.53	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #3

Q Culv Group (cfs)	881.50	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	8.19
Q Barrel (cfs)	440.75	Culv Vel DS (ft/s)	7.20
E.G. US. (ft)	2793.94	Culv Inv El Up (ft)	2785.00
W.S. US. (ft)	2793.24	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2793.45	Culv Frctn Ls (ft)	0.18
W.S. DS (ft)	2792.75	Culv Exit Loss (ft)	0.11
Delta EG (ft)	0.49	Culv Entr Loss (ft)	0.21
Delta WS (ft)	0.49	Q Weir (cfs)	
E.G. IC (ft)	2792.97	Weir Sta Lft (ft)	
E.G. OC (ft)	2793.94	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2792.69	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2792.75	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	4.13	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	4.97	Min El Weir Flow (ft)	2797.51

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #3

Q Culv Group (cfs)	493.64	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	7.18
Q Barrel (cfs)	246.82	Culv Vel DS (ft/s)	5.85
E.G. US. (ft)	2790.86	Culv Inv El Up (ft)	2785.00
W.S. US. (ft)	2790.30	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2790.48	Culv Frctn Ls (ft)	0.15
W.S. DS (ft)	2790.03	Culv Exit Loss (ft)	0.08
Delta EG (ft)	0.38	Culv Entr Loss (ft)	0.16
Delta WS (ft)	0.27	Q Weir (cfs)	
E.G. IC (ft)	2790.34	Weir Sta Lft (ft)	
E.G. OC (ft)	2790.87	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2789.91	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2790.03	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	2.68	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	3.38	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #10-yr FIS Culv Group: Culvert #3

Q Culv Group (cfs)	65.55	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	5.32
Q Barrel (cfs)	32.77	Culv Vel DS (ft/s)	3.79
E.G. US. (ft)	2786.42	Culv Inv El Up (ft)	2785.00
W.S. US. (ft)	2786.24	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2785.43	Culv Frctn Ls (ft)	0.86
W.S. DS (ft)	2785.24	Culv Exit Loss (ft)	0.03
Delta EG (ft)	1.00	Culv Entr Loss (ft)	0.09
Delta WS (ft)	1.00	Q Weir (cfs)	
E.G. IC (ft)	2786.33	Weir Sta Lft (ft)	
E.G. OC (ft)	2786.41	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2785.88	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2785.24	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	0.68	Weir Flow Area (sq ft)	

```
  Culv Crt Depth (ft)         0.88    Min El Weir Flow (ft)    2797.51


Note:    During supercritical analysis, the culvert direct step method went to normal depth.  The
program then assumed normal
         depth at the outlet.
Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #3

  Q Culv Group (cfs)        486.67    Culv Full Len (ft)
  # Barrels                      2    Culv Vel US (ft/s)          7.15
  Q Barrel (cfs)            243.33    Culv Vel DS (ft/s)          5.82
  E.G. US. (ft)            2790.80    Culv Inv El Up (ft)      2785.00
  W.S. US. (ft)            2790.24    Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)             2790.43    Culv Frctn Ls (ft)          0.15
  W.S. DS (ft)             2789.97    Culv Exit Loss (ft)         0.08
  Delta EG (ft)               0.38    Culv Entr Loss (ft)         0.16
  Delta WS (ft)               0.27    Q Weir (cfs)
  E.G. IC (ft)             2790.29    Weir Sta Lft (ft)
  E.G. OC (ft)             2790.81    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2789.86    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2789.97    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         2.66    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.35    Min El Weir Flow (ft)    2797.51


CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #3

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                      2    Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2785.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2797.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #3

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                      2    Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2785.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
```

Culvert Control		Weir Submerg	
Culv WS Inlet (ft)		Weir Max Depth (ft)	
Culv WS Outlet (ft)		Weir Avg Depth (ft)	
Culv Nml Depth (ft)		Weir Flow Area (sq ft)	
Culv Crt Depth (ft)		Min El Weir Flow (ft)	2797.51

Warning: The program cannot perform supercritical flow through multiple culverts. The program sets the water surface to critical
depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT Profile #100-yr SBCFCD Culv Group: Culvert #1

Q Culv Group (cfs)	2116.97	Culv Full Len (ft)	89.00
# Barrels	2	Culv Vel US (ft/s)	8.78
Q Barrel (cfs)	1058.49	Culv Vel DS (ft/s)	8.40
E.G. US. (ft)	2795.06	Culv Inv El Up (ft)	2785.00
W.S. US. (ft)	2794.35	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2794.35	Culv Frctn Ls (ft)	0.17
W.S. DS (ft)	2793.55	Culv Exit Loss (ft)	0.30
Delta EG (ft)	0.71	Culv Entr Loss (ft)	0.24
Delta WS (ft)	0.80	Q Weir (cfs)	
E.G. IC (ft)	2794.05	Weir Sta Lft (ft)	
E.G. OC (ft)	2795.05	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2793.61	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2793.00	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	4.05	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.62	Min El Weir Flow (ft)	2797.51

CULVERT OUTPUT Profile #100-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	1818.51	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	8.58
Q Barrel (cfs)	909.25	Culv Vel DS (ft/s)	7.42
E.G. US. (ft)	2793.94	Culv Inv El Up (ft)	2785.00
W.S. US. (ft)	2793.24	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2793.45	Culv Frctn Ls (ft)	0.11
W.S. DS (ft)	2792.75	Culv Exit Loss (ft)	0.16
Delta EG (ft)	0.49	Culv Entr Loss (ft)	0.23
Delta WS (ft)	0.49	Q Weir (cfs)	
E.G. IC (ft)	2793.15	Weir Sta Lft (ft)	
E.G. OC (ft)	2793.94	Weir Sta Rgt (ft)	
Culvert Control	Outlet	Weir Submerg	
Culv WS Inlet (ft)	2792.57	Weir Max Depth (ft)	
Culv WS Outlet (ft)	2792.75	Weir Avg Depth (ft)	
Culv Nml Depth (ft)	3.65	Weir Flow Area (sq ft)	
Culv Crt Depth (ft)	5.08	Min El Weir Flow (ft)	2797.51

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CULVERT OUTPUT Profile #50-yr FIS Culv Group: Culvert #1

Q Culv Group (cfs)	1006.36	Culv Full Len (ft)	
# Barrels	2	Culv Vel US (ft/s)	7.46
Q Barrel (cfs)	503.18	Culv Vel DS (ft/s)	5.96
E.G. US. (ft)	2790.86	Culv Inv El Up (ft)	2785.00
W.S. US. (ft)	2790.30	Culv Inv El Dn (ft)	2784.00
E.G. DS (ft)	2790.48	Culv Frctn Ls (ft)	0.10
W.S. DS (ft)	2790.03	Culv Exit Loss (ft)	0.10
Delta EG (ft)	0.38	Culv Entr Loss (ft)	0.17
Delta WS (ft)	0.27	Q Weir (cfs)	

```
  E.G. IC (ft)             2790.41    Weir Sta Lft (ft)
  E.G. OC (ft)             2790.85    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2789.82    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2790.03    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         2.44    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.42    Min El Weir Flow (ft)    2797.51


CULVERT OUTPUT  Profile #10-yr FIS  Culv Group:  Culvert #1

  Q Culv Group (cfs)        134.45    Culv Full Len (ft)
  # Barrels                      2    Culv Vel US (ft/s)          5.37
  Q Barrel (cfs)             67.23    Culv Vel DS (ft/s)          3.89
  E.G. US. (ft)            2786.42    Culv Inv El Up (ft)      2785.00
  W.S. US. (ft)            2786.24    Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)             2785.43    Culv Frctn Ls (ft)          0.87
  W.S. DS (ft)             2785.24    Culv Exit Loss (ft)         0.04
  Delta EG (ft)               1.00    Culv Entr Loss (ft)         0.09
  Delta WS (ft)               1.00    Q Weir (cfs)
  E.G. IC (ft)             2786.35    Weir Sta Lft (ft)
  E.G. OC (ft)             2786.43    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2785.90    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2785.24    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         0.67    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         0.89    Min El Weir Flow (ft)    2797.51


Note:    During supercritical analysis, the culvert direct step method went to normal depth.  The
program then assumed normal
         depth at the outlet.
Note:    During the supercritical calculations a hydraulic jump occurred inside of the culvert.

CULVERT OUTPUT  Profile #10-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)        993.33    Culv Full Len (ft)
  # Barrels                      2    Culv Vel US (ft/s)          7.45
  Q Barrel (cfs)            496.67    Culv Vel DS (ft/s)          5.94
  E.G. US. (ft)            2790.80    Culv Inv El Up (ft)      2785.00
  W.S. US. (ft)            2790.24    Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)             2790.43    Culv Frctn Ls (ft)          0.10
  W.S. DS (ft)             2789.97    Culv Exit Loss (ft)         0.10
  Delta EG (ft)               0.38    Culv Entr Loss (ft)         0.17
  Delta WS (ft)               0.27    Q Weir (cfs)
  E.G. IC (ft)             2790.36    Weir Sta Lft (ft)
  E.G. OC (ft)             2790.80    Weir Sta Rgt (ft)
  Culvert Control           Outlet    Weir Submerg
  Culv WS Inlet (ft)       2789.76    Weir Max Depth (ft)
  Culv WS Outlet (ft)      2789.97    Weir Avg Depth (ft)
  Culv Nml Depth (ft)         2.41    Weir Flow Area (sq ft)
  Culv Crt Depth (ft)         3.39    Min El Weir Flow (ft)    2797.51


CULVERT OUTPUT  Profile #5-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                      2    Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2785.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
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  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2797.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CULVERT OUTPUT  Profile #2-yr SBCFCD  Culv Group:  Culvert #1

  Q Culv Group (cfs)                  Culv Full Len (ft)
  # Barrels                     2     Culv Vel US (ft/s)
  Q Barrel (cfs)                      Culv Vel DS (ft/s)
  E.G. US. (ft)                       Culv Inv El Up (ft)      2785.00
  W.S. US. (ft)                       Culv Inv El Dn (ft)      2784.00
  E.G. DS (ft)                        Culv Frctn Ls (ft)
  W.S. DS (ft)                        Culv Exit Loss (ft)
  Delta EG (ft)                       Culv Entr Loss (ft)
  Delta WS (ft)                       Q Weir (cfs)
  E.G. IC (ft)                        Weir Sta Lft (ft)
  E.G. OC (ft)                        Weir Sta Rgt (ft)
  Culvert Control                     Weir Submerg
  Culv WS Inlet (ft)                  Weir Max Depth (ft)
  Culv WS Outlet (ft)                 Weir Avg Depth (ft)
  Culv Nml Depth (ft)                 Weir Flow Area (sq ft)
  Culv Crt Depth (ft)                 Min El Weir Flow (ft)    2797.51


Warning: The program cannot perform supercritical flow through multiple culverts.  The program sets
the water surface to critical
         depth at the downstream end of the culverts and continues on.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 5609.6

INPUT
Description: Section 56+09.6 (D/S of Apple Valley Road)
Station Elevation Data    num=      19
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2806  163.43    2803  186.22    2801  189.43    2800   193.6    2799
  220.14    2798  225.96    2797  235.64    2796  243.21    2795  252.32    2794
  265.12    2793     273    2792     273    2784     319    2784     319    2792
  340.05    2793  406.62    2794  422.95    2794  454.77    2795

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     273    .013     319    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           273     319             28.3    28.3    28.3             .3       .5
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     273    2797       T
     319  454.77    2797       T
Left Levee      Station=     273      Elevation=    2797
Right Levee     Station=     319      Elevation=    2797
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CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2794.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.80	Wt. n-Val.		0.013	
W.S. Elev (ft)	2793.55	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2789.28	Flow Area (sq ft)		439.25	
E.G. Slope (ft/ft)	0.000309	Area (sq ft)		439.25	
Q Total (cfs)	3150.00	Flow (cfs)		3150.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	7.17	Avg. Vel. (ft/s)		7.17	
Max Chl Dpth (ft)	9.55	Hydr. Depth (ft)		9.55	
Conv. Total (cfs)	179275.7	Conv. (cfs)		179275.7	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		65.10	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.54	27.20	0.38
C & E Loss (ft)	0.63	Cum SA (acres)	0.52	7.05	0.20

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2793.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.70	Wt. n-Val.		0.013	
W.S. Elev (ft)	2792.75	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2788.77	Flow Area (sq ft)		402.44	
E.G. Slope (ft/ft)	0.000294	Area (sq ft)		402.44	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	6.71	Avg. Vel. (ft/s)		6.71	
Max Chl Dpth (ft)	8.75	Hydr. Depth (ft)		8.75	
Conv. Total (cfs)	157539.4	Conv. (cfs)		157539.4	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		63.50	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.12	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.37	23.26	0.31
C & E Loss (ft)	0.61	Cum SA (acres)	0.39	6.83	0.17

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2790.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.013	
W.S. Elev (ft)	2790.03	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2787.23	Flow Area (sq ft)		277.22	
E.G. Slope (ft/ft)	0.000279	Area (sq ft)		277.22	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	5.41	Avg. Vel. (ft/s)		5.41	
Max Chl Dpth (ft)	6.03	Hydr. Depth (ft)		6.03	

Conv. Total (cfs)	89857.2	Conv. (cfs)		89857.2	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		58.05	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.15	16.04	0.15
C & E Loss (ft)	0.48	Cum SA (acres)	0.12	6.43	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2785.43	Element			
Vel Head (ft)	0.19	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.24	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2784.84	Flow Area (sq ft)		56.81	
E.G. Slope (ft/ft)	0.000767	Area (sq ft)		56.81	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	3.52	Avg. Vel. (ft/s)		3.52	
Max Chl Dpth (ft)	1.24	Hydr. Depth (ft)		1.24	
Conv. Total (cfs)	7219.5	Conv. (cfs)		7219.5	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		48.47	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.01	5.46	0.01
C & E Loss (ft)	0.12	Cum SA (acres)	0.03	5.61	0.03

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2790.43	Element			
Vel Head (ft)	0.45	Wt. n-Val.		0.013	
W.S. Elev (ft)	2789.97	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2787.19	Flow Area (sq ft)		274.81	
E.G. Slope (ft/ft)	0.000279	Area (sq ft)		274.81	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	5.39	Avg. Vel. (ft/s)		5.39	
Max Chl Dpth (ft)	5.97	Hydr. Depth (ft)		5.97	
Conv. Total (cfs)	88663.5	Conv. (cfs)		88663.5	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		57.95	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.15	16.70	0.15
C & E Loss (ft)	0.48	Cum SA (acres)	0.14	6.48	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2787.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.43	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2786.43	Flow Area (sq ft)		111.95	
E.G. Slope (ft/ft)	0.002091	Area (sq ft)		111.95	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	8.84	Avg. Vel. (ft/s)		8.84	
Max Chl Dpth (ft)	2.43	Hydr. Depth (ft)		2.43	
Conv. Total (cfs)	21648.9	Conv. (cfs)		21648.9	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		50.87	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.29	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.09	13.10	0.09
C & E Loss (ft)		Cum SA (acres)	0.09	6.24	0.09

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2786.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.77	Reach Len. (ft)	28.30	28.30	28.30
Crit W.S. (ft)	2785.77	Flow Area (sq ft)		81.45	
E.G. Slope (ft/ft)	0.002212	Area (sq ft)		81.45	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	46.00	Top Width (ft)		46.00	
Vel Total (ft/s)	7.49	Avg. Vel. (ft/s)		7.49	
Max Chl Dpth (ft)	1.77	Hydr. Depth (ft)		1.77	
Conv. Total (cfs)	12969.8	Conv. (cfs)		12969.8	
Length Wtd. (ft)	28.30	Wetted Per. (ft)		49.54	
Min Ch El (ft)	2784.00	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	454.77	273.00	319.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.05	9.84	0.05
C & E Loss (ft)		Cum SA (acres)	0.07	6.00	0.07

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, water surface was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 5581.3

INPUT
Description: Section 55+81.3
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2795	104.63	2793	111.39	2792	134.99	2791	136.49	2790
137.99	2789	140.22	2787	140.23	2783.6	170.24	2783.6	170.25	2788
171.65	2789	173.14	2790	175.06	2791	177.7	2792	203.68	2793

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	134.99	.013	175.06	.035

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Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        134.99  175.06             66.1    66.1    66.1             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     135    2794       T
     175  203.68    2794       T
Left Levee      Station=  134.99      Elevation=    2794
Right Levee     Station=  175.06      Elevation=    2794

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)          2793.70    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              2.91    Wt. n-Val.                            0.013
  W.S. Elev (ft)          2790.79    Reach Len. (ft)            66.10      66.10      66.10
  Crit W.S. (ft)          2790.79    Flow Area (sq ft)                    230.16
  E.G. Slope (ft/ft)     0.001835    Area (sq ft)                         230.16
  Q Total (cfs)           3150.00    Flow (cfs)                          3150.00
  Top Width (ft)            39.35    Top Width (ft)                        39.35
  Vel Total (ft/s)          13.69    Avg. Vel. (ft/s)                      13.69
  Max Chl Dpth (ft)          7.19    Hydr. Depth (ft)                       5.85
  Conv. Total (cfs)       73534.8    Conv. (cfs)                         73534.8
  Length Wtd. (ft)          66.10    Wetted Per. (ft)                      49.25
  Min Ch El (ft)          2783.60    Shear (lb/sq ft)                       0.54
  Alpha                      1.00    Stream Power (lb/ft s)    203.68     134.99     175.06
  Frctn Loss (ft)            0.09    Cum Volume (acre-ft)        0.54      26.98       0.38
  C & E Loss (ft)            0.32    Cum SA (acres)              0.52       7.02       0.20


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)          2792.82    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              2.72    Wt. n-Val.                            0.013
  W.S. Elev (ft)          2790.10    Reach Len. (ft)            66.10      66.10      66.10
  Crit W.S. (ft)          2790.10    Flow Area (sq ft)                    203.84
  E.G. Slope (ft/ft)     0.001873    Area (sq ft)                         203.84
  Q Total (cfs)           2700.00    Flow (cfs)                          2700.00
  Top Width (ft)            36.99    Top Width (ft)                        36.99
  Vel Total (ft/s)          13.25    Avg. Vel. (ft/s)                      13.25
  Max Chl Dpth (ft)          6.50    Hydr. Depth (ft)                       5.51
  Conv. Total (cfs)       62392.3    Conv. (cfs)                         62392.3
  Length Wtd. (ft)          66.10    Wetted Per. (ft)                      46.51
  Min Ch El (ft)          2783.60    Shear (lb/sq ft)                       0.51
  Alpha                      1.00    Stream Power (lb/ft s)    203.68     134.99     175.06
  Frctn Loss (ft)            0.11    Cum Volume (acre-ft)        0.37      23.06       0.31
  C & E Loss (ft)            0.16    Cum SA (acres)              0.39       6.80       0.17


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
```

for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2789.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.06	Wt. n-Val.		0.013	
W.S. Elev (ft)	2787.92	Reach Len. (ft)	66.10	66.10	66.10
Crit W.S. (ft)	2787.92	Flow Area (sq ft)		130.17	
E.G. Slope (ft/ft)	0.002045	Area (sq ft)		130.17	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	31.06	Top Width (ft)		31.06	
Vel Total (ft/s)	11.52	Avg. Vel. (ft/s)		11.52	
Max Chl Dpth (ft)	4.32	Hydr. Depth (ft)		4.19	
Conv. Total (cfs)	33169.6	Conv. (cfs)		33169.6	
Length Wtd. (ft)	66.10	Wetted Per. (ft)		39.11	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)	203.68	134.99	175.06
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.15	15.91	0.15
C & E Loss (ft)	0.13	Cum SA (acres)	0.12	6.41	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2785.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.		0.013	
W.S. Elev (ft)	2784.69	Reach Len. (ft)	66.10	66.10	66.10
Crit W.S. (ft)	2784.69	Flow Area (sq ft)		32.68	
E.G. Slope (ft/ft)	0.002809	Area (sq ft)		32.68	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	30.02	Top Width (ft)		30.02	
Vel Total (ft/s)	6.12	Avg. Vel. (ft/s)		6.12	
Max Chl Dpth (ft)	1.09	Hydr. Depth (ft)		1.09	
Conv. Total (cfs)	3773.4	Conv. (cfs)		3773.4	
Length Wtd. (ft)	66.10	Wetted Per. (ft)		32.19	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	203.68	134.99	175.06
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)	0.01	5.43	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	5.59	0.03

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2789.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.05	Wt. n-Val.		0.013	
W.S. Elev (ft)	2787.87	Reach Len. (ft)	66.10	66.10	66.10
Crit W.S. (ft)	2787.87	Flow Area (sq ft)		128.66	
E.G. Slope (ft/ft)	0.002062	Area (sq ft)		128.66	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	31.00	Top Width (ft)		31.00	
Vel Total (ft/s)	11.50	Avg. Vel. (ft/s)		11.50	
Max Chl Dpth (ft)	4.27	Hydr. Depth (ft)		4.15	
Conv. Total (cfs)	32595.5	Conv. (cfs)		32595.5	
Length Wtd. (ft)	66.10	Wetted Per. (ft)		38.99	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)	203.68	134.99	175.06
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.15	16.57	0.15
C & E Loss (ft)	0.13	Cum SA (acres)	0.14	6.46	0.12

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2788.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.60	Wt. n-Val.		0.013	
W.S. Elev (ft)	2786.85	Reach Len. (ft)	66.10	66.10	66.10
Crit W.S. (ft)	2786.85	Flow Area (sq ft)		97.50	
E.G. Slope (ft/ft)	0.002130	Area (sq ft)		97.50	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	30.03	Top Width (ft)		30.03	
Vel Total (ft/s)	10.15	Avg. Vel. (ft/s)		10.15	
Max Chl Dpth (ft)	3.25	Hydr. Depth (ft)		3.25	
Conv. Total (cfs)	21452.0	Conv. (cfs)		21452.0	
Length Wtd. (ft)	66.10	Wetted Per. (ft)		36.51	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.36	
Alpha	1.00	Stream Power (lb/ft s)	203.68	134.99	175.06
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.09	13.03	0.09
C & E Loss (ft)	0.09	Cum SA (acres)	0.09	6.22	0.09

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2787.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.16	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.95	Reach Len. (ft)	66.10	66.10	66.10
Crit W.S. (ft)	2785.95	Flow Area (sq ft)		70.55	
E.G. Slope (ft/ft)	0.002223	Area (sq ft)		70.55	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	30.02	Top Width (ft)		30.02	
Vel Total (ft/s)	8.65	Avg. Vel. (ft/s)		8.65	
Max Chl Dpth (ft)	2.35	Hydr. Depth (ft)		2.35	
Conv. Total (cfs)	12938.4	Conv. (cfs)		12938.4	
Length Wtd. (ft)	66.10	Wetted Per. (ft)		34.71	
Min Ch El (ft)	2783.60	Shear (lb/sq ft)		0.28	
Alpha	1.00	Stream Power (lb/ft s)	203.68	134.99	175.06
Frctn Loss (ft)	0.14	Cum Volume (acre-ft)	0.05	9.79	0.05
C & E Loss (ft)	0.05	Cum SA (acres)	0.07	5.97	0.07

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 5515.3

INPUT
Description: Section 55+15.3 (D/S of Apple Valley Road)
Station Elevation Data num= 24

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2799	104.77	2798	110.07	2797	113.04	2796	115.11	2795
116.81	2794	119.03	2793	121.23	2792	136.53	2791	141.5	2790.5
145.66	2788	149.33	2786	151.31	2785	153.42	2784	155.79	2783
187.1	2783	190.49	2785	194.01	2787	200.5	2790.5	215.96	2791
221.95	2792	227.95	2793	280.62	2793	330.6	2794		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	141.5	.013	200.5	.013

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

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        141.5   200.5             50.3    50.3    50.3             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2793.17    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               6.13    Wt. n-Val.                           0.013
  W.S. Elev (ft)           2787.05    Reach Len. (ft)            50.30     50.30      50.30
  Crit W.S. (ft)           2788.94    Flow Area (sq ft)                   158.58
  E.G. Slope (ft/ft)      0.006258    Area (sq ft)                        158.58
  Q Total (cfs)            3150.00    Flow (cfs)                         3150.00
  Top Width (ft)             46.69    Top Width (ft)                       46.69
  Vel Total (ft/s)           19.86    Avg. Vel. (ft/s)                     19.86
  Max Chl Dpth (ft)           4.05    Hydr. Depth (ft)                      3.40
  Conv. Total (cfs)        39818.4    Conv. (cfs)                       39818.4
  Length Wtd. (ft)           50.30    Wetted Per. (ft)                     48.71
  Min Ch El (ft)           2783.00    Shear (lb/sq ft)                      1.27
  Alpha                       1.00    Stream Power (lb/ft s)    330.60      0.00       0.00
  Frctn Loss (ft)             0.20    Cum Volume (acre-ft)        0.54     26.69       0.38
  C & E Loss (ft)             0.32    Cum SA (acres)              0.52      6.96       0.20


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2792.32    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               5.64    Wt. n-Val.                           0.013
  W.S. Elev (ft)           2786.68    Reach Len. (ft)            50.30     50.30      50.30
  Crit W.S. (ft)           2788.42    Flow Area (sq ft)                   141.65
  E.G. Slope (ft/ft)      0.006422    Area (sq ft)                        141.65
  Q Total (cfs)            2700.00    Flow (cfs)                         2700.00
  Top Width (ft)             45.36    Top Width (ft)                       45.36
  Vel Total (ft/s)           19.06    Avg. Vel. (ft/s)                     19.06
  Max Chl Dpth (ft)           3.68    Hydr. Depth (ft)                      3.12
  Conv. Total (cfs)        33691.1    Conv. (cfs)                       33691.1
  Length Wtd. (ft)           50.30    Wetted Per. (ft)                     47.19
  Min Ch El (ft)           2783.00    Shear (lb/sq ft)                      1.20
  Alpha                       1.00    Stream Power (lb/ft s)    330.60      0.00       0.00
  Frctn Loss (ft)             0.21    Cum Volume (acre-ft)        0.37     22.80       0.31
  C & E Loss (ft)             0.29    Cum SA (acres)              0.39      6.74       0.17


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2789.56    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               3.99    Wt. n-Val.                           0.013
  W.S. Elev (ft)           2785.57    Reach Len. (ft)            50.30     50.30      50.30
  Crit W.S. (ft)           2786.80    Flow Area (sq ft)                    93.55
  E.G. Slope (ft/ft)      0.006887    Area (sq ft)                         93.55
  Q Total (cfs)            1500.00    Flow (cfs)                         1500.00
  Top Width (ft)             41.31    Top Width (ft)                       41.31
```

Vel Total (ft/s)	16.03	Avg. Vel. (ft/s)		16.03	
Max Chl Dpth (ft)	2.57	Hydr. Depth (ft)		2.26	
Conv. Total (cfs)	18074.8	Conv. (cfs)		18074.8	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		42.57	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.15	15.74	0.15
C & E Loss (ft)	0.19	Cum SA (acres)	0.12	6.35	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2784.89	Element			
Vel Head (ft)	1.19	Wt. n-Val.		0.013	
W.S. Elev (ft)	2783.70	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2784.06	Flow Area (sq ft)		22.84	
E.G. Slope (ft/ft)	0.010169	Area (sq ft)		22.84	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	34.15	Top Width (ft)		34.15	
Vel Total (ft/s)	8.76	Avg. Vel. (ft/s)		8.76	
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	1983.3	Conv. (cfs)		1983.3	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		34.48	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.01	5.39	0.01
C & E Loss (ft)	0.06	Cum SA (acres)	0.03	5.54	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2789.51	Element			
Vel Head (ft)	3.96	Wt. n-Val.		0.013	
W.S. Elev (ft)	2785.55	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2786.76	Flow Area (sq ft)		92.70	
E.G. Slope (ft/ft)	0.006894	Area (sq ft)		92.70	
Q Total (cfs)	1480.00	Flow (cfs)		1480.00	
Top Width (ft)	41.23	Top Width (ft)		41.23	
Vel Total (ft/s)	15.97	Avg. Vel. (ft/s)		15.97	
Max Chl Dpth (ft)	2.55	Hydr. Depth (ft)		2.25	
Conv. Total (cfs)	17824.4	Conv. (cfs)		17824.4	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		42.48	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.15	16.41	0.15
C & E Loss (ft)	0.19	Cum SA (acres)	0.14	6.40	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2788.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.07	Wt. n-Val.		0.013	
W.S. Elev (ft)	2784.99	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2785.93	Flow Area (sq ft)		70.39	
E.G. Slope (ft/ft)	0.007157	Area (sq ft)		70.39	
Q Total (cfs)	990.00	Flow (cfs)		990.00	
Top Width (ft)	39.16	Top Width (ft)		39.16	
Vel Total (ft/s)	14.06	Avg. Vel. (ft/s)		14.06	
Max Chl Dpth (ft)	1.99	Hydr. Depth (ft)		1.80	
Conv. Total (cfs)	11702.4	Conv. (cfs)		11702.4	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		40.13	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.09	12.90	0.09
C & E Loss (ft)	0.15	Cum SA (acres)	0.09	6.17	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2786.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.27	Wt. n-Val.		0.013	
W.S. Elev (ft)	2784.47	Reach Len. (ft)	50.30	50.30	50.30
Crit W.S. (ft)	2785.16	Flow Area (sq ft)		50.43	
E.G. Slope (ft/ft)	0.007644	Area (sq ft)		50.43	
Q Total (cfs)	610.00	Flow (cfs)		610.00	
Top Width (ft)	37.17	Top Width (ft)		37.17	
Vel Total (ft/s)	12.10	Avg. Vel. (ft/s)		12.10	
Max Chl Dpth (ft)	1.47	Hydr. Depth (ft)		1.36	
Conv. Total (cfs)	6976.8	Conv. (cfs)		6976.8	
Length Wtd. (ft)	50.30	Wetted Per. (ft)		37.88	
Min Ch El (ft)	2783.00	Shear (lb/sq ft)		0.64	
Alpha	1.00	Stream Power (lb/ft s)	330.60	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.05	9.70	0.05
C & E Loss (ft)	0.11	Cum SA (acres)	0.07	5.92	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 5135

INPUT
Description: Section 51+35 Improved Concrete Channel
Station Elevation Data    num=       4
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2790.21     112 2782.21     142 2782.21     154 2790.21

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .013     112    .013     142    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           112     142              260     260     260             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2792.90    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               6.20    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2786.70    Reach Len. (ft)           260.00     260.00     260.00
  Crit W.S. (ft)           2788.63    Flow Area (sq ft)          15.10     134.60      15.10
  E.G. Slope (ft/ft)      0.004476    Area (sq ft)               15.10     134.60      15.10
  Q Total (cfs)            3150.00    Flow (cfs)                175.02    2799.96     175.02
  Top Width (ft)             43.46    Top Width (ft)              6.73      30.00       6.73
  Vel Total (ft/s)           19.12    Avg. Vel. (ft/s)           11.59      20.80      11.59
  Max Chl Dpth (ft)           4.49    Hydr. Depth (ft)            2.24       4.49       2.24
  Conv. Total (cfs)        47082.1    Conv. (cfs)               2616.0    41850.2     2616.0
  Length Wtd. (ft)          260.00    Wetted Per. (ft)            8.09      30.00       8.09
  Min Ch El (ft)           2782.21    Shear (lb/sq ft)            0.52       1.25       0.52
  Alpha                       1.09    Stream Power (lb/ft s)    154.00       0.00       0.00
  Frctn Loss (ft)             0.26    Cum Volume (acre-ft)        0.53      26.52       0.38
  C & E Loss (ft)             0.01    Cum SA (acres)              0.51       6.91       0.19


CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2792.03    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               5.78    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2786.26    Reach Len. (ft)           260.00     260.00     260.00
  Crit W.S. (ft)           2788.03    Flow Area (sq ft)          12.27     121.34      12.27
  E.G. Slope (ft/ft)      0.004750    Area (sq ft)               12.27     121.34      12.27
  Q Total (cfs)            2700.00    Flow (cfs)                136.74    2426.52     136.74
  Top Width (ft)             42.13    Top Width (ft)              6.07      30.00       6.07
  Vel Total (ft/s)           18.51    Avg. Vel. (ft/s)           11.14      20.00      11.14
  Max Chl Dpth (ft)           4.04    Hydr. Depth (ft)            2.02       4.04       2.02
  Conv. Total (cfs)        39176.5    Conv. (cfs)               1984.0    35208.4     1984.0
  Length Wtd. (ft)          260.00    Wetted Per. (ft)            7.29      30.00       7.29
  Min Ch El (ft)           2782.21    Shear (lb/sq ft)            0.50       1.20       0.50
  Alpha                       1.09    Stream Power (lb/ft s)    154.00       0.00       0.00
  Frctn Loss (ft)             0.28    Cum Volume (acre-ft)        0.37      22.65       0.30
  C & E Loss (ft)             0.01    Cum SA (acres)              0.38       6.70       0.17


CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2789.22    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               4.28    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2784.94    Reach Len. (ft)           260.00     260.00     260.00
  Crit W.S. (ft)           2786.24    Flow Area (sq ft)           5.59      81.88       5.59
  E.G. Slope (ft/ft)      0.005815    Area (sq ft)                5.59      81.88       5.59
  Q Total (cfs)            1500.00    Flow (cfs)                 53.01    1393.98      53.01
  Top Width (ft)             38.19    Top Width (ft)              4.09      30.00       4.09
  Vel Total (ft/s)           16.12    Avg. Vel. (ft/s)            9.49      17.02       9.49
  Max Chl Dpth (ft)           2.73    Hydr. Depth (ft)            1.36       2.73       1.36
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Conv. Total (cfs)	19670.3	Conv. (cfs)	695.1	18280.0	695.1
Length Wtd. (ft)	260.00	Wetted Per. (ft)	4.92	30.00	4.92
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.41	0.99	0.41
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.14	15.64	0.14
C & E Loss (ft)	0.03	Cum SA (acres)	0.11	6.31	0.11

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2784.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.42	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2782.89	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2783.31	Flow Area (sq ft)	0.35	20.36	0.35
E.G. Slope (ft/ft)	0.011926	Area (sq ft)	0.35	20.36	0.35
Q Total (cfs)	200.00	Flow (cfs)	1.86	196.29	1.86
Top Width (ft)	32.04	Top Width (ft)	1.02	30.00	1.02
Vel Total (ft/s)	9.50	Avg. Vel. (ft/s)	5.37	9.64	5.37
Max Chl Dpth (ft)	0.68	Hydr. Depth (ft)	0.34	0.68	0.34
Conv. Total (cfs)	1831.4	Conv. (cfs)	17.0	1797.4	17.0
Length Wtd. (ft)	260.00	Wetted Per. (ft)	1.22	30.00	1.22
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.21	0.51	0.21
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.55	Cum Volume (acre-ft)	0.01	5.36	0.01
C & E Loss (ft)	0.02	Cum SA (acres)	0.03	5.50	0.03

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2789.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.25	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2784.91	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2786.21	Flow Area (sq ft)	5.48	81.12	5.48
E.G. Slope (ft/ft)	0.005850	Area (sq ft)	5.48	81.12	5.48
Q Total (cfs)	1480.00	Flow (cfs)	51.85	1376.31	51.85
Top Width (ft)	38.11	Top Width (ft)	4.06	30.00	4.06
Vel Total (ft/s)	16.07	Avg. Vel. (ft/s)	9.46	16.97	9.46
Max Chl Dpth (ft)	2.70	Hydr. Depth (ft)	1.35	2.70	1.35
Conv. Total (cfs)	19350.5	Conv. (cfs)	677.9	17994.8	677.9
Length Wtd. (ft)	260.00	Wetted Per. (ft)	4.87	30.00	4.87
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.41	0.99	0.41
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)	0.14	16.31	0.14
C & E Loss (ft)	0.03	Cum SA (acres)	0.14	6.36	0.11

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2787.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.41	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2784.28	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2785.31	Flow Area (sq ft)	3.20	61.96	3.20
E.G. Slope (ft/ft)	0.006642	Area (sq ft)	3.20	61.96	3.20
Q Total (cfs)	990.00	Flow (cfs)	26.94	936.12	26.94
Top Width (ft)	36.20	Top Width (ft)	3.10	30.00	3.10
Vel Total (ft/s)	14.48	Avg. Vel. (ft/s)	8.42	15.11	8.42
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)	1.03	2.07	1.03
Conv. Total (cfs)	12147.7	Conv. (cfs)	330.5	11486.6	330.5
Length Wtd. (ft)	260.00	Wetted Per. (ft)	3.72	30.00	3.72
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.36	0.86	0.36
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.35	Cum Volume (acre-ft)	0.09	12.83	0.09
C & E Loss (ft)	0.03	Cum SA (acres)	0.09	6.13	0.09

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2786.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.62	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2783.69	Reach Len. (ft)	260.00	260.00	260.00
Crit W.S. (ft)	2784.48	Flow Area (sq ft)	1.65	44.46	1.65
E.G. Slope (ft/ft)	0.007866	Area (sq ft)	1.65	44.46	1.65
Q Total (cfs)	610.00	Flow (cfs)	12.09	585.81	12.09
Top Width (ft)	34.45	Top Width (ft)	2.22	30.00	2.22
Vel Total (ft/s)	12.77	Avg. Vel. (ft/s)	7.34	13.18	7.34
Max Chl Dpth (ft)	1.48	Hydr. Depth (ft)	0.74	1.48	0.74
Conv. Total (cfs)	6878.0	Conv. (cfs)	136.4	6605.2	136.4
Length Wtd. (ft)	260.00	Wetted Per. (ft)	2.67	30.00	2.67
Min Ch El (ft)	2782.21	Shear (lb/sq ft)	0.30	0.73	0.30
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.39	Cum Volume (acre-ft)	0.05	9.64	0.05
C & E Loss (ft)	0.04	Cum SA (acres)	0.07	5.88	0.07

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 4875

INPUT
Description: Section 48+75 Improved Concrete Channel
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2787.75	112	2779.75	142	2779.75	154	2787.75

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	112	.013	142	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112	142	240	240	240	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2791.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.55	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2783.87	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2786.17	Flow Area (sq ft)	12.71	123.51	12.71
E.G. Slope (ft/ft)	0.006072	Area (sq ft)	12.71	123.51	12.71
Q Total (cfs)	3150.00	Flow (cfs)	162.08	2825.83	162.08
Top Width (ft)	42.35	Top Width (ft)	6.18	30.00	6.18
Vel Total (ft/s)	21.15	Avg. Vel. (ft/s)	12.75	22.88	12.75
Max Chl Dpth (ft)	4.12	Hydr. Depth (ft)	2.06	4.12	2.06
Conv. Total (cfs)	40423.0	Conv. (cfs)	2080.0	36263.1	2080.0
Length Wtd. (ft)	240.00	Wetted Per. (ft)	7.42	30.00	7.42
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.65	1.56	0.65
Alpha	1.09	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.35	Cum Volume (acre-ft)	0.44	25.75	0.29
C & E Loss (ft)	0.13	Cum SA (acres)	0.47	6.73	0.15

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2790.48	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.03	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2783.46	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2785.57	Flow Area (sq ft)	10.32	111.27	10.32
E.G. Slope (ft/ft)	0.006448	Area (sq ft)	10.32	111.27	10.32
Q Total (cfs)	2700.00	Flow (cfs)	126.45	2447.10	126.45
Top Width (ft)	41.13	Top Width (ft)	5.56	30.00	5.56
Vel Total (ft/s)	20.47	Avg. Vel. (ft/s)	12.26	21.99	12.26
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)	1.85	3.71	1.85
Conv. Total (cfs)	33623.6	Conv. (cfs)	1574.7	30474.1	1574.7
Length Wtd. (ft)	240.00	Wetted Per. (ft)	6.69	30.00	6.69
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.62	1.49	0.62
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.43	Cum Volume (acre-ft)	0.30	21.96	0.23
C & E Loss (ft)	0.12	Cum SA (acres)	0.35	6.52	0.13

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2787.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.14	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2782.26	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2783.78	Flow Area (sq ft)	4.73	75.33	4.73
E.G. Slope (ft/ft)	0.007767	Area (sq ft)	4.73	75.33	4.73
Q Total (cfs)	1500.00	Flow (cfs)	49.04	1401.91	49.04
Top Width (ft)	37.53	Top Width (ft)	3.77	30.00	3.77
Vel Total (ft/s)	17.69	Avg. Vel. (ft/s)	10.37	18.61	10.37
Max Chl Dpth (ft)	2.51	Hydr. Depth (ft)	1.26	2.51	1.26
Conv. Total (cfs)	17019.7	Conv. (cfs)	556.5	15906.7	556.5
Length Wtd. (ft)	240.00	Wetted Per. (ft)	4.53	30.00	4.53
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.51	1.22	0.51
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.74	Cum Volume (acre-ft)	0.11	15.17	0.11
C & E Loss (ft)	0.09	Cum SA (acres)	0.09	6.13	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2781.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.15	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2780.50	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2780.84	Flow Area (sq ft)	0.43	22.60	0.43
E.G. Slope (ft/ft)	0.008395	Area (sq ft)	0.43	22.60	0.43
Q Total (cfs)	200.00	Flow (cfs)	2.06	195.89	2.06
Top Width (ft)	32.26	Top Width (ft)	1.13	30.00	1.13
Vel Total (ft/s)	8.53	Avg. Vel. (ft/s)	4.83	8.67	4.83
Max Chl Dpth (ft)	0.75	Hydr. Depth (ft)	0.38	0.75	0.38
Conv. Total (cfs)	2182.8	Conv. (cfs)	22.4	2138.0	22.4
Length Wtd. (ft)	240.00	Wetted Per. (ft)	1.36	30.00	1.36
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.16	0.39	0.16
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.58	Cum Volume (acre-ft)	0.01	5.24	0.01
C & E Loss (ft)	0.08	Cum SA (acres)	0.03	5.32	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2787.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.10	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2782.24	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2783.75	Flow Area (sq ft)	4.64	74.66	4.64
E.G. Slope (ft/ft)	0.007801	Area (sq ft)	4.64	74.66	4.64
Q Total (cfs)	1480.00	Flow (cfs)	47.99	1384.03	47.99
Top Width (ft)	37.47	Top Width (ft)	3.73	30.00	3.73
Vel Total (ft/s)	17.63	Avg. Vel. (ft/s)	10.33	18.54	10.33
Max Chl Dpth (ft)	2.49	Hydr. Depth (ft)	1.24	2.49	1.24
Conv. Total (cfs)	16756.9	Conv. (cfs)	543.3	15670.3	543.3
Length Wtd. (ft)	240.00	Wetted Per. (ft)	4.49	30.00	4.49
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.50	1.21	0.50
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.75	Cum Volume (acre-ft)	0.11	15.84	0.11
C & E Loss (ft)	0.08	Cum SA (acres)	0.11	6.18	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2785.67	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.00	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2781.67	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2782.85	Flow Area (sq ft)	2.75	57.49	2.75
E.G. Slope (ft/ft)	0.008595	Area (sq ft)	2.75	57.49	2.75
Q Total (cfs)	990.00	Flow (cfs)	25.09	939.82	25.09
Top Width (ft)	35.75	Top Width (ft)	2.87	30.00	2.87
Vel Total (ft/s)	15.72	Avg. Vel. (ft/s)	9.11	16.35	9.11
Max Chl Dpth (ft)	1.92	Hydr. Depth (ft)	0.96	1.92	0.96
Conv. Total (cfs)	10678.8	Conv. (cfs)	270.6	10137.5	270.6
Length Wtd. (ft)	240.00	Wetted Per. (ft)	3.45	30.00	3.45
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.43	1.03	0.43
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.96	Cum Volume (acre-ft)	0.07	12.47	0.07
C & E Loss (ft)	0.06	Cum SA (acres)	0.07	5.95	0.07

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2784.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.90	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2781.16	Reach Len. (ft)	240.00	240.00	240.00
Crit W.S. (ft)	2782.02	Flow Area (sq ft)	1.50	42.38	1.50
E.G. Slope (ft/ft)	0.009262	Area (sq ft)	1.50	42.38	1.50
Q Total (cfs)	610.00	Flow (cfs)	11.55	586.90	11.55
Top Width (ft)	34.24	Top Width (ft)	2.12	30.00	2.12

Vel Total (ft/s)	13.44	Avg. Vel. (ft/s)	7.72	13.85	7.72
Max Chl Dpth (ft)	1.41	Hydr. Depth (ft)	0.71	1.41	0.71
Conv. Total (cfs)	6338.3	Conv. (cfs)	120.0	6098.2	120.0
Length Wtd. (ft)	240.00	Wetted Per. (ft)	2.55	30.00	2.55
Min Ch El (ft)	2779.75	Shear (lb/sq ft)	0.34	0.82	0.34
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.22	Cum Volume (acre-ft)	0.04	9.39	0.04
C & E Loss (ft)	0.03	Cum SA (acres)	0.05	5.71	0.05

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 4635

INPUT
Description: Section 46+35 Improved Concrete Channel
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2785.45	112	2777.45	142	2777.45	154	2785.45

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	112	.013	142	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112	142	250	250	250	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2789.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.38	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2781.38	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2783.87	Flow Area (sq ft)	11.60	117.99	11.60
E.G. Slope (ft/ft)	0.007137	Area (sq ft)	11.60	117.99	11.60
Q Total (cfs)	3150.00	Flow (cfs)	155.56	2838.88	155.56
Top Width (ft)	41.80	Top Width (ft)	5.90	30.00	5.90
Vel Total (ft/s)	22.31	Avg. Vel. (ft/s)	13.41	24.06	13.41
Max Chl Dpth (ft)	3.93	Hydr. Depth (ft)	1.97	3.93	1.97
Conv. Total (cfs)	37287.5	Conv. (cfs)	1841.4	33604.6	1841.4
Length Wtd. (ft)	250.00	Wetted Per. (ft)	7.09	30.00	7.09
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.73	1.75	0.73
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.58	Cum Volume (acre-ft)	0.38	25.08	0.23
C & E Loss (ft)	0.08	Cum SA (acres)	0.44	6.57	0.12

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2788.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.75	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2781.00	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2783.27	Flow Area (sq ft)	9.45	106.50	9.45
E.G. Slope (ft/ft)	0.007522	Area (sq ft)	9.45	106.50	9.45

Q Total (cfs)	2700.00	Flow (cfs)	121.52	2456.96	121.52
Top Width (ft)	40.65	Top Width (ft)	5.33	30.00	5.33
Vel Total (ft/s)	21.53	Avg. Vel. (ft/s)	12.86	23.07	12.86
Max Chl Dpth (ft)	3.55	Hydr. Depth (ft)	1.78	3.55	1.78
Conv. Total (cfs)	31131.2	Conv. (cfs)	1401.1	28328.9	1401.1
Length Wtd. (ft)	250.00	Wetted Per. (ft)	6.40	30.00	6.40
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.69	1.67	0.69
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.67	Cum Volume (acre-ft)	0.25	21.36	0.18
C & E Loss (ft)	0.07	Cum SA (acres)	0.32	6.35	0.10

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2785.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.51	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2779.88	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2781.48	Flow Area (sq ft)	4.43	72.91	4.43
E.G. Slope (ft/ft)	0.008699	Area (sq ft)	4.43	72.91	4.43
Q Total (cfs)	1500.00	Flow (cfs)	47.57	1404.87	47.57
Top Width (ft)	37.29	Top Width (ft)	3.65	30.00	3.65
Vel Total (ft/s)	18.35	Avg. Vel. (ft/s)	10.74	19.27	10.74
Max Chl Dpth (ft)	2.43	Hydr. Depth (ft)	1.22	2.43	1.22
Conv. Total (cfs)	16082.7	Conv. (cfs)	510.0	15062.7	510.0
Length Wtd. (ft)	250.00	Wetted Per. (ft)	4.38	30.00	4.38
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.55	1.32	0.55
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.97	Cum Volume (acre-ft)	0.09	14.76	0.09
C & E Loss (ft)	0.04	Cum SA (acres)	0.07	5.97	0.07

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2779.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.28	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2778.17	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2778.54	Flow Area (sq ft)	0.38	21.46	0.38
E.G. Slope (ft/ft)	0.009990	Area (sq ft)	0.38	21.46	0.38
Q Total (cfs)	200.00	Flow (cfs)	1.95	196.09	1.95
Top Width (ft)	32.15	Top Width (ft)	1.07	30.00	1.07
Vel Total (ft/s)	9.00	Avg. Vel. (ft/s)	5.09	9.14	5.09
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)	0.36	0.72	0.36
Conv. Total (cfs)	2001.0	Conv. (cfs)	19.6	1961.9	19.6
Length Wtd. (ft)	250.00	Wetted Per. (ft)	1.29	30.00	1.29
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.19	0.45	0.19
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.19	Cum Volume (acre-ft)	0.01	5.11	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.02	5.16	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2785.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.47	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2779.86	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2781.45	Flow Area (sq ft)	4.35	72.28	4.35
E.G. Slope (ft/ft)	0.008727	Area (sq ft)	4.35	72.28	4.35
Q Total (cfs)	1480.00	Flow (cfs)	46.55	1386.90	46.55
Top Width (ft)	37.23	Top Width (ft)	3.61	30.00	3.61
Vel Total (ft/s)	18.28	Avg. Vel. (ft/s)	10.69	19.19	10.69
Max Chl Dpth (ft)	2.41	Hydr. Depth (ft)	1.20	2.41	1.20
Conv. Total (cfs)	15843.1	Conv. (cfs)	498.3	14846.4	498.3
Length Wtd. (ft)	250.00	Wetted Per. (ft)	4.34	30.00	4.34
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.55	1.31	0.55
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.98	Cum Volume (acre-ft)	0.09	15.44	0.09
C & E Loss (ft)	0.04	Cum SA (acres)	0.09	6.01	0.07

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2783.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.18	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2779.33	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2780.55	Flow Area (sq ft)	2.64	56.32	2.64
E.G. Slope (ft/ft)	0.009220	Area (sq ft)	2.64	56.32	2.64
Q Total (cfs)	990.00	Flow (cfs)	24.61	940.78	24.61
Top Width (ft)	35.63	Top Width (ft)	2.82	30.00	2.82
Vel Total (ft/s)	16.07	Avg. Vel. (ft/s)	9.31	16.70	9.31
Max Chl Dpth (ft)	1.88	Hydr. Depth (ft)	0.94	1.88	0.94
Conv. Total (cfs)	10310.1	Conv. (cfs)	256.3	9797.5	256.3
Length Wtd. (ft)	250.00	Wetted Per. (ft)	3.38	30.00	3.38
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.45	1.08	0.45
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.14	Cum Volume (acre-ft)	0.05	12.16	0.05
C & E Loss (ft)	0.02	Cum SA (acres)	0.06	5.78	0.06

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2781.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.95	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2778.85	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2779.72	Flow Area (sq ft)	1.47	42.03	1.47
E.G. Slope (ft/ft)	0.009523	Area (sq ft)	1.47	42.03	1.47
Q Total (cfs)	610.00	Flow (cfs)	11.46	587.08	11.46
Top Width (ft)	34.20	Top Width (ft)	2.10	30.00	2.10
Vel Total (ft/s)	13.56	Avg. Vel. (ft/s)	7.78	13.97	7.78
Max Chl Dpth (ft)	1.40	Hydr. Depth (ft)	0.70	1.40	0.70
Conv. Total (cfs)	6250.8	Conv. (cfs)	117.4	6015.9	117.4
Length Wtd. (ft)	250.00	Wetted Per. (ft)	2.53	30.00	2.53
Min Ch El (ft)	2777.45	Shear (lb/sq ft)	0.35	0.83	0.35
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.25	Cum Volume (acre-ft)	0.03	9.15	0.03
C & E Loss (ft)	0.01	Cum SA (acres)	0.04	5.54	0.04

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 4385

INPUT
Description: Section 43+85 Improved Concrete Channel
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2783.05	112	2775.05	142	2775.05	154	2783.05

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	112	.013	142	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112	142	250	250	250	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2787.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.95	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2778.87	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2781.47	Flow Area (sq ft)	10.94	114.57	10.94
E.G. Slope (ft/ft)	0.007917	Area (sq ft)	10.94	114.57	10.94
Q Total (cfs)	3150.00	Flow (cfs)	151.49	2847.03	151.49
Top Width (ft)	41.46	Top Width (ft)	5.73	30.00	5.73
Vel Total (ft/s)	23.09	Avg. Vel. (ft/s)	13.85	24.85	13.85
Max Chl Dpth (ft)	3.82	Hydr. Depth (ft)	1.91	3.82	1.91
Conv. Total (cfs)	35401.8	Conv. (cfs)	1702.5	31996.8	1702.5
Length Wtd. (ft)	250.00	Wetted Per. (ft)	6.88	30.00	6.88
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.79	1.89	0.79
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.88	Cum Volume (acre-ft)	0.31	24.42	0.16
C & E Loss (ft)	0.06	Cum SA (acres)	0.41	6.40	0.09

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2786.74	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.23	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2778.51	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2780.87	Flow Area (sq ft)	8.96	103.67	8.96
E.G. Slope (ft/ft)	0.008267	Area (sq ft)	8.96	103.67	8.96
Q Total (cfs)	2700.00	Flow (cfs)	118.58	2462.84	118.58
Top Width (ft)	40.37	Top Width (ft)	5.18	30.00	5.18
Vel Total (ft/s)	22.21	Avg. Vel. (ft/s)	13.24	23.76	13.24
Max Chl Dpth (ft)	3.46	Hydr. Depth (ft)	1.73	3.46	1.73
Conv. Total (cfs)	29695.0	Conv. (cfs)	1304.1	27086.7	1304.1
Length Wtd. (ft)	250.00	Wetted Per. (ft)	6.23	30.00	6.23
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.74	1.78	0.74
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	1.97	Cum Volume (acre-ft)	0.19	20.75	0.12
C & E Loss (ft)	0.05	Cum SA (acres)	0.29	6.18	0.07

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2783.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.69	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2777.45	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2779.08	Flow Area (sq ft)	4.30	71.84	4.30
E.G. Slope (ft/ft)	0.009155	Area (sq ft)	4.30	71.84	4.30
Q Total (cfs)	1500.00	Flow (cfs)	46.91	1406.18	46.91
Top Width (ft)	37.18	Top Width (ft)	3.59	30.00	3.59
Vel Total (ft/s)	18.65	Avg. Vel. (ft/s)	10.91	19.57	10.91
Max Chl Dpth (ft)	2.39	Hydr. Depth (ft)	1.20	2.39	1.20
Conv. Total (cfs)	15676.8	Conv. (cfs)	490.3	14696.3	490.3
Length Wtd. (ft)	250.00	Wetted Per. (ft)	4.32	30.00	4.32
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.57	1.37	0.57
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.23	Cum Volume (acre-ft)	0.06	14.35	0.06
C & E Loss (ft)	0.02	Cum SA (acres)	0.05	5.79	0.05

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2777.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.23	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2775.78	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2776.14	Flow Area (sq ft)	0.40	21.86	0.40
E.G. Slope (ft/ft)	0.009393	Area (sq ft)	0.40	21.86	0.40
Q Total (cfs)	200.00	Flow (cfs)	1.99	196.02	1.99
Top Width (ft)	32.19	Top Width (ft)	1.09	30.00	1.09
Vel Total (ft/s)	8.83	Avg. Vel. (ft/s)	5.00	8.97	5.00
Max Chl Dpth (ft)	0.73	Hydr. Depth (ft)	0.36	0.73	0.36
Conv. Total (cfs)	2063.6	Conv. (cfs)	20.5	2022.6	20.5
Length Wtd. (ft)	250.00	Wetted Per. (ft)	1.31	30.00	1.31
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.18	0.43	0.18
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.42	Cum Volume (acre-ft)	0.01	4.99	0.01
C & E Loss (ft)	0.01	Cum SA (acres)	0.01	4.99	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2783.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.64	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2777.43	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2779.05	Flow Area (sq ft)	4.23	71.24	4.23
E.G. Slope (ft/ft)	0.009175	Area (sq ft)	4.23	71.24	4.23
Q Total (cfs)	1480.00	Flow (cfs)	45.92	1388.15	45.92
Top Width (ft)	37.12	Top Width (ft)	3.56	30.00	3.56
Vel Total (ft/s)	18.57	Avg. Vel. (ft/s)	10.86	19.49	10.86
Max Chl Dpth (ft)	2.37	Hydr. Depth (ft)	1.19	2.37	1.19
Conv. Total (cfs)	15450.9	Conv. (cfs)	479.4	14492.1	479.4
Length Wtd. (ft)	250.00	Wetted Per. (ft)	4.28	30.00	4.28

Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.57	1.36	0.57
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.24	Cum Volume (acre-ft)	0.06	15.02	0.06
C & E Loss (ft)	0.02	Cum SA (acres)	0.07	5.84	0.05

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2781.17	Element			
Vel Head (ft)	4.25	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2776.91	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2778.15	Flow Area (sq ft)	2.60	55.89	2.60
E.G. Slope (ft/ft)	0.009467	Area (sq ft)	2.60	55.89	2.60
Q Total (cfs)	990.00	Flow (cfs)	24.43	941.14	24.43
Top Width (ft)	35.59	Top Width (ft)	2.79	30.00	2.79
Vel Total (ft/s)	16.20	Avg. Vel. (ft/s)	9.38	16.84	9.38
Max Chl Dpth (ft)	1.86	Hydr. Depth (ft)	0.93	1.86	0.93
Conv. Total (cfs)	10174.7	Conv. (cfs)	251.1	9672.6	251.1
Length Wtd. (ft)	250.00	Wetted Per. (ft)	3.36	30.00	3.36
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.46	1.10	0.46
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.34	Cum Volume (acre-ft)	0.04	11.84	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.04	5.61	0.04

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2779.41	Element			
Vel Head (ft)	2.96	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2776.45	Reach Len. (ft)	250.00	250.00	250.00
Crit W.S. (ft)	2777.32	Flow Area (sq ft)	1.47	41.94	1.47
E.G. Slope (ft/ft)	0.009597	Area (sq ft)	1.47	41.94	1.47
Q Total (cfs)	610.00	Flow (cfs)	11.44	587.13	11.44
Top Width (ft)	34.19	Top Width (ft)	2.10	30.00	2.10
Vel Total (ft/s)	13.59	Avg. Vel. (ft/s)	7.80	14.00	7.80
Max Chl Dpth (ft)	1.40	Hydr. Depth (ft)	0.70	1.40	0.70
Conv. Total (cfs)	6226.7	Conv. (cfs)	116.7	5993.2	116.7
Length Wtd. (ft)	250.00	Wetted Per. (ft)	2.52	30.00	2.52
Min Ch El (ft)	2775.05	Shear (lb/sq ft)	0.35	0.84	0.35
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	0.02	8.91	0.02
C & E Loss (ft)	0.00	Cum SA (acres)	0.03	5.37	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 4135

INPUT
Description: Section 41+35 Improved Concrete Channel
Station Elevation Data num= 4

```
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100 2780.65     112 2772.65     142 2772.65     154 2780.65

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .013     112    .013     142    .013

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           112     142              300     300     300             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2785.74    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               9.34    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2776.40    Reach Len. (ft)           300.00     300.00     300.00
  Crit W.S. (ft)           2779.07    Flow Area (sq ft)          10.54     112.44      10.54
  E.G. Slope (ft/ft)      0.008459    Area (sq ft)               10.54     112.44      10.54
  Q Total (cfs)            3150.00    Flow (cfs)                148.93    2852.13     148.93
  Top Width (ft)             41.24    Top Width (ft)              5.62      30.00       5.62
  Vel Total (ft/s)           23.59    Avg. Vel. (ft/s)           14.14      25.37      14.14
  Max Chl Dpth (ft)           3.75    Hydr. Depth (ft)            1.87       3.75       1.87
  Conv. Total (cfs)        34249.6    Conv. (cfs)               1619.3    31010.9     1619.3
  Length Wtd. (ft)          300.00    Wetted Per. (ft)            6.76      30.00       6.76
  Min Ch El (ft)           2772.65    Shear (lb/sq ft)            0.82       1.98       0.82
  Alpha                       1.08    Stream Power (lb/ft s)    154.00       0.00       0.00
  Frctn Loss (ft)             2.05    Cum Volume (acre-ft)        0.25      23.76       0.10
  C & E Loss (ft)             0.04    Cum SA (acres)              0.37       6.22       0.05


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2784.58    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               8.53    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2776.05    Reach Len. (ft)           300.00     300.00     300.00
  Crit W.S. (ft)           2778.47    Flow Area (sq ft)           8.68     102.04       8.68
  E.G. Slope (ft/ft)      0.008741    Area (sq ft)                8.68     102.04       8.68
  Q Total (cfs)            2700.00    Flow (cfs)                116.87    2466.26     116.87
  Top Width (ft)             40.20    Top Width (ft)              5.10      30.00       5.10
  Vel Total (ft/s)           22.61    Avg. Vel. (ft/s)           13.47      24.17      13.47
  Max Chl Dpth (ft)           3.40    Hydr. Depth (ft)            1.70       3.40       1.70
  Conv. Total (cfs)        28879.4    Conv. (cfs)               1250.1    26379.2     1250.1
  Length Wtd. (ft)          300.00    Wetted Per. (ft)            6.13      30.00       6.13
  Min Ch El (ft)           2772.65    Shear (lb/sq ft)            0.77       1.86       0.77
  Alpha                       1.07    Stream Power (lb/ft s)    154.00       0.00       0.00
  Frctn Loss (ft)             2.12    Cum Volume (acre-ft)        0.14      20.16       0.07
  C & E Loss (ft)             0.03    Cum SA (acres)              0.26       6.01       0.04


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2780.81    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               5.78    Wt. n-Val.                 0.013      0.013      0.013
  W.S. Elev (ft)           2775.03    Reach Len. (ft)           300.00     300.00     300.00
  Crit W.S. (ft)           2776.68    Flow Area (sq ft)           4.24      71.32       4.24
  E.G. Slope (ft/ft)      0.009388    Area (sq ft)                4.24      71.32       4.24
  Q Total (cfs)            1500.00    Flow (cfs)                 46.59    1406.81      46.59
  Top Width (ft)             37.13    Top Width (ft)              3.57      30.00       3.57
```

Vel Total (ft/s)	18.80	Avg. Vel. (ft/s)	10.99	19.73	10.99
Max Chl Dpth (ft)	2.38	Hydr. Depth (ft)	1.19	2.38	1.19
Conv. Total (cfs)	15481.1	Conv. (cfs)	480.9	14519.4	480.9
Length Wtd. (ft)	300.00	Wetted Per. (ft)	4.29	30.00	4.29
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.58	1.39	0.58
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.32	Cum Volume (acre-ft)	0.04	13.93	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.03	5.62	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2774.63	Element			
Vel Head (ft)	1.26	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2773.37	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2773.74	Flow Area (sq ft)	0.39	21.65	0.39
E.G. Slope (ft/ft)	0.009696	Area (sq ft)	0.39	21.65	0.39
Q Total (cfs)	200.00	Flow (cfs)	1.97	196.06	1.97
Top Width (ft)	32.17	Top Width (ft)	1.08	30.00	1.08
Vel Total (ft/s)	8.92	Avg. Vel. (ft/s)	5.05	9.06	5.05
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)	0.36	0.72	0.36
Conv. Total (cfs)	2031.1	Conv. (cfs)	20.0	1991.0	20.0
Length Wtd. (ft)	300.00	Wetted Per. (ft)	1.30	30.00	1.30
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.18	0.44	0.18
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	0.00	4.86	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.01	4.81	0.01

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2780.74	Element			
Vel Head (ft)	5.73	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2775.01	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2776.65	Flow Area (sq ft)	4.17	70.74	4.17
E.G. Slope (ft/ft)	0.009400	Area (sq ft)	4.17	70.74	4.17
Q Total (cfs)	1480.00	Flow (cfs)	45.62	1388.76	45.62
Top Width (ft)	37.07	Top Width (ft)	3.54	30.00	3.54
Vel Total (ft/s)	18.72	Avg. Vel. (ft/s)	10.94	19.63	10.94
Max Chl Dpth (ft)	2.36	Hydr. Depth (ft)	1.18	2.36	1.18
Conv. Total (cfs)	15264.7	Conv. (cfs)	470.5	14323.6	470.5
Length Wtd. (ft)	300.00	Wetted Per. (ft)	4.25	30.00	4.25
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.58	1.38	0.58
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.32	Cum Volume (acre-ft)	0.04	14.62	0.04
C & E Loss (ft)	0.01	Cum SA (acres)	0.05	5.67	0.03

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2778.79	Element			
Vel Head (ft)	4.28	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2774.51	Reach Len. (ft)	300.00	300.00	300.00

Crit W.S. (ft)	2775.75	Flow Area (sq ft)	2.59	55.72	2.59
E.G. Slope (ft/ft)	0.009570	Area (sq ft)	2.59	55.72	2.59
Q Total (cfs)	990.00	Flow (cfs)	24.36	941.29	24.36
Top Width (ft)	35.57	Top Width (ft)	2.79	30.00	2.79
Vel Total (ft/s)	16.26	Avg. Vel. (ft/s)	9.42	16.89	9.42
Max Chl Dpth (ft)	1.86	Hydr. Depth (ft)	0.93	1.86	0.93
Conv. Total (cfs)	10119.9	Conv. (cfs)	249.0	9621.9	249.0
Length Wtd. (ft)	300.00	Wetted Per. (ft)	3.35	30.00	3.35
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.46	1.11	0.46
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.38	Cum Volume (acre-ft)	0.02	11.51	0.02
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	5.44	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2777.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.97	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2774.05	Reach Len. (ft)	300.00	300.00	300.00
Crit W.S. (ft)	2774.92	Flow Area (sq ft)	1.47	41.93	1.47
E.G. Slope (ft/ft)	0.009603	Area (sq ft)	1.47	41.93	1.47
Q Total (cfs)	610.00	Flow (cfs)	11.43	587.13	11.43
Top Width (ft)	34.19	Top Width (ft)	2.10	30.00	2.10
Vel Total (ft/s)	13.60	Avg. Vel. (ft/s)	7.80	14.00	7.80
Max Chl Dpth (ft)	1.40	Hydr. Depth (ft)	0.70	1.40	0.70
Conv. Total (cfs)	6224.8	Conv. (cfs)	116.7	5991.5	116.7
Length Wtd. (ft)	300.00	Wetted Per. (ft)	2.52	30.00	2.52
Min Ch El (ft)	2772.65	Shear (lb/sq ft)	0.35	0.84	0.35
Alpha	1.03	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	2.40	Cum Volume (acre-ft)	0.01	8.67	0.01
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	5.20	0.02

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3969.6

INPUT
Description: Section 39+69.6
Station Elevation Data num= 20

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2785	141.2	2781	169.77	2780	181.58	2779	202.31	2778
207.79	2778	213.27	2779	229.66	2779	233.5	2778.5	234.4	2778
239.14	2775	245.44	2771	275.44	2771	277	2772	281.5	2775
286	2778	287	2778.5	299.19	2779	315.96	2781	324.96	2785

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	233.5	.013	287	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
233.5	287	134.6	134.6	134.6	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2782.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.68	Wt. n-Val.		0.013	
W.S. Elev (ft)	2775.17	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2777.49	Flow Area (sq ft)		151.94	
E.G. Slope (ft/ft)	0.007553	Area (sq ft)		151.94	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	42.88	Top Width (ft)		42.88	
Vel Total (ft/s)	22.25	Avg. Vel. (ft/s)		22.25	
Max Chl Dpth (ft)	4.17	Hydr. Depth (ft)		3.54	
Conv. Total (cfs)	38891.1	Conv. (cfs)		38891.1	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		45.34	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		1.58	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	2.39	Cum Volume (acre-ft)	0.21	22.85	0.06
C & E Loss (ft)	0.50	Cum SA (acres)	0.35	5.97	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2781.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.01	Wt. n-Val.		0.013	
W.S. Elev (ft)	2774.57	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2776.67	Flow Area (sq ft)		127.03	
E.G. Slope (ft/ft)	0.008198	Area (sq ft)		127.03	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	41.05	Top Width (ft)		41.05	
Vel Total (ft/s)	21.25	Avg. Vel. (ft/s)		21.25	
Max Chl Dpth (ft)	3.57	Hydr. Depth (ft)		3.09	
Conv. Total (cfs)	29821.0	Conv. (cfs)		29821.0	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		43.16	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		1.51	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	2.54	Cum Volume (acre-ft)	0.11	19.37	0.04
C & E Loss (ft)	0.45	Cum SA (acres)	0.24	5.77	0.03

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2777.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.28	Wt. n-Val.		0.013	
W.S. Elev (ft)	2773.65	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2774.96	Flow Area (sq ft)		90.33	
E.G. Slope (ft/ft)	0.007068	Area (sq ft)		90.33	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	38.20	Top Width (ft)		38.20	
Vel Total (ft/s)	16.61	Avg. Vel. (ft/s)		16.61	
Max Chl Dpth (ft)	2.65	Hydr. Depth (ft)		2.36	
Conv. Total (cfs)	17842.3	Conv. (cfs)		17842.3	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		39.76	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		1.00	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	2.43	Cum Volume (acre-ft)	0.02	13.38	0.02
C & E Loss (ft)	0.45	Cum SA (acres)	0.02	5.39	0.02

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2772.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.71	Wt. n-Val.		0.013	
W.S. Elev (ft)	2771.94	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2772.08	Flow Area (sq ft)		29.56	
E.G. Slope (ft/ft)	0.004139	Area (sq ft)		29.56	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	32.94	Top Width (ft)		32.94	
Vel Total (ft/s)	6.77	Avg. Vel. (ft/s)		6.77	
Max Chl Dpth (ft)	0.94	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	3108.6	Conv. (cfs)		3108.6	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		33.49	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		0.23	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	1.82	Cum Volume (acre-ft)	0.00	4.69	0.00
C & E Loss (ft)	0.16	Cum SA (acres)	0.00	4.60	0.00

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2778.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.16	Wt. n-Val.		0.013	
W.S. Elev (ft)	2773.84	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2775.12	Flow Area (sq ft)		97.74	
E.G. Slope (ft/ft)	0.006329	Area (sq ft)		97.74	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	38.79	Top Width (ft)		38.79	
Vel Total (ft/s)	16.37	Avg. Vel. (ft/s)		16.37	
Max Chl Dpth (ft)	2.84	Hydr. Depth (ft)		2.52	
Conv. Total (cfs)	20112.2	Conv. (cfs)		20112.2	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		40.47	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	2.27	Cum Volume (acre-ft)	0.03	14.04	0.03
C & E Loss (ft)	0.47	Cum SA (acres)	0.04	5.43	0.02

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2776.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.93	Wt. n-Val.		0.013	

W.S. Elev (ft)	2773.32	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2774.20	Flow Area (sq ft)		77.93	
E.G. Slope (ft/ft)	0.005646	Area (sq ft)		77.93	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	37.19	Top Width (ft)		37.19	
Vel Total (ft/s)	13.73	Avg. Vel. (ft/s)		13.73	
Max Chl Dpth (ft)	2.32	Hydr. Depth (ft)		2.10	
Conv. Total (cfs)	14240.5	Conv. (cfs)		14240.5	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		38.56	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		0.71	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	2.15	Cum Volume (acre-ft)	0.02	11.05	0.02
C & E Loss (ft)	0.41	Cum SA (acres)	0.01	5.21	0.01

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2774.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.91	Wt. n-Val.		0.013	
W.S. Elev (ft)	2772.79	Reach Len. (ft)	134.60	134.60	134.60
Crit W.S. (ft)	2773.33	Flow Area (sq ft)		58.65	
E.G. Slope (ft/ft)	0.005015	Area (sq ft)		58.65	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	35.56	Top Width (ft)		35.56	
Vel Total (ft/s)	11.08	Avg. Vel. (ft/s)		11.08	
Max Chl Dpth (ft)	1.79	Hydr. Depth (ft)		1.65	
Conv. Total (cfs)	9178.9	Conv. (cfs)		9178.9	
Length Wtd. (ft)	134.60	Wetted Per. (ft)		36.61	
Min Ch El (ft)	2771.00	Shear (lb/sq ft)		0.50	
Alpha	1.00	Stream Power (lb/ft s)	324.96	0.00	0.00
Frctn Loss (ft)	2.01	Cum Volume (acre-ft)	0.01	8.32	0.01
C & E Loss (ft)	0.32	Cum SA (acres)	0.01	4.97	0.01

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3835

INPUT
Description: Section 38+35 Improved Concrete Channel (D/S Limit)
Station Elevation Data num= 4

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2777.77	112	2769.77	142	2769.77	154	2777.77

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.013	112	.013	142	.013

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
112	142	235	235	235	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2781.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.85	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2774.08	Reach Len. (ft)	235.00	235.00	235.00
Crit W.S. (ft)	2776.48	Flow Area (sq ft)	13.90	129.16	13.90
E.G. Slope (ft/ft)	0.005966	Area (sq ft)	13.90	129.16	13.90
Q Total (cfs)	3380.00	Flow (cfs)	181.03	3017.94	181.03
Top Width (ft)	42.92	Top Width (ft)	6.46	30.00	6.46
Vel Total (ft/s)	21.53	Avg. Vel. (ft/s)	13.02	23.37	13.02
Max Chl Dpth (ft)	4.31	Hydr. Depth (ft)	2.15	4.31	2.15
Conv. Total (cfs)	43759.4	Conv. (cfs)	2343.7	39072.0	2343.7
Length Wtd. (ft)	235.00	Wetted Per. (ft)	7.76	30.00	7.76
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.67	1.60	0.67
Alpha	1.09	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	0.19	22.42	0.04
C & E Loss (ft)	0.02	Cum SA (acres)	0.34	5.86	0.02

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2780.59	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.13	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2773.45	Reach Len. (ft)	235.00	235.00	235.00
Crit W.S. (ft)	2775.59	Flow Area (sq ft)	10.18	110.51	10.18
E.G. Slope (ft/ft)	0.006606	Area (sq ft)	10.18	110.51	10.18
Q Total (cfs)	2700.00	Flow (cfs)	125.67	2448.67	125.67
Top Width (ft)	41.05	Top Width (ft)	5.53	30.00	5.53
Vel Total (ft/s)	20.63	Avg. Vel. (ft/s)	12.35	22.16	12.35
Max Chl Dpth (ft)	3.68	Hydr. Depth (ft)	1.84	3.68	1.84
Conv. Total (cfs)	33219.5	Conv. (cfs)	1546.1	30127.2	1546.1
Length Wtd. (ft)	235.00	Wetted Per. (ft)	6.64	30.00	6.64
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.63	1.52	0.63
Alpha	1.08	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.99	Cum Volume (acre-ft)	0.10	19.01	0.03
C & E Loss (ft)	0.01	Cum SA (acres)	0.23	5.66	0.02

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2777.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.58	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2772.42	Reach Len. (ft)	235.00	235.00	235.00
Crit W.S. (ft)	2773.80	Flow Area (sq ft)	5.25	79.40	5.25
E.G. Slope (ft/ft)	0.006471	Area (sq ft)	5.25	79.40	5.25
Q Total (cfs)	1500.00	Flow (cfs)	51.51	1396.97	51.51
Top Width (ft)	37.94	Top Width (ft)	3.97	30.00	3.97
Vel Total (ft/s)	16.68	Avg. Vel. (ft/s)	9.80	17.59	9.80
Max Chl Dpth (ft)	2.65	Hydr. Depth (ft)	1.32	2.65	1.32
Conv. Total (cfs)	18646.3	Conv. (cfs)	640.4	17365.6	640.4
Length Wtd. (ft)	235.00	Wetted Per. (ft)	4.77	30.00	4.77
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.44	1.07	0.44
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)	0.01	13.12	0.01
C & E Loss (ft)	0.03	Cum SA (acres)	0.01	5.28	0.01

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2771.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.28	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2770.49	Reach Len. (ft)	235.00	235.00	235.00

Crit W.S. (ft)	2770.87	Flow Area (sq ft)	0.38	21.46	0.38
E.G. Slope (ft/ft)	0.009990	Area (sq ft)	0.38	21.46	0.38
Q Total (cfs)	200.00	Flow (cfs)	1.95	196.09	1.95
Top Width (ft)	32.15	Top Width (ft)	1.07	30.00	1.07
Vel Total (ft/s)	9.00	Avg. Vel. (ft/s)	5.09	9.14	5.09
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)	0.36	0.72	0.36
Conv. Total (cfs)	2001.0	Conv. (cfs)	19.6	1961.9	19.6
Length Wtd. (ft)	235.00	Wetted Per. (ft)	1.29	30.00	1.29
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.19	0.45	0.19
Alpha	1.02	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.82	Cum Volume (acre-ft)	0.00	4.61	0.00
C & E Loss (ft)	0.06	Cum SA (acres)	0.00	4.50	0.00

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2777.13	Element			
Vel Head (ft)	4.54	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2772.59	Reach Len. (ft)	235.00	235.00	235.00
Crit W.S. (ft)	2773.97	Flow Area (sq ft)	5.96	84.54	5.96
E.G. Slope (ft/ft)	0.005921	Area (sq ft)	5.96	84.54	5.96
Q Total (cfs)	1600.00	Flow (cfs)	58.25	1483.51	58.25
Top Width (ft)	38.45	Top Width (ft)	4.23	30.00	4.23
Vel Total (ft/s)	16.59	Avg. Vel. (ft/s)	9.78	17.55	9.78
Max Chl Dpth (ft)	2.82	Hydr. Depth (ft)	1.41	2.82	1.41
Conv. Total (cfs)	20793.8	Conv. (cfs)	757.0	19279.9	757.0
Length Wtd. (ft)	235.00	Wetted Per. (ft)	5.08	30.00	5.08
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.43	1.04	0.43
Alpha	1.06	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.82	Cum Volume (acre-ft)	0.02	13.75	0.02
C & E Loss (ft)	0.04	Cum SA (acres)	0.03	5.33	0.01

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2775.40	Element			
Vel Head (ft)	3.41	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2771.99	Reach Len. (ft)	235.00	235.00	235.00
Crit W.S. (ft)	2773.03	Flow Area (sq ft)	3.70	66.60	3.70
E.G. Slope (ft/ft)	0.006051	Area (sq ft)	3.70	66.60	3.70
Q Total (cfs)	1070.00	Flow (cfs)	31.17	1007.67	31.17
Top Width (ft)	36.66	Top Width (ft)	3.33	30.00	3.33
Vel Total (ft/s)	14.46	Avg. Vel. (ft/s)	8.43	15.13	8.43
Max Chl Dpth (ft)	2.22	Hydr. Depth (ft)	1.11	2.22	1.11
Conv. Total (cfs)	13755.8	Conv. (cfs)	400.7	12954.4	400.7
Length Wtd. (ft)	235.00	Wetted Per. (ft)	4.00	30.00	4.00
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.35	0.84	0.35
Alpha	1.05	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.79	Cum Volume (acre-ft)	0.01	10.83	0.01
C & E Loss (ft)	0.05	Cum SA (acres)	0.01	5.10	0.01

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2773.87	Element			
Vel Head (ft)	2.48	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2771.39	Reach Len. (ft)	235.00	235.00	235.00
Crit W.S. (ft)	2772.13	Flow Area (sq ft)	1.96	48.50	1.96
E.G. Slope (ft/ft)	0.006634	Area (sq ft)	1.96	48.50	1.96

Q Total (cfs)	650.00	Flow (cfs)	14.01	621.98	14.01
Top Width (ft)	34.85	Top Width (ft)	2.43	30.00	2.43
Vel Total (ft/s)	12.40	Avg. Vel. (ft/s)	7.15	12.82	7.15
Max Chl Dpth (ft)	1.62	Hydr. Depth (ft)	0.81	1.62	0.81
Conv. Total (cfs)	7980.4	Conv. (cfs)	172.0	7636.4	172.0
Length Wtd. (ft)	235.00	Wetted Per. (ft)	2.91	30.00	2.91
Min Ch El (ft)	2769.77	Shear (lb/sq ft)	0.28	0.67	0.28
Alpha	1.04	Stream Power (lb/ft s)	154.00	0.00	0.00
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)	0.01	8.16	0.01
C & E Loss (ft)	0.06	Cum SA (acres)	0.01	4.87	0.01

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3600.*

INPUT
Description: Boulder Stabilizer #9
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2773.5	113.4	2772.6	207.9	2770.7	233.5	2773	253.5	2773
274	2766.2	324	2766.2	344.5	2773	364.5	2773	367.7	2775.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	253.5	.035	344.5	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
253.5	344.5	2	2	2	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2778.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	9.40	Wt. n-Val.		0.035	
W.S. Elev (ft)	2768.60	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2770.97	Flow Area (sq ft)		137.41	
E.G. Slope (ft/ft)	0.124377	Area (sq ft)		137.41	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	64.47	Top Width (ft)		64.47	
Vel Total (ft/s)	24.60	Avg. Vel. (ft/s)		24.60	
Max Chl Dpth (ft)	2.40	Hydr. Depth (ft)		2.13	
Conv. Total (cfs)	9584.0	Conv. (cfs)		9584.0	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		65.25	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		16.35	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	3.77	Cum Volume (acre-ft)	0.15	21.70	0.00
C & E Loss (ft)	0.15	Cum SA (acres)	0.33	5.61	0.01

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2776.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.08	Wt. n-Val.		0.035	
W.S. Elev (ft)	2768.30	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2770.30	Flow Area (sq ft)		118.36	
E.G. Slope (ft/ft)	0.125449	Area (sq ft)		118.36	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	62.67	Top Width (ft)		62.67	
Vel Total (ft/s)	22.81	Avg. Vel. (ft/s)		22.81	
Max Chl Dpth (ft)	2.10	Hydr. Depth (ft)		1.89	
Conv. Total (cfs)	7623.1	Conv. (cfs)		7623.1	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		63.35	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		14.63	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	4.11	Cum Volume (acre-ft)	0.07	18.39	0.00
C & E Loss (ft)	0.09	Cum SA (acres)	0.22	5.41	0.00

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2772.91	Element	Left OB	Channel	Right OB
Vel Head (ft)	5.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.70	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2769.05	Flow Area (sq ft)		81.87	
E.G. Slope (ft/ft)	0.121800	Area (sq ft)		81.87	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	59.05	Top Width (ft)		59.05	
Vel Total (ft/s)	18.32	Avg. Vel. (ft/s)		18.32	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		1.39	
Conv. Total (cfs)	4298.0	Conv. (cfs)		4298.0	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		59.54	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		10.46	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	4.02	Cum Volume (acre-ft)		12.68	
C & E Loss (ft)	0.06	Cum SA (acres)		5.04	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2767.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.27	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2766.98	Flow Area (sq ft)		56.97	
E.G. Slope (ft/ft)	0.006811	Area (sq ft)		56.97	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	56.45	Top Width (ft)		56.45	
Vel Total (ft/s)	3.51	Avg. Vel. (ft/s)		3.51	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		1.01	

Conv. Total (cfs)	2423.4	Conv. (cfs)		2423.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		56.80	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		4.40	
C & E Loss (ft)	0.00	Cum SA (acres)		4.27	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2773.28	Element			
Vel Head (ft)	5.53	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.75	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2769.16	Flow Area (sq ft)		84.79	
E.G. Slope (ft/ft)	0.124170	Area (sq ft)		84.79	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	59.35	Top Width (ft)		59.35	
Vel Total (ft/s)	18.87	Avg. Vel. (ft/s)		18.87	
Max Chl Dpth (ft)	1.55	Hydr. Depth (ft)		1.43	
Conv. Total (cfs)	4540.6	Conv. (cfs)		4540.6	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		59.85	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		10.98	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	3.75	Cum Volume (acre-ft)	0.00	13.30	
C & E Loss (ft)	0.10	Cum SA (acres)	0.02	5.09	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2771.52	Element			
Vel Head (ft)	4.10	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.43	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2768.50	Flow Area (sq ft)		65.88	
E.G. Slope (ft/ft)	0.122920	Area (sq ft)		65.88	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	57.40	Top Width (ft)		57.40	
Vel Total (ft/s)	16.24	Avg. Vel. (ft/s)		16.24	
Max Chl Dpth (ft)	1.23	Hydr. Depth (ft)		1.15	
Conv. Total (cfs)	3051.9	Conv. (cfs)		3051.9	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		57.79	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		8.75	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	3.81	Cum Volume (acre-ft)		10.47	
C & E Loss (ft)	0.07	Cum SA (acres)		4.87	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2769.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.67	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.14	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2767.87	Flow Area (sq ft)		49.54	
E.G. Slope (ft/ft)	0.112368	Area (sq ft)		49.54	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	55.65	Top Width (ft)		55.65	
Vel Total (ft/s)	13.12	Avg. Vel. (ft/s)		13.12	
Max Chl Dpth (ft)	0.94	Hydr. Depth (ft)		0.89	
Conv. Total (cfs)	1939.1	Conv. (cfs)		1939.1	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		55.96	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		6.21	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	4.04	Cum Volume (acre-ft)		7.89	
C & E Loss (ft)	0.02	Cum SA (acres)		4.64	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3598

INPUT
Description: Boulder Stabilizer #9
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2773.5	113.4	2772.6	207.9	2770.7	233.5	2773	253.5	2773
274	2766.2	324	2766.2	344.5	2773	364.5	2773	367.7	2775.7

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	253.5	.035	344.5	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
253.5	344.5	15	15	15	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2777.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	8.98	Wt. n-Val.		0.035	
W.S. Elev (ft)	2768.65	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2770.97	Flow Area (sq ft)		140.51	
E.G. Slope (ft/ft)	0.116162	Area (sq ft)		140.51	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	64.76	Top Width (ft)		64.76	
Vel Total (ft/s)	24.05	Avg. Vel. (ft/s)		24.05	
Max Chl Dpth (ft)	2.45	Hydr. Depth (ft)		2.17	
Conv. Total (cfs)	9917.1	Conv. (cfs)		9917.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		65.56	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		15.54	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.15	21.69	0.00
C & E Loss (ft)	0.12	Cum SA (acres)	0.33	5.60	0.01

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2776.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	7.67	Wt. n-Val.		0.035	
W.S. Elev (ft)	2768.35	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2770.30	Flow Area (sq ft)		121.51	
E.G. Slope (ft/ft)	0.115721	Area (sq ft)		121.51	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	62.97	Top Width (ft)		62.97	
Vel Total (ft/s)	22.22	Avg. Vel. (ft/s)		22.22	
Max Chl Dpth (ft)	2.15	Hydr. Depth (ft)		1.93	
Conv. Total (cfs)	7937.0	Conv. (cfs)		7937.0	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		63.66	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		13.79	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	0.24	Cum Volume (acre-ft)	0.07	18.38	0.00
C & E Loss (ft)	0.12	Cum SA (acres)	0.22	5.40	0.00

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2772.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.81	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.76	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2769.05	Flow Area (sq ft)		85.22	
E.G. Slope (ft/ft)	0.107400	Area (sq ft)		85.22	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	59.39	Top Width (ft)		59.39	
Vel Total (ft/s)	17.60	Avg. Vel. (ft/s)		17.60	
Max Chl Dpth (ft)	1.56	Hydr. Depth (ft)		1.43	
Conv. Total (cfs)	4577.1	Conv. (cfs)		4577.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		59.90	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		9.54	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)		12.68	
C & E Loss (ft)	0.12	Cum SA (acres)		5.04	

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2767.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.25	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		55.92	
E.G. Slope (ft/ft)	0.007225	Area (sq ft)		55.92	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	56.34	Top Width (ft)		56.34	
Vel Total (ft/s)	3.58	Avg. Vel. (ft/s)		3.58	
Max Chl Dpth (ft)	1.05	Hydr. Depth (ft)		0.99	
Conv. Total (cfs)	2353.0	Conv. (cfs)		2353.0	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		56.68	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		0.45	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		4.40	
C & E Loss (ft)	0.06	Cum SA (acres)		4.26	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2772.93	Element	Left OB	Channel	Right OB

Vel Head (ft)	5.12	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.81	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2769.17	Flow Area (sq ft)		88.10	
E.G. Slope (ft/ft)	0.110138	Area (sq ft)		88.10	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	59.69	Top Width (ft)		59.69	
Vel Total (ft/s)	18.16	Avg. Vel. (ft/s)		18.16	
Max Chl Dpth (ft)	1.61	Hydr. Depth (ft)		1.48	
Conv. Total (cfs)	4821.1	Conv. (cfs)		4821.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		60.20	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		10.06	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.00	13.29	
C & E Loss (ft)	0.12	Cum SA (acres)	0.02	5.08	

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2771.18	Element			
Vel Head (ft)	3.70	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.49	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2768.50	Flow Area (sq ft)		69.36	
E.G. Slope (ft/ft)	0.104427	Area (sq ft)		69.36	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	57.76	Top Width (ft)		57.76	
Vel Total (ft/s)	15.43	Avg. Vel. (ft/s)		15.43	
Max Chl Dpth (ft)	1.29	Hydr. Depth (ft)		1.20	
Conv. Total (cfs)	3311.1	Conv. (cfs)		3311.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		58.18	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		7.77	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)		10.47	
C & E Loss (ft)	0.12	Cum SA (acres)		4.87	

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2769.51	Element			
Vel Head (ft)	2.30	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.21	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2767.87	Flow Area (sq ft)		53.40	
E.G. Slope (ft/ft)	0.088421	Area (sq ft)		53.40	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	56.07	Top Width (ft)		56.07	
Vel Total (ft/s)	12.17	Avg. Vel. (ft/s)		12.17	
Max Chl Dpth (ft)	1.01	Hydr. Depth (ft)		0.95	
Conv. Total (cfs)	2185.9	Conv. (cfs)		2185.9	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		56.40	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		5.23	
Alpha	1.00	Stream Power (lb/ft s)	367.70	0.00	0.00
Frctn Loss (ft)	0.20	Cum Volume (acre-ft)		7.89	
C & E Loss (ft)	0.11	Cum SA (acres)		4.64	

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3583

INPUT
Description: Boulder Stabilizer #9
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2773.5	113.4	2772.6	215.5	2774	235.5	2774	274	2761.2

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     324  2761.2   362.5    2774   382.5    2774     386  2775.7

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04   215.5    .016   235.5    .035   362.5    .016   382.5     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         235.5   362.5                2       2       2             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100   235.5    2776       T
   362.5     386    2776       T
Left Levee      Station=   235.5      Elevation=    2776
Right Levee     Station=   362.5      Elevation=    2776

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2773.04    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.18    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2772.86    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2765.93    Flow Area (sq ft)                    992.15
  E.G. Slope (ft/ft)      0.000402    Area (sq ft)                         992.15
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)            120.15    Top Width (ft)                       120.15
  Vel Total (ft/s)            3.41    Avg. Vel. (ft/s)                       3.41
  Max Chl Dpth (ft)          11.66    Hydr. Depth (ft)                       8.26
  Conv. Total (cfs)       168568.3    Conv. (cfs)                        168568.3
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                     123.93
  Min Ch El (ft)           2761.20    Shear (lb/sq ft)                       0.20
  Alpha                       1.00    Stream Power (lb/ft s)    386.00     235.50     362.50
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.15      21.50       0.00
  C & E Loss (ft)             0.00    Cum SA (acres)              0.33       5.57       0.01


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2772.20    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.14    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2772.06    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2765.32    Flow Area (sq ft)                    898.09
  E.G. Slope (ft/ft)      0.000338    Area (sq ft)                         898.09
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)            115.35    Top Width (ft)                       115.35
  Vel Total (ft/s)            3.01    Avg. Vel. (ft/s)                       3.01
  Max Chl Dpth (ft)          10.86    Hydr. Depth (ft)                       7.79
  Conv. Total (cfs)       146810.7    Conv. (cfs)                        146810.7
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                     118.86
  Min Ch El (ft)           2761.20    Shear (lb/sq ft)                       0.16
  Alpha                       1.00    Stream Power (lb/ft s)    386.00     235.50     362.50
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.07      18.21       0.00
  C & E Loss (ft)             0.00    Cum SA (acres)              0.22       5.37       0.00


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2770.43    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                            0.035
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W.S. Elev (ft)	2770.36	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2764.07	Flow Area (sq ft)		710.34	
E.G. Slope (ft/ft)	0.000201	Area (sq ft)		710.34	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	105.10	Top Width (ft)		105.10	
Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)		2.11	
Max Chl Dpth (ft)	9.16	Hydr. Depth (ft)		6.76	
Conv. Total (cfs)	105821.4	Conv. (cfs)		105821.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		108.07	
Min Ch El (ft)	2761.20	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	386.00	235.50	362.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		12.54	
C & E Loss (ft)	0.00	Cum SA (acres)		5.01	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2767.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.39	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2761.99	Flow Area (sq ft)		424.49	
E.G. Slope (ft/ft)	0.000015	Area (sq ft)		424.49	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	87.22	Top Width (ft)		87.22	
Vel Total (ft/s)	0.47	Avg. Vel. (ft/s)		0.47	
Max Chl Dpth (ft)	6.19	Hydr. Depth (ft)		4.87	
Conv. Total (cfs)	50978.5	Conv. (cfs)		50978.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		89.22	
Min Ch El (ft)	2761.20	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	386.00	235.50	362.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		4.31	
C & E Loss (ft)	0.00	Cum SA (acres)		4.24	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2770.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.035	
W.S. Elev (ft)	2770.52	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2764.19	Flow Area (sq ft)		727.56	
E.G. Slope (ft/ft)	0.000214	Area (sq ft)		727.56	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	106.08	Top Width (ft)		106.08	
Vel Total (ft/s)	2.20	Avg. Vel. (ft/s)		2.20	
Max Chl Dpth (ft)	9.32	Hydr. Depth (ft)		6.86	
Conv. Total (cfs)	109434.6	Conv. (cfs)		109434.6	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		109.10	
Min Ch El (ft)	2761.20	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	386.00	235.50	362.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.00	13.15	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	5.06	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2769.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2769.60	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2763.53	Flow Area (sq ft)		631.95	
E.G. Slope (ft/ft)	0.000142	Area (sq ft)		631.95	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	100.51	Top Width (ft)		100.51	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69	
Max Chl Dpth (ft)	8.40	Hydr. Depth (ft)		6.29	
Conv. Total (cfs)	89781.5	Conv. (cfs)		89781.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		103.23	
Min Ch El (ft)	2761.20	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	386.00	235.50	362.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		10.35	
C & E Loss (ft)	0.00	Cum SA (acres)		4.84	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2768.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2768.70	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2762.88	Flow Area (sq ft)		544.51	
E.G. Slope (ft/ft)	0.000080	Area (sq ft)		544.51	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	95.14	Top Width (ft)		95.14	
Vel Total (ft/s)	1.19	Avg. Vel. (ft/s)		1.19	
Max Chl Dpth (ft)	7.50	Hydr. Depth (ft)		5.72	
Conv. Total (cfs)	72734.5	Conv. (cfs)		72734.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		97.57	
Min Ch El (ft)	2761.20	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	386.00	235.50	362.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		7.79	
C & E Loss (ft)	0.00	Cum SA (acres)		4.61	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3581

INPUT
Description: Boulder Stabilizer #9
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2773.5	113.4	2772.6	215.5	2774	235.5	2774	274	2761.2
324	2761.2	362.5	2774	382.5	2774	386	2775.7		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	215.5	.016	235.5	.035	362.5	.016	382.5	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
235.5	362.5	15	15	15	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	235.5	2776	T
362.5	386	2776	T

Left Levee Station= 235.5 Elevation= 2776
Right Levee Station= 362.5 Elevation= 2776

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2773.04	Element			
Vel Head (ft)	0.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2772.86	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2765.93	Flow Area (sq ft)		992.06	
E.G. Slope (ft/ft)	0.000402	Area (sq ft)		992.06	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	120.15	Top Width (ft)		120.15	
Vel Total (ft/s)	3.41	Avg. Vel. (ft/s)		3.41	
Max Chl Dpth (ft)	11.66	Hydr. Depth (ft)		8.26	
Conv. Total (cfs)	168547.5	Conv. (cfs)		168547.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		123.92	
Min Ch El (ft)	2761.20	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	386.00	235.50	362.50
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.15	21.45	0.00
C & E Loss (ft)	0.17	Cum SA (acres)	0.33	5.57	0.01

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2772.20	Element			
Vel Head (ft)	0.14	Wt. n-Val.		0.035	
W.S. Elev (ft)	2772.06	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2765.32	Flow Area (sq ft)		898.00	
E.G. Slope (ft/ft)	0.000338	Area (sq ft)		898.00	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	115.34	Top Width (ft)		115.34	
Vel Total (ft/s)	3.01	Avg. Vel. (ft/s)		3.01	
Max Chl Dpth (ft)	10.86	Hydr. Depth (ft)		7.79	
Conv. Total (cfs)	146791.5	Conv. (cfs)		146791.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		118.86	
Min Ch El (ft)	2761.20	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	386.00	235.50	362.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	18.17	0.00
C & E Loss (ft)	0.16	Cum SA (acres)	0.22	5.37	0.00

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2770.43	Element			
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2770.36	Reach Len. (ft)	15.00	15.00	15.00

Crit W.S. (ft)	2764.07	Flow Area (sq ft)		710.29	
E.G. Slope (ft/ft)	0.000201	Area (sq ft)		710.29	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	105.10	Top Width (ft)		105.10	
Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)		2.11	
Max Chl Dpth (ft)	9.16	Hydr. Depth (ft)		6.76	
Conv. Total (cfs)	105810.6	Conv. (cfs)		105810.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		108.06	
Min Ch El (ft)	2761.20	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	386.00	235.50	362.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		12.51	
C & E Loss (ft)	0.12	Cum SA (acres)		5.01	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2767.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.39	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2761.99	Flow Area (sq ft)		424.49	
E.G. Slope (ft/ft)	0.000015	Area (sq ft)		424.49	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	87.22	Top Width (ft)		87.22	
Vel Total (ft/s)	0.47	Avg. Vel. (ft/s)		0.47	
Max Chl Dpth (ft)	6.19	Hydr. Depth (ft)		4.87	
Conv. Total (cfs)	50978.5	Conv. (cfs)		50978.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		89.22	
Min Ch El (ft)	2761.20	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	386.00	235.50	362.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		4.29	
C & E Loss (ft)	0.04	Cum SA (acres)		4.24	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2770.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.035	
W.S. Elev (ft)	2770.52	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2764.19	Flow Area (sq ft)		727.51	
E.G. Slope (ft/ft)	0.000214	Area (sq ft)		727.51	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	106.08	Top Width (ft)		106.08	
Vel Total (ft/s)	2.20	Avg. Vel. (ft/s)		2.20	
Max Chl Dpth (ft)	9.32	Hydr. Depth (ft)		6.86	
Conv. Total (cfs)	109423.7	Conv. (cfs)		109423.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		109.10	
Min Ch El (ft)	2761.20	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	386.00	235.50	362.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	13.12	
C & E Loss (ft)	0.12	Cum SA (acres)	0.02	5.05	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2769.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2769.60	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2763.53	Flow Area (sq ft)		631.93	
E.G. Slope (ft/ft)	0.000142	Area (sq ft)		631.93	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	100.51	Top Width (ft)		100.51	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69	
Max Chl Dpth (ft)	8.40	Hydr. Depth (ft)		6.29	
Conv. Total (cfs)	89776.6	Conv. (cfs)		89776.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		103.23	
Min Ch El (ft)	2761.20	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	386.00	235.50	362.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		10.32	
C & E Loss (ft)	0.10	Cum SA (acres)		4.83	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2768.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2768.70	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2762.88	Flow Area (sq ft)		544.49	
E.G. Slope (ft/ft)	0.000080	Area (sq ft)		544.49	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	95.14	Top Width (ft)		95.14	
Vel Total (ft/s)	1.19	Avg. Vel. (ft/s)		1.19	
Max Chl Dpth (ft)	7.50	Hydr. Depth (ft)		5.72	
Conv. Total (cfs)	72730.1	Conv. (cfs)		72730.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		97.57	
Min Ch El (ft)	2761.20	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	386.00	235.50	362.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		7.76	
C & E Loss (ft)	0.07	Cum SA (acres)		4.61	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 3566

INPUT
Description: Boulder Stabilizer #9
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2773.5   113.4  2772.6   207.9  2770.7   233.5    2773   253.5    2773
     274  2766.2     324  2766.2   344.5    2773   364.5    2773   367.7  2775.7

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04   253.5    .035   344.5     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         253.5   344.5             45.7    45.7    45.7             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100   253.5    2774       T
   344.5   367.7    2774       T
Left Levee      Station=   253.5      Elevation=    2774
Right Levee     Station=   344.5      Elevation=    2774

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2772.85    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.92    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2770.93    Reach Len. (ft)            45.70      45.70      45.70
  Crit W.S. (ft)           2770.93    Flow Area (sq ft)                    303.87
  E.G. Slope (ft/ft)      0.011591    Area (sq ft)                         303.87
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             78.51    Top Width (ft)                        78.51
  Vel Total (ft/s)           11.12    Avg. Vel. (ft/s)                      11.12
  Max Chl Dpth (ft)           4.73    Hydr. Depth (ft)                       3.87
  Conv. Total (cfs)        31395.3    Conv. (cfs)                        31395.3
  Length Wtd. (ft)           45.70    Wetted Per. (ft)                      80.04
  Min Ch El (ft)           2766.20    Shear (lb/sq ft)                       2.75
  Alpha                       1.00    Stream Power (lb/ft s)    367.70     253.50     344.50
  Frctn Loss (ft)             0.46    Cum Volume (acre-ft)        0.15      21.23       0.00
  C & E Loss (ft)             0.02    Cum SA (acres)              0.33       5.53       0.01


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2772.03    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.70    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2770.33    Reach Len. (ft)            45.70      45.70      45.70
  Crit W.S. (ft)           2770.33    Flow Area (sq ft)                    257.89
  E.G. Slope (ft/ft)      0.011975    Area (sq ft)                         257.89
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
```

Top Width (ft)	74.90	Top Width (ft)		74.90	
Vel Total (ft/s)	10.47	Avg. Vel. (ft/s)		10.47	
Max Chl Dpth (ft)	4.13	Hydr. Depth (ft)		3.44	
Conv. Total (cfs)	24673.7	Conv. (cfs)		24673.7	
Length Wtd. (ft)	45.70	Wetted Per. (ft)		76.23	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		2.53	
Alpha	1.00	Stream Power (lb/ft s)	367.70	253.50	344.50
Frctn Loss (ft)	0.47	Cum Volume (acre-ft)	0.07	17.97	0.00
C & E Loss (ft)	0.03	Cum SA (acres)	0.22	5.33	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2770.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.23	Wt. n-Val.		0.035	
W.S. Elev (ft)	2769.08	Reach Len. (ft)	45.70	45.70	45.70
Crit W.S. (ft)	2769.08	Flow Area (sq ft)		168.75	
E.G. Slope (ft/ft)	0.013117	Area (sq ft)		168.75	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	67.34	Top Width (ft)		67.34	
Vel Total (ft/s)	8.89	Avg. Vel. (ft/s)		8.89	
Max Chl Dpth (ft)	2.88	Hydr. Depth (ft)		2.51	
Conv. Total (cfs)	13097.2	Conv. (cfs)		13097.2	
Length Wtd. (ft)	45.70	Wetted Per. (ft)		68.27	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		2.02	
Alpha	1.00	Stream Power (lb/ft s)	367.70	253.50	344.50
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)		12.36	
C & E Loss (ft)	0.03	Cum SA (acres)		4.98	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2767.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.035	
W.S. Elev (ft)	2766.98	Reach Len. (ft)	45.70	45.70	45.70
Crit W.S. (ft)	2766.98	Flow Area (sq ft)		40.86	
E.G. Slope (ft/ft)	0.019732	Area (sq ft)		40.86	

Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	54.71	Top Width (ft)		54.71	
Vel Total (ft/s)	4.89	Avg. Vel. (ft/s)		4.89	
Max Chl Dpth (ft)	0.78	Hydr. Depth (ft)		0.75	
Conv. Total (cfs)	1423.8	Conv. (cfs)		1423.8	
Length Wtd. (ft)	45.70	Wetted Per. (ft)		54.96	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		0.92	
Alpha	1.00	Stream Power (lb/ft s)	367.70	253.50	344.50
Frctn Loss (ft)	0.78	Cum Volume (acre-ft)		4.21	
C & E Loss (ft)	0.01	Cum SA (acres)		4.21	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2770.47	Element			
Vel Head (ft)	1.28	Wt. n-Val.		0.035	
W.S. Elev (ft)	2769.19	Reach Len. (ft)	45.70	45.70	45.70
Crit W.S. (ft)	2769.19	Flow Area (sq ft)		176.19	
E.G. Slope (ft/ft)	0.013103	Area (sq ft)		176.19	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	68.00	Top Width (ft)		68.00	
Vel Total (ft/s)	9.08	Avg. Vel. (ft/s)		9.08	
Max Chl Dpth (ft)	2.99	Hydr. Depth (ft)		2.59	
Conv. Total (cfs)	13977.9	Conv. (cfs)		13977.9	
Length Wtd. (ft)	45.70	Wetted Per. (ft)		68.97	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)	367.70	253.50	344.50
Frctn Loss (ft)	0.52	Cum Volume (acre-ft)	0.00	12.96	
C & E Loss (ft)	0.03	Cum SA (acres)	0.02	5.02	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2769.54	Element			
Vel Head (ft)	1.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2768.52	Reach Len. (ft)	45.70	45.70	45.70
Crit W.S. (ft)	2768.52	Flow Area (sq ft)		131.95	

E.G. Slope (ft/ft)	0.014110	Area (sq ft)		131.95	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	63.96	Top Width (ft)		63.96	
Vel Total (ft/s)	8.11	Avg. Vel. (ft/s)		8.11	
Max Chl Dpth (ft)	2.32	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	9007.9	Conv. (cfs)		9007.9	
Length Wtd. (ft)	45.70	Wetted Per. (ft)		64.71	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		1.80	
Alpha	1.00	Stream Power (lb/ft s)	367.70	253.50	344.50
Frctn Loss (ft)	0.56	Cum Volume (acre-ft)		10.19	
C & E Loss (ft)	0.03	Cum SA (acres)		4.80	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2768.65	Element			
Vel Head (ft)	0.77	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.88	Reach Len. (ft)	45.70	45.70	45.70
Crit W.S. (ft)	2767.88	Flow Area (sq ft)		92.30	
E.G. Slope (ft/ft)	0.015719	Area (sq ft)		92.30	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	60.11	Top Width (ft)		60.11	
Vel Total (ft/s)	7.04	Avg. Vel. (ft/s)		7.04	
Max Chl Dpth (ft)	1.68	Hydr. Depth (ft)		1.54	
Conv. Total (cfs)	5184.4	Conv. (cfs)		5184.4	
Length Wtd. (ft)	45.70	Wetted Per. (ft)		60.65	
Min Ch El (ft)	2766.20	Shear (lb/sq ft)		1.49	
Alpha	1.00	Stream Power (lb/ft s)	367.70	253.50	344.50
Frctn Loss (ft)	0.61	Cum Volume (acre-ft)		7.65	
C & E Loss (ft)	0.03	Cum SA (acres)		4.58	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3520.3

```
INPUT
Description: Section 35+20.3
Station Elevation Data    num=      22
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2772  117.68    2771  241.89    2770  276.62    2770  285.12    2773
  306.91    2774  315.48    2774  321.51    2770  324.48    2768  328.96    2765
  359.25    2765  378.56    2765  382.01    2765   395.5    2766  400.18    2767
  406.92    2770  409.91    2771  412.91    2772  417.26    2774  424.85    2774
  435.64    2774  440.24    2775

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035  321.51     .03  406.92    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        321.51  406.92             70.3    70.3    70.3             .1       .3
Ineffective Flow     num=       1
   Sta L   Sta R    Elev  Permanent
     100   321.5    2770       F

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2771.90    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               3.79    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2768.11    Reach Len. (ft)             70.30      70.30      70.30
  Crit W.S. (ft)           2769.26    Flow Area (sq ft)                     216.36
  E.G. Slope (ft/ft)      0.026260    Area (sq ft)                          216.36
  Q Total (cfs)            3380.00    Flow (cfs)                           3380.00
  Top Width (ft)             78.36    Top Width (ft)                         78.36
  Vel Total (ft/s)           15.62    Avg. Vel. (ft/s)                       15.62
  Max Chl Dpth (ft)           3.11    Hydr. Depth (ft)                        2.76
  Conv. Total (cfs)        20857.8    Conv. (cfs)                          20857.8
  Length Wtd. (ft)           70.30    Wetted Per. (ft)                       79.68
  Min Ch El (ft)           2765.00    Shear (lb/sq ft)                        4.45
  Alpha                       1.00    Stream Power (lb/ft s)    440.24       0.00       0.00
  Frctn Loss (ft)             0.76    Cum Volume (acre-ft)        0.15      20.96       0.00
  C & E Loss (ft)             0.19    Cum SA (acres)              0.33       5.45       0.01


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Program found supercritical flow starting at this cross section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2771.06    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               3.38    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2767.68    Reach Len. (ft)             70.30      70.30      70.30
  Crit W.S. (ft)           2768.72    Flow Area (sq ft)                     183.02
  E.G. Slope (ft/ft)      0.028381    Area (sq ft)                          183.02
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             76.75    Top Width (ft)                         76.75
  Vel Total (ft/s)           14.75    Avg. Vel. (ft/s)                       14.75
  Max Chl Dpth (ft)           2.68    Hydr. Depth (ft)                        2.38
  Conv. Total (cfs)        16026.9    Conv. (cfs)                          16026.9
  Length Wtd. (ft)           70.30    Wetted Per. (ft)                       77.85
  Min Ch El (ft)           2765.00    Shear (lb/sq ft)                        4.17
  Alpha                       1.00    Stream Power (lb/ft s)    440.24       0.00       0.00
  Frctn Loss (ft)             0.80    Cum Volume (acre-ft)        0.07      17.74       0.00
```

C & E Loss (ft)	0.17	Cum SA (acres)	0.22	5.25	0.00

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2769.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.44	Wt. n-Val.		0.030	
W.S. Elev (ft)	2766.84	Reach Len. (ft)	70.30	70.30	70.30
Crit W.S. (ft)	2767.59	Flow Area (sq ft)		119.77	
E.G. Slope (ft/ft)	0.033584	Area (sq ft)		119.77	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	73.21	Top Width (ft)		73.21	
Vel Total (ft/s)	12.52	Avg. Vel. (ft/s)		12.52	
Max Chl Dpth (ft)	1.84	Hydr. Depth (ft)		1.64	
Conv. Total (cfs)	8185.1	Conv. (cfs)		8185.1	
Length Wtd. (ft)	70.30	Wetted Per. (ft)		73.89	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		3.40	
Alpha	1.00	Stream Power (lb/ft s)	440.24	0.00	0.00
Frctn Loss (ft)	0.91	Cum Volume (acre-ft)		12.20	
C & E Loss (ft)	0.12	Cum SA (acres)		4.90	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2766.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.58	Wt. n-Val.		0.030	
W.S. Elev (ft)	2765.57	Reach Len. (ft)	70.30	70.30	70.30
Crit W.S. (ft)	2765.74	Flow Area (sq ft)		32.77	
E.G. Slope (ft/ft)	0.035393	Area (sq ft)		32.77	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	61.61	Top Width (ft)		61.61	
Vel Total (ft/s)	6.10	Avg. Vel. (ft/s)		6.10	
Max Chl Dpth (ft)	0.57	Hydr. Depth (ft)		0.53	
Conv. Total (cfs)	1063.1	Conv. (cfs)		1063.1	
Length Wtd. (ft)	70.30	Wetted Per. (ft)		61.81	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		1.17	
Alpha	1.00	Stream Power (lb/ft s)	440.24	0.00	0.00
Frctn Loss (ft)	1.18	Cum Volume (acre-ft)		4.17	
C & E Loss (ft)	0.02	Cum SA (acres)		4.15	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2769.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.52	Wt. n-Val.		0.030	
W.S. Elev (ft)	2766.92	Reach Len. (ft)	70.30	70.30	70.30
Crit W.S. (ft)	2767.68	Flow Area (sq ft)		125.49	
E.G. Slope (ft/ft)	0.033010	Area (sq ft)		125.49	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	73.69	Top Width (ft)		73.69	
Vel Total (ft/s)	12.75	Avg. Vel. (ft/s)		12.75	
Max Chl Dpth (ft)	1.92	Hydr. Depth (ft)		1.70	
Conv. Total (cfs)	8806.3	Conv. (cfs)		8806.3	
Length Wtd. (ft)	70.30	Wetted Per. (ft)		74.41	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		3.48	
Alpha	1.00	Stream Power (lb/ft s)	440.24	0.00	0.00
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)	0.00	12.81	
C & E Loss (ft)	0.12	Cum SA (acres)	0.02	4.95	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2768.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.97	Wt. n-Val.		0.030	
W.S. Elev (ft)	2766.50	Reach Len. (ft)	70.30	70.30	70.30
Crit W.S. (ft)	2767.11	Flow Area (sq ft)		95.05	
E.G. Slope (ft/ft)	0.035428	Area (sq ft)		95.05	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	71.10	Top Width (ft)		71.10	
Vel Total (ft/s)	11.26	Avg. Vel. (ft/s)		11.26	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		1.34	
Conv. Total (cfs)	5684.7	Conv. (cfs)		5684.7	
Length Wtd. (ft)	70.30	Wetted Per. (ft)		71.64	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		2.93	
Alpha	1.00	Stream Power (lb/ft s)	440.24	0.00	0.00
Frctn Loss (ft)	0.97	Cum Volume (acre-ft)		10.07	
C & E Loss (ft)	0.09	Cum SA (acres)		4.73	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2767.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.41	Wt. n-Val.		0.030	
W.S. Elev (ft)	2766.11	Reach Len. (ft)	70.30	70.30	70.30
Crit W.S. (ft)	2766.55	Flow Area (sq ft)		68.25	
E.G. Slope (ft/ft)	0.037591	Area (sq ft)		68.25	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	68.73	Top Width (ft)		68.73	
Vel Total (ft/s)	9.52	Avg. Vel. (ft/s)		9.52	
Max Chl Dpth (ft)	1.11	Hydr. Depth (ft)		0.99	
Conv. Total (cfs)	3352.5	Conv. (cfs)		3352.5	
Length Wtd. (ft)	70.30	Wetted Per. (ft)		69.12	
Min Ch El (ft)	2765.00	Shear (lb/sq ft)		2.32	
Alpha	1.00	Stream Power (lb/ft s)	440.24	0.00	0.00
Frctn Loss (ft)	1.06	Cum Volume (acre-ft)		7.57	
C & E Loss (ft)	0.06	Cum SA (acres)		4.51	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Program found supercritical flow starting at this cross section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3450.*

INPUT
Description: Boulder Stabilizer #8
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2771.5	113.3	2770.4	151.7	2769	197.9	2770	206.8	2770
232	2770	252	2770	274.4	2762.5	324.4	2762.5	347	2770
367	2770	377.1	2772.1	379.3	2772.8	382	2773.6		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	252	.035	347	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
252	347	2	2	2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	252	2772	T
347	382	2772	T

Left Levee Station= 252 Elevation= 2772
Right Levee Station= 347 Elevation= 2772

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2769.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2768.60	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2767.23	Flow Area (sq ft)		416.47	

E.G. Slope (ft/ft)	0.004639	Area (sq ft)		416.47	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	86.59	Top Width (ft)		86.59	
Vel Total (ft/s)	8.12	Avg. Vel. (ft/s)		8.12	
Max Chl Dpth (ft)	6.10	Hydr. Depth (ft)		4.81	
Conv. Total (cfs)	49626.5	Conv. (cfs)		49626.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		88.57	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		1.36	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	20.45	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.33	5.32	0.01

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2768.76	Element			
Vel Head (ft)	0.91	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.85	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2766.64	Flow Area (sq ft)		353.60	
E.G. Slope (ft/ft)	0.004748	Area (sq ft)		353.60	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	82.12	Top Width (ft)		82.12	
Vel Total (ft/s)	7.64	Avg. Vel. (ft/s)		7.64	
Max Chl Dpth (ft)	5.35	Hydr. Depth (ft)		4.31	
Conv. Total (cfs)	39182.3	Conv. (cfs)		39182.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		83.85	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		1.25	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	17.30	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.22	5.13	0.00

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2766.92	Element			
Vel Head (ft)	0.65	Wt. n-Val.		0.035	
W.S. Elev (ft)	2766.27	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2765.37	Flow Area (sq ft)		231.02	
E.G. Slope (ft/ft)	0.005111	Area (sq ft)		231.02	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	72.61	Top Width (ft)		72.61	
Vel Total (ft/s)	6.49	Avg. Vel. (ft/s)		6.49	
Max Chl Dpth (ft)	3.77	Hydr. Depth (ft)		3.18	
Conv. Total (cfs)	20981.2	Conv. (cfs)		20981.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		73.83	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		1.00	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		11.92	
C & E Loss (ft)	0.00	Cum SA (acres)		4.78	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2763.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.19	Wt. n-Val.		0.035	
W.S. Elev (ft)	2763.57	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2763.28	Flow Area (sq ft)		56.98	
E.G. Slope (ft/ft)	0.006802	Area (sq ft)		56.98	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	56.42	Top Width (ft)		56.42	
Vel Total (ft/s)	3.51	Avg. Vel. (ft/s)		3.51	
Max Chl Dpth (ft)	1.07	Hydr. Depth (ft)		1.01	
Conv. Total (cfs)	2425.0	Conv. (cfs)		2425.0	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		56.77	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		0.43	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		4.10	
C & E Loss (ft)	0.00	Cum SA (acres)		4.05	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2767.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.		0.035	
W.S. Elev (ft)	2766.42	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2765.49	Flow Area (sq ft)		242.20	
E.G. Slope (ft/ft)	0.005054	Area (sq ft)		242.20	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	73.53	Top Width (ft)		73.53	
Vel Total (ft/s)	6.61	Avg. Vel. (ft/s)		6.61	
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		3.29	
Conv. Total (cfs)	22505.2	Conv. (cfs)		22505.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		74.80	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		1.02	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	12.51	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	4.83	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2766.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.		0.035	
W.S. Elev (ft)	2765.57	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2764.79	Flow Area (sq ft)		181.95	
E.G. Slope (ft/ft)	0.005311	Area (sq ft)		181.95	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	68.44	Top Width (ft)		68.44	
Vel Total (ft/s)	5.88	Avg. Vel. (ft/s)		5.88	
Max Chl Dpth (ft)	3.07	Hydr. Depth (ft)		2.66	
Conv. Total (cfs)	14682.2	Conv. (cfs)		14682.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		69.43	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		9.85	
C & E Loss (ft)	0.00	Cum SA (acres)		4.62	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2765.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.40	Wt. n-Val.		0.035	
W.S. Elev (ft)	2764.76	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2764.17	Flow Area (sq ft)		128.18	
E.G. Slope (ft/ft)	0.005684	Area (sq ft)		128.18	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	63.55	Top Width (ft)		63.55	
Vel Total (ft/s)	5.07	Avg. Vel. (ft/s)		5.07	
Max Chl Dpth (ft)	2.26	Hydr. Depth (ft)		2.02	
Conv. Total (cfs)	8621.8	Conv. (cfs)		8621.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		64.28	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		0.71	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		7.41	
C & E Loss (ft)	0.00	Cum SA (acres)		4.40	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3448

INPUT
Description: Boulder Stabilizer #8
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2771.5	113.3	2770.4	197.9	2770	206.8	2770	232	2770
252	2770	274.4	2762.5	324.4	2762.5	347	2770	367	2770
377.1	2772.1	379.3	2772.8	382	2773.6				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	232	.016	252	.035	347	.016	367	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
252	347	15	15	15	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	252	2771.6	T
347	382	2771.6	T

Left Levee Station= 252 Elevation= 2771.6
Right Levee Station= 347 Elevation= 2771.6

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2769.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2768.59	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2767.23	Flow Area (sq ft)		415.58	
E.G. Slope (ft/ft)	0.004667	Area (sq ft)		415.58	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	86.53	Top Width (ft)		86.53	
Vel Total (ft/s)	8.13	Avg. Vel. (ft/s)		8.13	
Max Chl Dpth (ft)	6.09	Hydr. Depth (ft)		4.80	
Conv. Total (cfs)	49474.6	Conv. (cfs)		49474.6	

Length Wtd. (ft)	15.00	Wetted Per. (ft)		88.50	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		1.37	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	20.43	0.00
C & E Loss (ft)	0.25	Cum SA (acres)	0.33	5.31	0.01

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2768.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.84	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2766.64	Flow Area (sq ft)		352.75	
E.G. Slope (ft/ft)	0.004781	Area (sq ft)		352.75	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	82.06	Top Width (ft)		82.06	
Vel Total (ft/s)	7.65	Avg. Vel. (ft/s)		7.65	
Max Chl Dpth (ft)	5.34	Hydr. Depth (ft)		4.30	
Conv. Total (cfs)	39047.1	Conv. (cfs)		39047.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		83.79	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		1.26	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	17.29	0.00
C & E Loss (ft)	0.23	Cum SA (acres)	0.22	5.12	0.00

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2766.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.66	Wt. n-Val.		0.035	
W.S. Elev (ft)	2766.26	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2765.37	Flow Area (sq ft)		230.24	
E.G. Slope (ft/ft)	0.005163	Area (sq ft)		230.24	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	72.55	Top Width (ft)		72.55	
Vel Total (ft/s)	6.52	Avg. Vel. (ft/s)		6.52	
Max Chl Dpth (ft)	3.76	Hydr. Depth (ft)		3.17	
Conv. Total (cfs)	20876.1	Conv. (cfs)		20876.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		73.76	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		1.01	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		11.91	
C & E Loss (ft)	0.18	Cum SA (acres)		4.78	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2763.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.20	Wt. n-Val.		0.035	
W.S. Elev (ft)	2763.55	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2763.28	Flow Area (sq ft)		55.92	
E.G. Slope (ft/ft)	0.007221	Area (sq ft)		55.92	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	56.31	Top Width (ft)		56.31	
Vel Total (ft/s)	3.58	Avg. Vel. (ft/s)		3.58	
Max Chl Dpth (ft)	1.05	Hydr. Depth (ft)		0.99	
Conv. Total (cfs)	2353.6	Conv. (cfs)		2353.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		56.65	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		0.44	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		4.10	
C & E Loss (ft)	0.06	Cum SA (acres)		4.05	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2767.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.		0.035	
W.S. Elev (ft)	2766.41	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2765.49	Flow Area (sq ft)		241.41	
E.G. Slope (ft/ft)	0.005104	Area (sq ft)		241.41	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	73.46	Top Width (ft)		73.46	
Vel Total (ft/s)	6.63	Avg. Vel. (ft/s)		6.63	
Max Chl Dpth (ft)	3.91	Hydr. Depth (ft)		3.29	
Conv. Total (cfs)	22396.6	Conv. (cfs)		22396.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		74.73	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		1.03	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	12.50	
C & E Loss (ft)	0.18	Cum SA (acres)	0.02	4.82	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2766.10	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.		0.035	
W.S. Elev (ft)	2765.56	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2764.82	Flow Area (sq ft)		180.96	
E.G. Slope (ft/ft)	0.005399	Area (sq ft)		180.96	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	68.35	Top Width (ft)		68.35	

Vel Total (ft/s)	5.91	Avg. Vel. (ft/s)		5.91	
Max Chl Dpth (ft)	3.06	Hydr. Depth (ft)		2.65	
Conv. Total (cfs)	14562.7	Conv. (cfs)		14562.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		69.34	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		0.88	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		9.84	
C & E Loss (ft)	0.15	Cum SA (acres)		4.62	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2765.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.		0.035	
W.S. Elev (ft)	2764.74	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2764.18	Flow Area (sq ft)		127.21	
E.G. Slope (ft/ft)	0.005819	Area (sq ft)		127.21	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	63.45	Top Width (ft)		63.45	
Vel Total (ft/s)	5.11	Avg. Vel. (ft/s)		5.11	
Max Chl Dpth (ft)	2.24	Hydr. Depth (ft)		2.00	
Conv. Total (cfs)	8521.2	Conv. (cfs)		8521.2	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		64.18	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		0.72	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		7.41	
C & E Loss (ft)	0.11	Cum SA (acres)		4.40	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3433

INPUT
Description: Boulder Stabilizer #8
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2771.5	113.3	2770.4	151.7	2769	197.9	2771	206.8	2771
214	2771	234	2771	274.4	2757.5	324.4	2757.5	365	2771
385	2771	389	2773.6						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	234	.035	365	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
234	365	2	2	2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	234	2772.5	T
365	389	2772.5	T

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Left Levee      Station=     234      Elevation=  2772.5
Right Levee     Station=     365      Elevation=  2772.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2769.35    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.18    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2769.17    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2762.23    Flow Area (sq ft)                    991.56
  E.G. Slope (ft/ft)      0.000402    Area (sq ft)                         991.56
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)            119.99    Top Width (ft)                       119.99
  Vel Total (ft/s)            3.41    Avg. Vel. (ft/s)                       3.41
  Max Chl Dpth (ft)          11.67    Hydr. Depth (ft)                       8.26
  Conv. Total (cfs)       168534.7    Conv. (cfs)                        168534.7
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                     123.78
  Min Ch El (ft)           2757.50    Shear (lb/sq ft)                       0.20
  Alpha                       1.00    Stream Power (lb/ft s)    389.00     234.00     365.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.15      20.19       0.00
  C & E Loss (ft)             0.00    Cum SA (acres)              0.33       5.28       0.01


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2768.51    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.14    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2768.37    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2761.63    Flow Area (sq ft)                    897.73
  E.G. Slope (ft/ft)      0.000338    Area (sq ft)                         897.73
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)            115.21    Top Width (ft)                       115.21
  Vel Total (ft/s)            3.01    Avg. Vel. (ft/s)                       3.01
  Max Chl Dpth (ft)          10.87    Hydr. Depth (ft)                       7.79
  Conv. Total (cfs)       146820.1    Conv. (cfs)                        146820.1
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                     118.73
  Min Ch El (ft)           2757.50    Shear (lb/sq ft)                       0.16
  Alpha                       1.00    Stream Power (lb/ft s)    389.00     234.00     365.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.07      17.07       0.00
  C & E Loss (ft)             0.00    Cum SA (acres)              0.22       5.09       0.00


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2766.73    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.07    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2766.66    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2760.37    Flow Area (sq ft)                    709.91
  E.G. Slope (ft/ft)      0.000201    Area (sq ft)                         709.91
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
  Top Width (ft)            104.97    Top Width (ft)                       104.97
  Vel Total (ft/s)            2.11    Avg. Vel. (ft/s)                       2.11
  Max Chl Dpth (ft)           9.16    Hydr. Depth (ft)                       6.76
  Conv. Total (cfs)       105795.6    Conv. (cfs)                        105795.6
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                     107.94
  Min Ch El (ft)           2757.50    Shear (lb/sq ft)                       0.08
  Alpha                       1.00    Stream Power (lb/ft s)    389.00     234.00     365.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)                  11.75
  C & E Loss (ft)             0.00    Cum SA (acres)                         4.75
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Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2763.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2763.69	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2758.28	Flow Area (sq ft)		424.21	
E.G. Slope (ft/ft)	0.000015	Area (sq ft)		424.21	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	87.12	Top Width (ft)		87.12	
Vel Total (ft/s)	0.47	Avg. Vel. (ft/s)		0.47	
Max Chl Dpth (ft)	6.19	Hydr. Depth (ft)		4.87	
Conv. Total (cfs)	50957.3	Conv. (cfs)		50957.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		89.13	
Min Ch El (ft)	2757.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	389.00	234.00	365.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		4.02	
C & E Loss (ft)	0.00	Cum SA (acres)		4.03	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2766.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.035	
W.S. Elev (ft)	2766.82	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2760.49	Flow Area (sq ft)		727.06	
E.G. Slope (ft/ft)	0.000214	Area (sq ft)		727.06	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	105.95	Top Width (ft)		105.95	
Vel Total (ft/s)	2.20	Avg. Vel. (ft/s)		2.20	
Max Chl Dpth (ft)	9.32	Hydr. Depth (ft)		6.86	
Conv. Total (cfs)	109395.1	Conv. (cfs)		109395.1	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		108.97	
Min Ch El (ft)	2757.50	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	389.00	234.00	365.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.00	12.33	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	4.79	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2765.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2765.90	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2759.81	Flow Area (sq ft)		631.65	
E.G. Slope (ft/ft)	0.000142	Area (sq ft)		631.65	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	100.40	Top Width (ft)		100.40	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69	
Max Chl Dpth (ft)	8.40	Hydr. Depth (ft)		6.29	
Conv. Total (cfs)	89772.4	Conv. (cfs)		89772.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		103.12	
Min Ch El (ft)	2757.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	389.00	234.00	365.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		9.70	
C & E Loss (ft)	0.00	Cum SA (acres)		4.59	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2765.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2765.00	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2759.19	Flow Area (sq ft)		544.14	
E.G. Slope (ft/ft)	0.000080	Area (sq ft)		544.14	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	95.02	Top Width (ft)		95.02	
Vel Total (ft/s)	1.19	Avg. Vel. (ft/s)		1.19	
Max Chl Dpth (ft)	7.50	Hydr. Depth (ft)		5.73	
Conv. Total (cfs)	72705.2	Conv. (cfs)		72705.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		97.46	
Min Ch El (ft)	2757.50	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	389.00	234.00	365.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		7.29	
C & E Loss (ft)	0.00	Cum SA (acres)		4.37	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3431

INPUT
Description: Boulder Stabilizer #8
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2771.5	113.3	2770.4	151.7	2769	197.9	2771	206.8	2771
214	2771	234	2771	274.4	2757.5	324.4	2757.5	365	2771
385	2771	389	2773.6						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	214	.016	234	.035	365	.016	385	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
234	365	15	15	15	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	234	2772.5	T
365	389	2772.5	T

Left Levee Station= 234 Elevation= 2772.5
Right Levee Station= 365 Elevation= 2772.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2769.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2769.17	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2762.23	Flow Area (sq ft)		991.47	
E.G. Slope (ft/ft)	0.000402	Area (sq ft)		991.47	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	119.99	Top Width (ft)		119.99	
Vel Total (ft/s)	3.41	Avg. Vel. (ft/s)		3.41	
Max Chl Dpth (ft)	11.67	Hydr. Depth (ft)		8.26	

Conv. Total (cfs)	168514.0	Conv. (cfs)		168514.0	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		123.78	
Min Ch El (ft)	2757.50	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	389.00	234.00	365.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.15	20.14	0.00
C & E Loss (ft)	0.17	Cum SA (acres)	0.33	5.27	0.01

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2768.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.035	
W.S. Elev (ft)	2768.37	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2761.63	Flow Area (sq ft)		897.65	
E.G. Slope (ft/ft)	0.000338	Area (sq ft)		897.65	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	115.20	Top Width (ft)		115.20	
Vel Total (ft/s)	3.01	Avg. Vel. (ft/s)		3.01	
Max Chl Dpth (ft)	10.87	Hydr. Depth (ft)		7.79	
Conv. Total (cfs)	146800.9	Conv. (cfs)		146800.9	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		118.73	
Min Ch El (ft)	2757.50	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	389.00	234.00	365.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	17.03	0.00
C & E Loss (ft)	0.16	Cum SA (acres)	0.22	5.08	0.00

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2766.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2766.66	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2760.37	Flow Area (sq ft)		709.86	
E.G. Slope (ft/ft)	0.000201	Area (sq ft)		709.86	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	104.97	Top Width (ft)		104.97	
Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)		2.11	
Max Chl Dpth (ft)	9.16	Hydr. Depth (ft)		6.76	
Conv. Total (cfs)	105784.9	Conv. (cfs)		105784.9	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		107.94	
Min Ch El (ft)	2757.50	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	389.00	234.00	365.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		11.72	
C & E Loss (ft)	0.12	Cum SA (acres)		4.75	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2763.69	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2763.69	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2758.28	Flow Area (sq ft)		424.21	
E.G. Slope (ft/ft)	0.000015	Area (sq ft)		424.21	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	87.12	Top Width (ft)		87.12	
Vel Total (ft/s)	0.47	Avg. Vel. (ft/s)		0.47	
Max Chl Dpth (ft)	6.19	Hydr. Depth (ft)		4.87	
Conv. Total (cfs)	50957.3	Conv. (cfs)		50957.3	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		89.13	
Min Ch El (ft)	2757.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	389.00	234.00	365.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		4.00	
C & E Loss (ft)	0.04	Cum SA (acres)		4.02	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2766.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.08	Wt. n-Val.		0.035	
W.S. Elev (ft)	2766.82	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2760.49	Flow Area (sq ft)		727.01	
E.G. Slope (ft/ft)	0.000214	Area (sq ft)		727.01	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	105.94	Top Width (ft)		105.94	
Vel Total (ft/s)	2.20	Avg. Vel. (ft/s)		2.20	
Max Chl Dpth (ft)	9.32	Hydr. Depth (ft)		6.86	
Conv. Total (cfs)	109384.2	Conv. (cfs)		109384.2	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		108.97	
Min Ch El (ft)	2757.50	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	389.00	234.00	365.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	12.30	
C & E Loss (ft)	0.12	Cum SA (acres)	0.02	4.79	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2765.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2765.90	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2759.81	Flow Area (sq ft)		631.60	
E.G. Slope (ft/ft)	0.000142	Area (sq ft)		631.60	

Q Total (cfs)	1070.00	Flow (cfs)		1070.00		
Top Width (ft)	100.40	Top Width (ft)		100.40		
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69		
Max Chl Dpth (ft)	8.40	Hydr. Depth (ft)		6.29		
Conv. Total (cfs)	89762.6	Conv. (cfs)		89762.6		
Length Wtd. (ft)	15.00	Wetted Per. (ft)		103.12		
Min Ch El (ft)	2757.50	Shear (lb/sq ft)		0.05		
Alpha	1.00	Stream Power (lb/ft s)	389.00	234.00	365.00	
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		9.67		
C & E Loss (ft)	0.10	Cum SA (acres)		4.58		

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2765.03	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2765.00	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2759.19	Flow Area (sq ft)		544.12	
E.G. Slope (ft/ft)	0.000080	Area (sq ft)		544.12	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	95.02	Top Width (ft)		95.02	
Vel Total (ft/s)	1.19	Avg. Vel. (ft/s)		1.19	
Max Chl Dpth (ft)	7.50	Hydr. Depth (ft)		5.73	
Conv. Total (cfs)	72700.7	Conv. (cfs)		72700.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		97.46	
Min Ch El (ft)	2757.50	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	389.00	234.00	365.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		7.27	
C & E Loss (ft)	0.07	Cum SA (acres)		4.37	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3416

INPUT
Description: Boulder Stabilizer #8
Station Elevation Data num= 14

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2771.5	113.3	2770.4	151.7	2769	197.9	2770	206.8	2770
232	2770	252	2770	274.4	2762.5	324.4	2762.5	347	2770
367	2770	377.1	2772.1	379.3	2772.8	382	2773.6		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	232	.016	252	.035	347	.016	367	.04

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           252     347              116     116     116             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     252  2770.5       T
     347     382  2770.5       T
Left Levee      Station=     252      Elevation=  2770.5
Right Levee     Station=     347      Elevation=  2770.5
```

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2769.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.92	Wt. n-Val.		0.035	
W.S. Elev (ft)	2767.23	Reach Len. (ft)	116.00	116.00	116.00
Crit W.S. (ft)	2767.23	Flow Area (sq ft)		303.92	
E.G. Slope (ft/ft)	0.011564	Area (sq ft)		303.92	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	78.40	Top Width (ft)		78.40	
Vel Total (ft/s)	11.12	Avg. Vel. (ft/s)		11.12	
Max Chl Dpth (ft)	4.73	Hydr. Depth (ft)		3.88	
Conv. Total (cfs)	31431.0	Conv. (cfs)		31431.0	
Length Wtd. (ft)	116.00	Wetted Per. (ft)		79.94	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		2.74	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.80	Cum Volume (acre-ft)	0.15	19.92	0.00
C & E Loss (ft)	0.27	Cum SA (acres)	0.33	5.24	0.01

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2768.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.72	Wt. n-Val.		0.035	
W.S. Elev (ft)	2766.62	Reach Len. (ft)	116.00	116.00	116.00
Crit W.S. (ft)	2766.62	Flow Area (sq ft)		256.71	
E.G. Slope (ft/ft)	0.012118	Area (sq ft)		256.71	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	74.70	Top Width (ft)		74.70	
Vel Total (ft/s)	10.52	Avg. Vel. (ft/s)		10.52	
Max Chl Dpth (ft)	4.12	Hydr. Depth (ft)		3.44	
Conv. Total (cfs)	24527.2	Conv. (cfs)		24527.2	
Length Wtd. (ft)	116.00	Wetted Per. (ft)		76.04	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		2.55	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)	0.07	16.83	0.00
C & E Loss (ft)	0.24	Cum SA (acres)	0.22	5.05	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2766.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.23	Wt. n-Val.		0.035	
W.S. Elev (ft)	2765.37	Reach Len. (ft)	116.00	116.00	116.00
Crit W.S. (ft)	2765.37	Flow Area (sq ft)		168.35	
E.G. Slope (ft/ft)	0.013194	Area (sq ft)		168.35	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	67.23	Top Width (ft)		67.23	
Vel Total (ft/s)	8.91	Avg. Vel. (ft/s)		8.91	
Max Chl Dpth (ft)	2.87	Hydr. Depth (ft)		2.50	
Conv. Total (cfs)	13059.0	Conv. (cfs)		13059.0	
Length Wtd. (ft)	116.00	Wetted Per. (ft)		68.16	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		2.03	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.90	Cum Volume (acre-ft)		11.56	
C & E Loss (ft)	0.17	Cum SA (acres)		4.72	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2763.65	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.035	
W.S. Elev (ft)	2763.28	Reach Len. (ft)	116.00	116.00	116.00
Crit W.S. (ft)	2763.28	Flow Area (sq ft)		40.73	
E.G. Slope (ft/ft)	0.019924	Area (sq ft)		40.73	

Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	54.67	Top Width (ft)		54.67	
Vel Total (ft/s)	4.91	Avg. Vel. (ft/s)		4.91	
Max Chl Dpth (ft)	0.78	Hydr. Depth (ft)		0.75	
Conv. Total (cfs)	1416.9	Conv. (cfs)		1416.9	
Length Wtd. (ft)	116.00	Wetted Per. (ft)		54.92	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		0.92	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	1.26	Cum Volume (acre-ft)		3.92	
C & E Loss (ft)	0.05	Cum SA (acres)		4.00	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2766.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.28	Wt. n-Val.		0.035	
W.S. Elev (ft)	2765.49	Reach Len. (ft)	116.00	116.00	116.00
Crit W.S. (ft)	2765.49	Flow Area (sq ft)		176.24	
E.G. Slope (ft/ft)	0.013073	Area (sq ft)		176.24	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	67.93	Top Width (ft)		67.93	
Vel Total (ft/s)	9.08	Avg. Vel. (ft/s)		9.08	
Max Chl Dpth (ft)	2.99	Hydr. Depth (ft)		2.59	
Conv. Total (cfs)	13993.6	Conv. (cfs)		13993.6	
Length Wtd. (ft)	116.00	Wetted Per. (ft)		68.90	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		2.09	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.89	Cum Volume (acre-ft)	0.00	12.14	
C & E Loss (ft)	0.18	Cum SA (acres)	0.02	4.76	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2765.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2764.81	Reach Len. (ft)	116.00	116.00	116.00
Crit W.S. (ft)	2764.81	Flow Area (sq ft)		131.23	
E.G. Slope (ft/ft)	0.014331	Area (sq ft)		131.23	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	63.83	Top Width (ft)		63.83	
Vel Total (ft/s)	8.15	Avg. Vel. (ft/s)		8.15	
Max Chl Dpth (ft)	2.31	Hydr. Depth (ft)		2.06	
Conv. Total (cfs)	8938.2	Conv. (cfs)		8938.2	
Length Wtd. (ft)	116.00	Wetted Per. (ft)		64.58	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		1.82	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	0.95	Cum Volume (acre-ft)		9.54	
C & E Loss (ft)	0.15	Cum SA (acres)		4.56	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2764.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.77	Wt. n-Val.		0.035	
W.S. Elev (ft)	2764.18	Reach Len. (ft)	116.00	116.00	116.00
Crit W.S. (ft)	2764.18	Flow Area (sq ft)		92.39	
E.G. Slope (ft/ft)	0.015656	Area (sq ft)		92.39	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	60.07	Top Width (ft)		60.07	
Vel Total (ft/s)	7.04	Avg. Vel. (ft/s)		7.04	
Max Chl Dpth (ft)	1.68	Hydr. Depth (ft)		1.54	
Conv. Total (cfs)	5194.8	Conv. (cfs)		5194.8	
Length Wtd. (ft)	116.00	Wetted Per. (ft)		60.62	
Min Ch El (ft)	2762.50	Shear (lb/sq ft)		1.49	
Alpha	1.00	Stream Power (lb/ft s)	382.00	252.00	347.00
Frctn Loss (ft)	1.03	Cum Volume (acre-ft)		7.16	
C & E Loss (ft)	0.11	Cum SA (acres)		4.34	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

```
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 3300

INPUT
Description: Boulder Stabilizer #7 (inlet)
Station Elevation Data    num=      15
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2770.3   103.9    2769     115  2765.7     119  2763.2     139  2763.2
   156.3  2757.2   185.1  2757.2   203.5  2757.2   206.7  2757.2   212.3  2759.2
   214.2    2760     224  2763.2     244  2763.2     253  2769.3     256  2770.7

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04     119    .016     139    .035     224    .016     244     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           139     224                2       2       2             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2766.14    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               6.01    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2760.13    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2761.92    Flow Area (sq ft)                    171.84
  E.G. Slope (ft/ft)      0.062076    Area (sq ft)                         171.84
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             66.74    Top Width (ft)                        66.74
  Vel Total (ft/s)           19.67    Avg. Vel. (ft/s)                      19.67
  Max Chl Dpth (ft)           2.93    Hydr. Depth (ft)                       2.57
  Conv. Total (cfs)        13566.1    Conv. (cfs)                         13566.1
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      67.76
  Min Ch El (ft)           2757.20    Shear (lb/sq ft)                       9.83
  Alpha                       1.00    Stream Power (lb/ft s)    256.00       0.00       0.00
  Frctn Loss (ft)             2.62    Cum Volume (acre-ft)        0.15      19.28       0.00
  C & E Loss (ft)             0.41    Cum SA (acres)              0.33       5.04       0.01


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2765.18    Element                   Left OB    Channel   Right OB
```

Vel Head (ft)	5.48	Wt. n-Val.		0.035	
W.S. Elev (ft)	2759.70	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2761.31	Flow Area (sq ft)		143.79	
E.G. Slope (ft/ft)	0.068252	Area (sq ft)		143.79	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	64.40	Top Width (ft)		64.40	
Vel Total (ft/s)	18.78	Avg. Vel. (ft/s)		18.78	
Max Chl Dpth (ft)	2.50	Hydr. Depth (ft)		2.23	
Conv. Total (cfs)	10334.9	Conv. (cfs)		10334.9	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		65.27	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		9.39	
Alpha	1.00	Stream Power (lb/ft s)	256.00	0.00	0.00
Frctn Loss (ft)	2.78	Cum Volume (acre-ft)	0.07	16.30	0.00
C & E Loss (ft)	0.38	Cum SA (acres)	0.22	4.87	0.00

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2763.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	4.27	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.84	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2760.04	Flow Area (sq ft)		90.45	
E.G. Slope (ft/ft)	0.088847	Area (sq ft)		90.45	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	59.74	Top Width (ft)		59.74	
Vel Total (ft/s)	16.58	Avg. Vel. (ft/s)		16.58	
Max Chl Dpth (ft)	1.64	Hydr. Depth (ft)		1.51	
Conv. Total (cfs)	5032.3	Conv. (cfs)		5032.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		60.30	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		8.32	
Alpha	1.00	Stream Power (lb/ft s)	256.00	0.00	0.00
Frctn Loss (ft)	3.19	Cum Volume (acre-ft)		11.22	
C & E Loss (ft)	0.30	Cum SA (acres)		4.55	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2758.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.65	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2757.97	Flow Area (sq ft)		23.01	
E.G. Slope (ft/ft)	0.127819	Area (sq ft)		23.01	
Q Total (cfs)	200.00	Flow (cfs)		200.00	

Top Width (ft)	52.93	Top Width (ft)		52.93	
Vel Total (ft/s)	8.69	Avg. Vel. (ft/s)		8.69	
Max Chl Dpth (ft)	0.45	Hydr. Depth (ft)		0.43	
Conv. Total (cfs)	559.4	Conv. (cfs)		559.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		53.08	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		3.46	
Alpha	1.00	Stream Power (lb/ft s)	256.00	0.00	0.00
Frctn Loss (ft)	4.75	Cum Volume (acre-ft)		3.83	
C & E Loss (ft)	0.08	Cum SA (acres)		3.86	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2763.32	Element			
Vel Head (ft)	4.39	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.92	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2760.17	Flow Area (sq ft)		95.11	
E.G. Slope (ft/ft)	0.086404	Area (sq ft)		95.11	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	60.18	Top Width (ft)		60.18	
Vel Total (ft/s)	16.82	Avg. Vel. (ft/s)		16.82	
Max Chl Dpth (ft)	1.72	Hydr. Depth (ft)		1.58	
Conv. Total (cfs)	5443.2	Conv. (cfs)		5443.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		60.76	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		8.44	
Alpha	1.00	Stream Power (lb/ft s)	256.00	0.00	0.00
Frctn Loss (ft)	3.14	Cum Volume (acre-ft)	0.00	11.78	
C & E Loss (ft)	0.31	Cum SA (acres)	0.02	4.59	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2762.09	Element			
Vel Head (ft)	3.59	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.50	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2759.49	Flow Area (sq ft)		70.40	
E.G. Slope (ft/ft)	0.099553	Area (sq ft)		70.40	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	57.80	Top Width (ft)		57.80	
Vel Total (ft/s)	15.20	Avg. Vel. (ft/s)		15.20	
Max Chl Dpth (ft)	1.30	Hydr. Depth (ft)		1.22	
Conv. Total (cfs)	3391.2	Conv. (cfs)		3391.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		58.24	

Min Ch El (ft)	2757.20	Shear (lb/sq ft)		7.51	
Alpha	1.00	Stream Power (lb/ft s)	256.00	0.00	0.00
Frctn Loss (ft)	3.49	Cum Volume (acre-ft)		9.27	
C & E Loss (ft)	0.26	Cum SA (acres)		4.39	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2760.85	Element			
Vel Head (ft)	2.73	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.13	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2758.86	Flow Area (sq ft)		49.03	
E.G. Slope (ft/ft)	0.116360	Area (sq ft)		49.03	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	55.65	Top Width (ft)		55.65	
Vel Total (ft/s)	13.26	Avg. Vel. (ft/s)		13.26	
Max Chl Dpth (ft)	0.92	Hydr. Depth (ft)		0.88	
Conv. Total (cfs)	1905.5	Conv. (cfs)		1905.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		55.97	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		6.36	
Alpha	1.00	Stream Power (lb/ft s)	256.00	0.00	0.00
Frctn Loss (ft)	3.89	Cum Volume (acre-ft)		6.97	
C & E Loss (ft)	0.20	Cum SA (acres)		4.19	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3298

INPUT
Description: Boulder Stabilizer #7
Station Elevation Data num= 15

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2770.3	103.9	2769	115	2765.7	119	2763.2	139	2763.2
156.3	2757.2	185.1	2757.2	203.5	2757.2	206.7	2757.2	212.3	2759.2
214.2	2760	224	2763.2	244	2763.2	253	2769.3	256	2770.7

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	119	.016	139	.035	224	.016	244	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
139	224	15	15	15	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2765.94	Element			
Vel Head (ft)	5.76	Wt. n-Val.		0.035	
W.S. Elev (ft)	2760.18	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2761.92	Flow Area (sq ft)		175.53	
E.G. Slope (ft/ft)	0.058225	Area (sq ft)		175.53	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	67.07	Top Width (ft)		67.07	
Vel Total (ft/s)	19.26	Avg. Vel. (ft/s)		19.26	
Max Chl Dpth (ft)	2.98	Hydr. Depth (ft)		2.62	
Conv. Total (cfs)	14007.6	Conv. (cfs)		14007.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		68.11	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		9.37	
Alpha	1.00	Stream Power (lb/ft s)	256.00	0.00	0.00
Frctn Loss (ft)	0.12	Cum Volume (acre-ft)	0.15	19.28	0.00
C & E Loss (ft)	0.08	Cum SA (acres)	0.33	5.04	0.01

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2764.97	Element			
Vel Head (ft)	5.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	2759.76	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2761.31	Flow Area (sq ft)		147.43	
E.G. Slope (ft/ft)	0.063202	Area (sq ft)		147.43	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	64.70	Top Width (ft)		64.70	
Vel Total (ft/s)	18.31	Avg. Vel. (ft/s)		18.31	
Max Chl Dpth (ft)	2.56	Hydr. Depth (ft)		2.28	
Conv. Total (cfs)	10739.9	Conv. (cfs)		10739.9	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		65.59	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		8.87	
Alpha	1.00	Stream Power (lb/ft s)	256.00	0.00	0.00
Frctn Loss (ft)	0.13	Cum Volume (acre-ft)	0.07	16.29	0.00
C & E Loss (ft)	0.08	Cum SA (acres)	0.22	4.86	0.00

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2762.85	Element			
Vel Head (ft)	3.95	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.90	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2760.04	Flow Area (sq ft)		94.08	
E.G. Slope (ft/ft)	0.078563	Area (sq ft)		94.08	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	60.08	Top Width (ft)		60.08	
Vel Total (ft/s)	15.94	Avg. Vel. (ft/s)		15.94	
Max Chl Dpth (ft)	1.70	Hydr. Depth (ft)		1.57	
Conv. Total (cfs)	5351.6	Conv. (cfs)		5351.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		60.66	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		7.61	
Alpha	1.00	Stream Power (lb/ft s)	256.00	0.00	0.00
Frctn Loss (ft)	0.17	Cum Volume (acre-ft)		11.22	
C & E Loss (ft)	0.10	Cum SA (acres)		4.54	

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2758.53	Element			
Vel Head (ft)	0.78	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.74	Reach Len. (ft)	15.00	15.00	15.00

Crit W.S. (ft)	2757.97	Flow Area (sq ft)		28.18	
E.G. Slope (ft/ft)	0.065994	Area (sq ft)		28.18	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	53.48	Top Width (ft)		53.48	
Vel Total (ft/s)	7.10	Avg. Vel. (ft/s)		7.10	
Max Chl Dpth (ft)	0.54	Hydr. Depth (ft)		0.53	
Conv. Total (cfs)	778.5	Conv. (cfs)		778.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		53.67	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		2.16	
Alpha	1.00	Stream Power (lb/ft s)	256.00	0.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		3.83	
C & E Loss (ft)	0.12	Cum SA (acres)		3.85	

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2763.06	Element			
Vel Head (ft)	4.08	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.98	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2760.16	Flow Area (sq ft)		98.73	
E.G. Slope (ft/ft)	0.076883	Area (sq ft)		98.73	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	60.52	Top Width (ft)		60.52	
Vel Total (ft/s)	16.21	Avg. Vel. (ft/s)		16.21	
Max Chl Dpth (ft)	1.78	Hydr. Depth (ft)		1.63	
Conv. Total (cfs)	5770.4	Conv. (cfs)		5770.4	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		61.13	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		7.75	
Alpha	1.00	Stream Power (lb/ft s)	256.00	0.00	0.00
Frctn Loss (ft)	0.16	Cum Volume (acre-ft)	0.00	11.78	
C & E Loss (ft)	0.10	Cum SA (acres)	0.02	4.58	

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2761.81	Element			
Vel Head (ft)	3.24	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.57	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2759.49	Flow Area (sq ft)		74.08	
E.G. Slope (ft/ft)	0.084738	Area (sq ft)		74.08	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	58.16	Top Width (ft)		58.16	
Vel Total (ft/s)	14.44	Avg. Vel. (ft/s)		14.44	
Max Chl Dpth (ft)	1.36	Hydr. Depth (ft)		1.27	
Conv. Total (cfs)	3675.7	Conv. (cfs)		3675.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		58.62	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		6.68	
Alpha	1.00	Stream Power (lb/ft s)	256.00	0.00	0.00
Frctn Loss (ft)	0.18	Cum Volume (acre-ft)		9.27	
C & E Loss (ft)	0.10	Cum SA (acres)		4.39	

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2760.54	Element			
Vel Head (ft)	2.35	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.19	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2758.87	Flow Area (sq ft)		52.87	
E.G. Slope (ft/ft)	0.091363	Area (sq ft)		52.87	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	56.05	Top Width (ft)		56.05	
Vel Total (ft/s)	12.29	Avg. Vel. (ft/s)		12.29	
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)		0.94	
Conv. Total (cfs)	2150.4	Conv. (cfs)		2150.4	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		56.39	

Min Ch El (ft)	2757.20	Shear (lb/sq ft)		5.35	
Alpha	1.00	Stream Power (lb/ft s)	256.00	0.00	0.00
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		6.97	
C & E Loss (ft)	0.11	Cum SA (acres)		4.19	

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3283

INPUT
Description: Boulder Stabilizer #7
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
91	2770.3	95	2766	115	2766	156.3	2752.2	206.7	2752.2
248	2766	268	2766	272	2769.3	273	2770.7		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
91	.04	95	.016	115	.035	248	.016	268	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
115	248	2	2	2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
91	115	2767	T
248	273	2767	T

Left Levee Station= 115 Elevation= 2767
Right Levee Station= 248 Elevation= 2767

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2764.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2763.88	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2756.91	Flow Area (sq ft)		996.85	
E.G. Slope (ft/ft)	0.000397	Area (sq ft)		996.85	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	120.31	Top Width (ft)		120.31	
Vel Total (ft/s)	3.39	Avg. Vel. (ft/s)		3.39	
Max Chl Dpth (ft)	11.68	Hydr. Depth (ft)		8.29	
Conv. Total (cfs)	169740.8	Conv. (cfs)		169740.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		124.10	
Min Ch El (ft)	2752.20	Shear (lb/sq ft)		0.20	
Alpha	1.00	Stream Power (lb/ft s)	273.00	115.00	248.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	19.07	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.33	5.01	0.01

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2763.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.14	Wt. n-Val.		0.035	
W.S. Elev (ft)	2763.08	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2756.31	Flow Area (sq ft)		902.41	
E.G. Slope (ft/ft)	0.000334	Area (sq ft)		902.41	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	115.51	Top Width (ft)		115.51	
Vel Total (ft/s)	2.99	Avg. Vel. (ft/s)		2.99	

Max Chl Dpth (ft)	10.88	Hydr. Depth (ft)		7.81	
Conv. Total (cfs)	147835.0	Conv. (cfs)		147835.0	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		119.05	
Min Ch El (ft)	2752.20	Shear (lb/sq ft)		0.16	
Alpha	1.00	Stream Power (lb/ft s)	273.00	115.00	248.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.07	16.11	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.22	4.83	0.00

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2761.44	Element			
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2761.37	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2755.05	Flow Area (sq ft)		713.51	
E.G. Slope (ft/ft)	0.000198	Area (sq ft)		713.51	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	105.27	Top Width (ft)		105.27	
Vel Total (ft/s)	2.10	Avg. Vel. (ft/s)		2.10	
Max Chl Dpth (ft)	9.17	Hydr. Depth (ft)		6.78	
Conv. Total (cfs)	106488.8	Conv. (cfs)		106488.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		108.25	
Min Ch El (ft)	2752.20	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	273.00	115.00	248.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		11.08	
C & E Loss (ft)	0.00	Cum SA (acres)		4.52	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2758.39	Element			
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.38	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2752.97	Flow Area (sq ft)		425.96	
E.G. Slope (ft/ft)	0.000015	Area (sq ft)		425.96	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	87.40	Top Width (ft)		87.40	
Vel Total (ft/s)	0.47	Avg. Vel. (ft/s)		0.47	
Max Chl Dpth (ft)	6.18	Hydr. Depth (ft)		4.87	
Conv. Total (cfs)	51199.8	Conv. (cfs)		51199.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		89.41	
Min Ch El (ft)	2752.20	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	273.00	115.00	248.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.75	
C & E Loss (ft)	0.00	Cum SA (acres)		3.83	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2761.61	Element			
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2761.53	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2755.17	Flow Area (sq ft)		731.01	

E.G. Slope (ft/ft)	0.000211	Area (sq ft)		731.01	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	106.26	Top Width (ft)		106.26	
Vel Total (ft/s)	2.19	Avg. Vel. (ft/s)		2.19	
Max Chl Dpth (ft)	9.33	Hydr. Depth (ft)		6.88	
Conv. Total (cfs)	110171.4	Conv. (cfs)		110171.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		109.30	
Min Ch El (ft)	2752.20	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	273.00	115.00	248.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.00	11.63	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	4.56	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2760.64	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2760.60	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2754.50	Flow Area (sq ft)		634.44	
E.G. Slope (ft/ft)	0.000140	Area (sq ft)		634.44	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	100.67	Top Width (ft)		100.67	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69	
Max Chl Dpth (ft)	8.40	Hydr. Depth (ft)		6.30	
Conv. Total (cfs)	90272.3	Conv. (cfs)		90272.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		103.41	
Min Ch El (ft)	2752.20	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	273.00	115.00	248.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		9.14	
C & E Loss (ft)	0.00	Cum SA (acres)		4.36	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2759.72	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2759.70	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2753.88	Flow Area (sq ft)		546.34	
E.G. Slope (ft/ft)	0.000079	Area (sq ft)		546.34	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	95.29	Top Width (ft)		95.29	
Vel Total (ft/s)	1.19	Avg. Vel. (ft/s)		1.19	
Max Chl Dpth (ft)	7.50	Hydr. Depth (ft)		5.73	
Conv. Total (cfs)	73060.0	Conv. (cfs)		73060.0	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		97.73	
Min Ch El (ft)	2752.20	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	273.00	115.00	248.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		6.86	
C & E Loss (ft)	0.00	Cum SA (acres)		4.16	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

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RIVER: Desert Knolls Wa
REACH: Main               RS: 3281

INPUT
Description: Boulder Stabilizer #7
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
      91  2770.3      95    2766     115    2766   156.3  2752.2   206.7  2752.2
     248    2766     268    2766     272  2769.3     273  2770.7

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
      91     .04      95    .016     115    .035     248    .016     268    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           115     248               15      15      15             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
      91     115    2767       T
     248     273    2767       T
Left Levee      Station=     115      Elevation=    2767
Right Levee     Station=     248      Elevation=    2767

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2764.06    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.18    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2763.88    Reach Len. (ft)             15.00      15.00      15.00
  Crit W.S. (ft)           2756.91    Flow Area (sq ft)                     996.76
  E.G. Slope (ft/ft)      0.000397    Area (sq ft)                          996.76
  Q Total (cfs)            3380.00    Flow (cfs)                           3380.00
  Top Width (ft)            120.30    Top Width (ft)                        120.30
  Vel Total (ft/s)            3.39    Avg. Vel. (ft/s)                        3.39
  Max Chl Dpth (ft)          11.68    Hydr. Depth (ft)                        8.29
  Conv. Total (cfs)       169720.0    Conv. (cfs)                        169720.0
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                      124.10
  Min Ch El (ft)           2752.20    Shear (lb/sq ft)                        0.20
  Alpha                       1.00    Stream Power (lb/ft s)    273.00     115.00     248.00
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)        0.15      19.03       0.00
  C & E Loss (ft)             0.17    Cum SA (acres)              0.33       5.00       0.01


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2763.22    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.14    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2763.08    Reach Len. (ft)             15.00      15.00      15.00
  Crit W.S. (ft)           2756.31    Flow Area (sq ft)                     902.29
  E.G. Slope (ft/ft)      0.000334    Area (sq ft)                          902.29
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)            115.51    Top Width (ft)                        115.51
  Vel Total (ft/s)            2.99    Avg. Vel. (ft/s)                        2.99
  Max Chl Dpth (ft)          10.88    Hydr. Depth (ft)                        7.81
  Conv. Total (cfs)       147809.3    Conv. (cfs)                        147809.3
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                      119.04
  Min Ch El (ft)           2752.20    Shear (lb/sq ft)                        0.16
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Alpha	1.00	Stream Power (lb/ft s)	273.00	115.00	248.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	16.07	0.00
C & E Loss (ft)	0.16	Cum SA (acres)	0.22	4.83	0.00

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2761.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2761.37	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2755.05	Flow Area (sq ft)		713.46	
E.G. Slope (ft/ft)	0.000198	Area (sq ft)		713.46	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	105.27	Top Width (ft)		105.27	
Vel Total (ft/s)	2.10	Avg. Vel. (ft/s)		2.10	
Max Chl Dpth (ft)	9.17	Hydr. Depth (ft)		6.78	
Conv. Total (cfs)	106478.0	Conv. (cfs)		106478.0	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		108.25	
Min Ch El (ft)	2752.20	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	273.00	115.00	248.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		11.04	
C & E Loss (ft)	0.12	Cum SA (acres)		4.51	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2758.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.38	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2752.97	Flow Area (sq ft)		425.96	
E.G. Slope (ft/ft)	0.000015	Area (sq ft)		425.96	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	87.40	Top Width (ft)		87.40	
Vel Total (ft/s)	0.47	Avg. Vel. (ft/s)		0.47	
Max Chl Dpth (ft)	6.18	Hydr. Depth (ft)		4.87	
Conv. Total (cfs)	51199.8	Conv. (cfs)		51199.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		89.41	
Min Ch El (ft)	2752.20	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	273.00	115.00	248.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.73	
C & E Loss (ft)	0.03	Cum SA (acres)		3.82	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2761.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2761.53	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2755.17	Flow Area (sq ft)		730.96	
E.G. Slope (ft/ft)	0.000211	Area (sq ft)		730.96	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	106.26	Top Width (ft)		106.26	
Vel Total (ft/s)	2.19	Avg. Vel. (ft/s)		2.19	
Max Chl Dpth (ft)	9.33	Hydr. Depth (ft)		6.88	
Conv. Total (cfs)	110160.5	Conv. (cfs)		110160.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		109.29	
Min Ch El (ft)	2752.20	Shear (lb/sq ft)		0.09	
Alpha	1.00	Stream Power (lb/ft s)	273.00	115.00	248.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	11.60	
C & E Loss (ft)	0.12	Cum SA (acres)	0.02	4.55	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2760.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2760.60	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2754.50	Flow Area (sq ft)		634.42	
E.G. Slope (ft/ft)	0.000141	Area (sq ft)		634.42	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	100.67	Top Width (ft)		100.67	
Vel Total (ft/s)	1.69	Avg. Vel. (ft/s)		1.69	
Max Chl Dpth (ft)	8.40	Hydr. Depth (ft)		6.30	
Conv. Total (cfs)	90267.3	Conv. (cfs)		90267.3	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		103.40	
Min Ch El (ft)	2752.20	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	273.00	115.00	248.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		9.12	
C & E Loss (ft)	0.10	Cum SA (acres)		4.36	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2759.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2759.70	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2753.88	Flow Area (sq ft)		546.32	
E.G. Slope (ft/ft)	0.000079	Area (sq ft)		546.32	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	95.29	Top Width (ft)		95.29	
Vel Total (ft/s)	1.19	Avg. Vel. (ft/s)		1.19	
Max Chl Dpth (ft)	7.50	Hydr. Depth (ft)		5.73	

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  Conv. Total (cfs)        73055.6    Conv. (cfs)                        73055.6
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                     97.73
  Min Ch El (ft)           2752.20    Shear (lb/sq ft)                      0.03
  Alpha                       1.00    Stream Power (lb/ft s)    273.00     115.00     248.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)                  6.84
  C & E Loss (ft)             0.07    Cum SA (acres)                        4.16


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 3266

INPUT
Description: Boulder Stabilizer #7 (exit)
Station Elevation Data    num=      11
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2770.3   103.9    2769     116    2764     136    2764   156.3  2757.2
   206.7  2757.2   214.2    2760     227    2764     247    2764     253  2769.3
     256  2770.7

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04     116    .016     136    .035     227    .016     247     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           136     227              266     266     266             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     136    2765       T
     227     256    2765       T
Left Levee      Station=     136      Elevation=    2765
Right Levee     Station=     227      Elevation=    2765

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2763.87    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.92    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2761.95    Reach Len. (ft)           266.00     266.00     266.00
  Crit W.S. (ft)           2761.95    Flow Area (sq ft)                    303.88
  E.G. Slope (ft/ft)      0.011555    Area (sq ft)                         303.88
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             78.29    Top Width (ft)                        78.29
  Vel Total (ft/s)           11.12    Avg. Vel. (ft/s)                      11.12
  Max Chl Dpth (ft)           4.74    Hydr. Depth (ft)                       3.88
  Conv. Total (cfs)        31444.2    Conv. (cfs)                        31444.2
  Length Wtd. (ft)          266.00    Wetted Per. (ft)                      79.86
  Min Ch El (ft)           2757.20    Shear (lb/sq ft)                       2.74
  Alpha                       1.00    Stream Power (lb/ft s)    256.00     136.00     227.00
  Frctn Loss (ft)             1.86    Cum Volume (acre-ft)        0.15      18.80       0.00
  C & E Loss (ft)             0.29    Cum SA (acres)              0.33       4.97       0.01


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2763.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.71	Wt. n-Val.		0.035	
W.S. Elev (ft)	2761.34	Reach Len. (ft)	266.00	266.00	266.00
Crit W.S. (ft)	2761.34	Flow Area (sq ft)		257.54	
E.G. Slope (ft/ft)	0.011963	Area (sq ft)		257.54	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	74.54	Top Width (ft)		74.54	
Vel Total (ft/s)	10.48	Avg. Vel. (ft/s)		10.48	
Max Chl Dpth (ft)	4.14	Hydr. Depth (ft)		3.46	
Conv. Total (cfs)	24685.2	Conv. (cfs)		24685.2	
Length Wtd. (ft)	266.00	Wetted Per. (ft)		75.92	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		2.53	
Alpha	1.00	Stream Power (lb/ft s)	256.00	136.00	227.00
Frctn Loss (ft)	1.91	Cum Volume (acre-ft)	0.07	15.87	0.00
C & E Loss (ft)	0.26	Cum SA (acres)	0.22	4.79	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2761.31	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.24	Wt. n-Val.		0.035	
W.S. Elev (ft)	2760.07	Reach Len. (ft)	266.00	266.00	266.00
Crit W.S. (ft)	2760.07	Flow Area (sq ft)		167.67	
E.G. Slope (ft/ft)	0.013236	Area (sq ft)		167.67	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	66.66	Top Width (ft)		66.66	
Vel Total (ft/s)	8.95	Avg. Vel. (ft/s)		8.95	
Max Chl Dpth (ft)	2.87	Hydr. Depth (ft)		2.52	

Conv. Total (cfs)	13037.9	Conv. (cfs)		13037.9	
Length Wtd. (ft)	266.00	Wetted Per. (ft)		67.65	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		2.05	
Alpha	1.00	Stream Power (lb/ft s)	256.00	136.00	227.00
Frctn Loss (ft)	2.08	Cum Volume (acre-ft)		10.89	
C & E Loss (ft)	0.19	Cum SA (acres)		4.48	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2758.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.01	Reach Len. (ft)	266.00	266.00	266.00
Crit W.S. (ft)	2757.98	Flow Area (sq ft)		42.67	
E.G. Slope (ft/ft)	0.017206	Area (sq ft)		42.67	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	54.99	Top Width (ft)		54.99	
Vel Total (ft/s)	4.69	Avg. Vel. (ft/s)		4.69	
Max Chl Dpth (ft)	0.81	Hydr. Depth (ft)		0.78	
Conv. Total (cfs)	1524.7	Conv. (cfs)		1524.7	
Length Wtd. (ft)	266.00	Wetted Per. (ft)		55.26	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)	256.00	136.00	227.00
Frctn Loss (ft)	2.76	Cum Volume (acre-ft)		3.65	
C & E Loss (ft)	0.05	Cum SA (acres)		3.80	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2761.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.31	Wt. n-Val.		0.035	
W.S. Elev (ft)	2760.17	Reach Len. (ft)	266.00	266.00	266.00
Crit W.S. (ft)	2760.17	Flow Area (sq ft)		174.38	
E.G. Slope (ft/ft)	0.013385	Area (sq ft)		174.38	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	67.28	Top Width (ft)		67.28	
Vel Total (ft/s)	9.18	Avg. Vel. (ft/s)		9.18	

Max Chl Dpth (ft)	2.97	Hydr. Depth (ft)		2.59	
Conv. Total (cfs)	13829.6	Conv. (cfs)		13829.6	
Length Wtd. (ft)	266.00	Wetted Per. (ft)		68.30	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		2.13	
Alpha	1.00	Stream Power (lb/ft s)	256.00	136.00	227.00
Frctn Loss (ft)	2.08	Cum Volume (acre-ft)	0.00	11.44	
C & E Loss (ft)	0.20	Cum SA (acres)	0.02	4.52	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2760.54	Element			
Vel Head (ft)	1.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2759.51	Reach Len. (ft)	266.00	266.00	266.00
Crit W.S. (ft)	2759.51	Flow Area (sq ft)		131.34	
E.G. Slope (ft/ft)	0.014197	Area (sq ft)		131.34	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	63.47	Top Width (ft)		63.47	
Vel Total (ft/s)	8.15	Avg. Vel. (ft/s)		8.15	
Max Chl Dpth (ft)	2.31	Hydr. Depth (ft)		2.07	
Conv. Total (cfs)	8980.3	Conv. (cfs)		8980.3	
Length Wtd. (ft)	266.00	Wetted Per. (ft)		64.26	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		1.81	
Alpha	1.00	Stream Power (lb/ft s)	256.00	136.00	227.00
Frctn Loss (ft)	2.19	Cum Volume (acre-ft)		8.98	
C & E Loss (ft)	0.16	Cum SA (acres)		4.33	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2759.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.76	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.89	Reach Len. (ft)	266.00	266.00	266.00
Crit W.S. (ft)	2758.89	Flow Area (sq ft)		93.14	
E.G. Slope (ft/ft)	0.015212	Area (sq ft)		93.14	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	59.96	Top Width (ft)		59.96	
Vel Total (ft/s)	6.98	Avg. Vel. (ft/s)		6.98	
Max Chl Dpth (ft)	1.69	Hydr. Depth (ft)		1.55	
Conv. Total (cfs)	5270.1	Conv. (cfs)		5270.1	
Length Wtd. (ft)	266.00	Wetted Per. (ft)		60.54	
Min Ch El (ft)	2757.20	Shear (lb/sq ft)		1.46	
Alpha	1.00	Stream Power (lb/ft s)	256.00	136.00	227.00
Frctn Loss (ft)	2.36	Cum Volume (acre-ft)		6.73	
C & E Loss (ft)	0.12	Cum SA (acres)		4.13	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 3000

INPUT
Description: Boulder Stabilizer #6 (inlet)
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2765.9	104.4	2765	127.8	2764.8	135.5	2764.7	169.9	2764.8
187.3	2764.4	204.4	2764.1	211.7	2763.2	285.5	2763	304.5	2763
305.5	2762.6	313	2760	326.5	2756	330	2754.4	390	2754.4
393.4	2755.4	407	2760	420	2763.2	422	2764.3	423.3	2764.5
433.3	2765.9								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	285.5	.016	304.5	.035	420	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
304.5	420	2	2	2	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2760.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.97	Wt. n-Val.		0.035	
W.S. Elev (ft)	2760.00	Reach Len. (ft)	2.00	2.00	2.00

Crit W.S. (ft)	2758.70	Flow Area (sq ft)		428.31	
E.G. Slope (ft/ft)	0.004692	Area (sq ft)		428.31	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	93.99	Top Width (ft)		93.99	
Vel Total (ft/s)	7.89	Avg. Vel. (ft/s)		7.89	
Max Chl Dpth (ft)	5.60	Hydr. Depth (ft)		4.56	
Conv. Total (cfs)	49342.3	Conv. (cfs)		49342.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		95.82	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		1.31	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	16.57	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.33	4.44	0.01

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2760.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.85	Wt. n-Val.		0.035	
W.S. Elev (ft)	2759.31	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2758.13	Flow Area (sq ft)		364.88	
E.G. Slope (ft/ft)	0.004785	Area (sq ft)		364.88	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	89.62	Top Width (ft)		89.62	
Vel Total (ft/s)	7.40	Avg. Vel. (ft/s)		7.40	
Max Chl Dpth (ft)	4.91	Hydr. Depth (ft)		4.07	
Conv. Total (cfs)	39031.4	Conv. (cfs)		39031.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		91.23	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		1.19	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	13.97	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.22	4.29	0.00

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2758.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.84	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2756.97	Flow Area (sq ft)		239.83	
E.G. Slope (ft/ft)	0.005143	Area (sq ft)		239.83	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	80.30	Top Width (ft)		80.30	
Vel Total (ft/s)	6.25	Avg. Vel. (ft/s)		6.25	
Max Chl Dpth (ft)	3.44	Hydr. Depth (ft)		2.99	
Conv. Total (cfs)	20916.1	Conv. (cfs)		20916.1	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		81.46	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		9.65	
C & E Loss (ft)	0.00	Cum SA (acres)		4.03	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2755.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.36	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)		Flow Area (sq ft)		60.04	
E.G. Slope (ft/ft)	0.006940	Area (sq ft)		60.04	

Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	65.35	Top Width (ft)		65.35	
Vel Total (ft/s)	3.33	Avg. Vel. (ft/s)		3.33	
Max Chl Dpth (ft)	0.96	Hydr. Depth (ft)		0.92	
Conv. Total (cfs)	2400.7	Conv. (cfs)		2400.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		65.70	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		3.34	
C & E Loss (ft)	0.00	Cum SA (acres)		3.43	

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2758.60	Element			
Vel Head (ft)	0.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.97	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2757.09	Flow Area (sq ft)		250.79	
E.G. Slope (ft/ft)	0.005117	Area (sq ft)		250.79	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	81.16	Top Width (ft)		81.16	
Vel Total (ft/s)	6.38	Avg. Vel. (ft/s)		6.38	
Max Chl Dpth (ft)	3.57	Hydr. Depth (ft)		3.09	
Conv. Total (cfs)	22368.3	Conv. (cfs)		22368.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		82.36	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	10.15	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	4.07	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2757.68	Element			
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.19	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2756.47	Flow Area (sq ft)		189.00	
E.G. Slope (ft/ft)	0.005384	Area (sq ft)		189.00	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	76.19	Top Width (ft)		76.19	
Vel Total (ft/s)	5.66	Avg. Vel. (ft/s)		5.66	
Max Chl Dpth (ft)	2.79	Hydr. Depth (ft)		2.48	
Conv. Total (cfs)	14582.5	Conv. (cfs)		14582.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		77.14	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		0.82	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		8.01	
C & E Loss (ft)	0.00	Cum SA (acres)		3.91	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2756.80	Element			
Vel Head (ft)	0.37	Wt. n-Val.		0.035	
W.S. Elev (ft)	2756.43	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2755.90	Flow Area (sq ft)		133.36	
E.G. Slope (ft/ft)	0.005808	Area (sq ft)		133.36	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	71.41	Top Width (ft)		71.41	
Vel Total (ft/s)	4.87	Avg. Vel. (ft/s)		4.87	
Max Chl Dpth (ft)	2.03	Hydr. Depth (ft)		1.87	

Conv. Total (cfs)	8528.7	Conv. (cfs)		8528.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		72.14	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		6.04	
C & E Loss (ft)	0.00	Cum SA (acres)		3.73	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2998

INPUT
Description: Boulder Stabilizer #6
Station Elevation Data num= 21

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2765.9	104.4	2765	127.8	2764.8	135.5	2764.7	169.9	2764.8
187.3	2764.4	204.4	2764.1	211.7	2763.2	285.5	2763	304.5	2763
305.5	2762.6	313	2760	326.5	2756	330	2754.4	390	2754.4
393.4	2755.4	407	2760	420	2763.2	422	2764.3	423.3	2764.5
433.3	2765.9								

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	285.5	.016	304.5	.035	420	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
304.5	420	15	15	15	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2760.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.97	Wt. n-Val.		0.035	
W.S. Elev (ft)	2759.99	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		427.35	
E.G. Slope (ft/ft)	0.004723	Area (sq ft)		427.35	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	93.93	Top Width (ft)		93.93	
Vel Total (ft/s)	7.91	Avg. Vel. (ft/s)		7.91	
Max Chl Dpth (ft)	5.59	Hydr. Depth (ft)		4.55	
Conv. Total (cfs)	49180.8	Conv. (cfs)		49180.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		95.75	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		1.32	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	16.55	0.00
C & E Loss (ft)	0.24	Cum SA (acres)	0.33	4.44	0.01

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2760.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.85	Wt. n-Val.		0.035	
W.S. Elev (ft)	2759.30	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		363.96	
E.G. Slope (ft/ft)	0.004821	Area (sq ft)		363.96	

Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	89.55	Top Width (ft)		89.55	
Vel Total (ft/s)	7.42	Avg. Vel. (ft/s)		7.42	
Max Chl Dpth (ft)	4.90	Hydr. Depth (ft)		4.06	
Conv. Total (cfs)	38887.1	Conv. (cfs)		38887.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		91.16	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		1.20	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	13.95	0.00
C & E Loss (ft)	0.22	Cum SA (acres)	0.22	4.29	0.00

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2758.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.82	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		238.69	
E.G. Slope (ft/ft)	0.005217	Area (sq ft)		238.69	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	80.21	Top Width (ft)		80.21	
Vel Total (ft/s)	6.28	Avg. Vel. (ft/s)		6.28	
Max Chl Dpth (ft)	3.42	Hydr. Depth (ft)		2.98	
Conv. Total (cfs)	20767.1	Conv. (cfs)		20767.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		81.36	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		9.64	
C & E Loss (ft)	0.17	Cum SA (acres)		4.03	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2755.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.34	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		58.82	
E.G. Slope (ft/ft)	0.007418	Area (sq ft)		58.82	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	65.25	Top Width (ft)		65.25	
Vel Total (ft/s)	3.40	Avg. Vel. (ft/s)		3.40	
Max Chl Dpth (ft)	0.94	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	2322.1	Conv. (cfs)		2322.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		65.59	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.34	
C & E Loss (ft)	0.05	Cum SA (acres)		3.43	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2758.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.96	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		249.92	
E.G. Slope (ft/ft)	0.005170	Area (sq ft)		249.92	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	81.09	Top Width (ft)		81.09	
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.40	
Max Chl Dpth (ft)	3.56	Hydr. Depth (ft)		3.08	
Conv. Total (cfs)	22251.7	Conv. (cfs)		22251.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		82.29	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		0.98	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	10.14	
C & E Loss (ft)	0.17	Cum SA (acres)	0.02	4.06	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2757.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.17	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		187.89	
E.G. Slope (ft/ft)	0.005482	Area (sq ft)		187.89	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	76.09	Top Width (ft)		76.09	
Vel Total (ft/s)	5.69	Avg. Vel. (ft/s)		5.69	
Max Chl Dpth (ft)	2.77	Hydr. Depth (ft)		2.47	
Conv. Total (cfs)	14451.5	Conv. (cfs)		14451.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		77.05	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		8.00	
C & E Loss (ft)	0.14	Cum SA (acres)		3.90	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2756.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.035	
W.S. Elev (ft)	2756.42	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)		Flow Area (sq ft)		132.23	
E.G. Slope (ft/ft)	0.005964	Area (sq ft)		132.23	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	71.31	Top Width (ft)		71.31	
Vel Total (ft/s)	4.92	Avg. Vel. (ft/s)		4.92	
Max Chl Dpth (ft)	2.02	Hydr. Depth (ft)		1.85	
Conv. Total (cfs)	8416.6	Conv. (cfs)		8416.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		72.03	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		6.03	

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  C & E Loss (ft)             0.11    Cum SA (acres)                        3.72


Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 2983

INPUT
Description: Boulder Stabilizer #6
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2765.9   104.4    2765   127.8  2764.8   135.5  2764.7   169.9  2764.8
   187.3  2764.4   204.4  2764.1   211.7  2763.2   218.9  2762.3   224.1  2761.5
   239.7  2761.4     272    2762     292    2762     330  2749.4     390  2749.4
     428    2762     448    2762     456  2765.9

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     272    .016     292    .035     428    .016     448    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           292     428                2       2       2             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     292  2763.8       T
     428     456  2763.8       T
Left Levee      Station=     292      Elevation=  2763.8
Right Levee     Station=     428      Elevation=  2763.8

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)          2760.70    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              0.16    Wt. n-Val.                            0.035
  W.S. Elev (ft)          2760.54    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)          2753.69    Flow Area (sq ft)                   1042.75
  E.G. Slope (ft/ft)     0.000366    Area (sq ft)                        1042.75
  Q Total (cfs)           3380.00    Flow (cfs)                          3380.00
  Top Width (ft)           127.20    Top Width (ft)                       127.20
  Vel Total (ft/s)           3.24    Avg. Vel. (ft/s)                       3.24
  Max Chl Dpth (ft)         11.14    Hydr. Depth (ft)                       8.20
  Conv. Total (cfs)      176670.6    Conv. (cfs)                        176670.6
  Length Wtd. (ft)           2.00    Wetted Per. (ft)                     130.79
  Min Ch El (ft)          2749.40    Shear (lb/sq ft)                       0.18
  Alpha                      1.00    Stream Power (lb/ft s)    456.00     292.00     428.00
  Frctn Loss (ft)            0.00    Cum Volume (acre-ft)        0.15      16.30       0.00
  C & E Loss (ft)            0.00    Cum SA (acres)              0.33       4.40       0.01


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)          2759.92    Element                   Left OB    Channel   Right OB
  Vel Head (ft)              0.13    Wt. n-Val.                            0.035
  W.S. Elev (ft)          2759.80    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)          2753.14    Flow Area (sq ft)                    949.70
  E.G. Slope (ft/ft)     0.000304    Area (sq ft)                         949.70
  Q Total (cfs)           2700.00    Flow (cfs)                          2700.00
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Top Width (ft)	122.71	Top Width (ft)		122.71	
Vel Total (ft/s)	2.84	Avg. Vel. (ft/s)		2.84	
Max Chl Dpth (ft)	10.40	Hydr. Depth (ft)		7.74	
Conv. Total (cfs)	154946.7	Conv. (cfs)		154946.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		126.06	
Min Ch El (ft)	2749.40	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	456.00	292.00	428.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.07	13.73	0.00
C & E Loss (ft)	0.00	Cum SA (acres)	0.22	4.25	0.00

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2758.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.20	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2751.98	Flow Area (sq ft)		761.66	
E.G. Slope (ft/ft)	0.000175	Area (sq ft)		761.66	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	113.09	Top Width (ft)		113.09	
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)		1.97	
Max Chl Dpth (ft)	8.80	Hydr. Depth (ft)		6.74	
Conv. Total (cfs)	113433.6	Conv. (cfs)		113433.6	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		115.93	
Min Ch El (ft)	2749.40	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	456.00	292.00	428.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		9.47	
C & E Loss (ft)	0.00	Cum SA (acres)		4.00	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2755.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.46	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2750.09	Flow Area (sq ft)		474.50	
E.G. Slope (ft/ft)	0.000012	Area (sq ft)		474.50	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	96.56	Top Width (ft)		96.56	
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.42	
Max Chl Dpth (ft)	6.06	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	57452.4	Conv. (cfs)		57452.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		98.52	
Min Ch El (ft)	2749.40	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	456.00	292.00	428.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.24	
C & E Loss (ft)	0.00	Cum SA (acres)		3.40	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2758.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.35	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2752.06	Flow Area (sq ft)		778.88	
E.G. Slope (ft/ft)	0.000187	Area (sq ft)		778.88	

Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	114.00	Top Width (ft)		114.00	
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)		2.05	
Max Chl Dpth (ft)	8.95	Hydr. Depth (ft)		6.83	
Conv. Total (cfs)	117090.8	Conv. (cfs)		117090.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		116.89	
Min Ch El (ft)	2749.40	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	456.00	292.00	428.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.00	9.96	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	4.03	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2757.53	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.49	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2751.47	Flow Area (sq ft)		682.84	
E.G. Slope (ft/ft)	0.000121	Area (sq ft)		682.84	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	108.80	Top Width (ft)		108.80	
Vel Total (ft/s)	1.57	Avg. Vel. (ft/s)		1.57	
Max Chl Dpth (ft)	8.09	Hydr. Depth (ft)		6.28	
Conv. Total (cfs)	97089.8	Conv. (cfs)		97089.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		111.41	
Min Ch El (ft)	2749.40	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	456.00	292.00	428.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		7.85	
C & E Loss (ft)	0.00	Cum SA (acres)		3.87	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2756.68	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2756.66	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2750.91	Flow Area (sq ft)		594.86	
E.G. Slope (ft/ft)	0.000067	Area (sq ft)		594.86	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	103.81	Top Width (ft)		103.81	
Vel Total (ft/s)	1.09	Avg. Vel. (ft/s)		1.09	
Max Chl Dpth (ft)	7.26	Hydr. Depth (ft)		5.73	
Conv. Total (cfs)	79677.1	Conv. (cfs)		79677.1	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		106.15	
Min Ch El (ft)	2749.40	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	456.00	292.00	428.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		5.90	
C & E Loss (ft)	0.00	Cum SA (acres)		3.69	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2981

```
INPUT
Description: Boulder Stabilizer #6
Station Elevation Data    num=      18
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2765.9   104.4    2765   127.8  2764.8   135.5  2764.7   169.9  2764.8
   187.3  2764.4   204.4  2764.1   211.7  2763.2   218.9  2762.3   224.1  2761.5
   239.7  2761.4     272    2762     292    2762     330  2749.4     390  2749.4
     428    2762     448    2762     456  2765.9

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     272    .016     292    .035     428    .016     448    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           292     428               15      15      15             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     292  2763.8       T
     428     456  2763.8       T
Left Levee      Station=     292      Elevation=  2763.8
Right Levee     Station=     428      Elevation=  2763.8

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2760.70    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.16    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2760.54    Reach Len. (ft)             15.00      15.00      15.00
  Crit W.S. (ft)           2753.69    Flow Area (sq ft)                    1042.65
  E.G. Slope (ft/ft)      0.000366    Area (sq ft)                         1042.65
  Q Total (cfs)            3380.00    Flow (cfs)                           3380.00
  Top Width (ft)            127.19    Top Width (ft)                        127.19
  Vel Total (ft/s)            3.24    Avg. Vel. (ft/s)                        3.24
  Max Chl Dpth (ft)          11.14    Hydr. Depth (ft)                        8.20
  Conv. Total (cfs)       176648.5    Conv. (cfs)                         176648.5
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                      130.79
  Min Ch El (ft)           2749.40    Shear (lb/sq ft)                        0.18
  Alpha                       1.00    Stream Power (lb/ft s)    456.00     292.00     428.00
  Frctn Loss (ft)             0.02    Cum Volume (acre-ft)        0.15      16.25       0.00
  C & E Loss (ft)             0.16    Cum SA (acres)              0.33       4.39       0.01


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2759.92    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.13    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2759.80    Reach Len. (ft)             15.00      15.00      15.00
  Crit W.S. (ft)           2753.14    Flow Area (sq ft)                     949.61
  E.G. Slope (ft/ft)      0.000304    Area (sq ft)                          949.61
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)            122.70    Top Width (ft)                        122.70
  Vel Total (ft/s)            2.84    Avg. Vel. (ft/s)                        2.84
  Max Chl Dpth (ft)          10.40    Hydr. Depth (ft)                        7.74
  Conv. Total (cfs)       154926.0    Conv. (cfs)                         154926.0
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                      126.06
  Min Ch El (ft)           2749.40    Shear (lb/sq ft)                        0.14
  Alpha                       1.00    Stream Power (lb/ft s)    456.00     292.00     428.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.07      13.68       0.00
```

C & E Loss (ft)	0.15	Cum SA (acres)	0.22	4.25	0.00

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2758.26	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.20	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2751.98	Flow Area (sq ft)		761.64	
E.G. Slope (ft/ft)	0.000175	Area (sq ft)		761.64	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	113.08	Top Width (ft)		113.08	
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)		1.97	
Max Chl Dpth (ft)	8.80	Hydr. Depth (ft)		6.74	
Conv. Total (cfs)	113427.8	Conv. (cfs)		113427.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		115.93	
Min Ch El (ft)	2749.40	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	456.00	292.00	428.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		9.43	
C & E Loss (ft)	0.11	Cum SA (acres)		3.99	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2755.46	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.46	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2750.09	Flow Area (sq ft)		474.50	
E.G. Slope (ft/ft)	0.000012	Area (sq ft)		474.50	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	96.56	Top Width (ft)		96.56	
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.42	
Max Chl Dpth (ft)	6.06	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	57452.4	Conv. (cfs)		57452.4	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		98.52	
Min Ch El (ft)	2749.40	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	456.00	292.00	428.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.22	
C & E Loss (ft)	0.03	Cum SA (acres)		3.40	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2758.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.35	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2752.06	Flow Area (sq ft)		778.82	
E.G. Slope (ft/ft)	0.000187	Area (sq ft)		778.82	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	114.00	Top Width (ft)		114.00	
Vel Total (ft/s)	2.05	Avg. Vel. (ft/s)		2.05	
Max Chl Dpth (ft)	8.95	Hydr. Depth (ft)		6.83	
Conv. Total (cfs)	117078.8	Conv. (cfs)		117078.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		116.89	
Min Ch El (ft)	2749.40	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	456.00	292.00	428.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	9.92	
C & E Loss (ft)	0.11	Cum SA (acres)	0.02	4.03	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2757.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.49	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2751.47	Flow Area (sq ft)		682.82	
E.G. Slope (ft/ft)	0.000121	Area (sq ft)		682.82	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	108.80	Top Width (ft)		108.80	
Vel Total (ft/s)	1.57	Avg. Vel. (ft/s)		1.57	
Max Chl Dpth (ft)	8.09	Hydr. Depth (ft)		6.28	
Conv. Total (cfs)	97084.4	Conv. (cfs)		97084.4	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		111.41	
Min Ch El (ft)	2749.40	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	456.00	292.00	428.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		7.82	
C & E Loss (ft)	0.09	Cum SA (acres)		3.86	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2756.68	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2756.66	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2750.91	Flow Area (sq ft)		594.84	
E.G. Slope (ft/ft)	0.000067	Area (sq ft)		594.84	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	103.81	Top Width (ft)		103.81	
Vel Total (ft/s)	1.09	Avg. Vel. (ft/s)		1.09	
Max Chl Dpth (ft)	7.26	Hydr. Depth (ft)		5.73	
Conv. Total (cfs)	79672.2	Conv. (cfs)		79672.2	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		106.15	

Min Ch El (ft)	2749.40	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	456.00	292.00	428.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		5.88	
C & E Loss (ft)	0.07	Cum SA (acres)		3.69	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2966

INPUT
Description: Boulder Stabilizer #6
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2765.9	104.4	2765	127.8	2764.8	135.5	2764.7	169.9	2764.8
187.3	2764.4	204.4	2764.1	211.7	2763.2	218.9	2762.3	224.1	2761.5
239.7	2761.4	284.6	2761.9	293.2	2762.6	310	2761	313	2760
326.5	2756	330	2754.4	390	2754.4	393.4	2755.4	407	2760
410	2761	414.1	2763.2	420	2764.3	423.3	2764.5	433.3	2765.9

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.04	310	.035	410	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
310	410	23.4	23.4	23.4	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2760.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.73	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.80	Reach Len. (ft)	23.40	23.40	23.40
Crit W.S. (ft)	2758.70	Flow Area (sq ft)		319.77	
E.G. Slope (ft/ft)	0.011067	Area (sq ft)		319.77	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	86.37	Top Width (ft)		86.37	
Vel Total (ft/s)	10.57	Avg. Vel. (ft/s)		10.57	
Max Chl Dpth (ft)	4.40	Hydr. Depth (ft)		3.70	
Conv. Total (cfs)	32129.0	Conv. (cfs)		32129.0	
Length Wtd. (ft)	23.40	Wetted Per. (ft)		87.83	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		2.52	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.23	Cum Volume (acre-ft)	0.15	16.01	0.00
C & E Loss (ft)	0.02	Cum SA (acres)	0.33	4.36	0.01

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2759.76	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.62	Wt. n-Val.		0.035	
W.S. Elev (ft)	2758.14	Reach Len. (ft)	23.40	23.40	23.40
Crit W.S. (ft)	2758.14	Flow Area (sq ft)		264.25	
E.G. Slope (ft/ft)	0.012457	Area (sq ft)		264.25	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	82.20	Top Width (ft)		82.20	

Vel Total (ft/s)	10.22	Avg. Vel. (ft/s)		10.22	
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)		3.21	
Conv. Total (cfs)	24191.0	Conv. (cfs)		24191.0	
Length Wtd. (ft)	23.40	Wetted Per. (ft)		83.45	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		2.46	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.07	13.47	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.22	4.21	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2758.14	Element			
Vel Head (ft)	1.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2756.98	Reach Len. (ft)	23.40	23.40	23.40
Crit W.S. (ft)	2756.98	Flow Area (sq ft)		173.14	
E.G. Slope (ft/ft)	0.013829	Area (sq ft)		173.14	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	74.86	Top Width (ft)		74.86	
Vel Total (ft/s)	8.66	Avg. Vel. (ft/s)		8.66	
Max Chl Dpth (ft)	2.58	Hydr. Depth (ft)		2.31	
Conv. Total (cfs)	12755.2	Conv. (cfs)		12755.2	
Length Wtd. (ft)	23.40	Wetted Per. (ft)		75.75	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		1.97	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)		9.27	
C & E Loss (ft)	0.02	Cum SA (acres)		3.96	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2755.43	Element			
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.09	Reach Len. (ft)	23.40	23.40	23.40
Crit W.S. (ft)	2755.09	Flow Area (sq ft)		42.94	
E.G. Slope (ft/ft)	0.020537	Area (sq ft)		42.94	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	63.87	Top Width (ft)		63.87	
Vel Total (ft/s)	4.66	Avg. Vel. (ft/s)		4.66	
Max Chl Dpth (ft)	0.69	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	1395.6	Conv. (cfs)		1395.6	
Length Wtd. (ft)	23.40	Wetted Per. (ft)		64.12	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.29	Cum Volume (acre-ft)		3.13	
C & E Loss (ft)	0.03	Cum SA (acres)		3.37	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2758.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.09	Reach Len. (ft)	23.40	23.40	23.40
Crit W.S. (ft)	2757.09	Flow Area (sq ft)		181.39	
E.G. Slope (ft/ft)	0.013648	Area (sq ft)		181.39	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	75.55	Top Width (ft)		75.55	
Vel Total (ft/s)	8.82	Avg. Vel. (ft/s)		8.82	
Max Chl Dpth (ft)	2.69	Hydr. Depth (ft)		2.40	
Conv. Total (cfs)	13695.8	Conv. (cfs)		13695.8	
Length Wtd. (ft)	23.40	Wetted Per. (ft)		76.48	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		2.02	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.25	Cum Volume (acre-ft)	0.00	9.76	
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	3.99	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2757.43	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.		0.035	
W.S. Elev (ft)	2756.47	Reach Len. (ft)	23.40	23.40	23.40
Crit W.S. (ft)	2756.47	Flow Area (sq ft)		136.32	
E.G. Slope (ft/ft)	0.014706	Area (sq ft)		136.32	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	71.67	Top Width (ft)		71.67	
Vel Total (ft/s)	7.85	Avg. Vel. (ft/s)		7.85	
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)		1.90	
Conv. Total (cfs)	8823.3	Conv. (cfs)		8823.3	
Length Wtd. (ft)	23.40	Wetted Per. (ft)		72.41	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		1.73	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)		7.67	
C & E Loss (ft)	0.02	Cum SA (acres)		3.83	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated

water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2756.61	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.71	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.90	Reach Len. (ft)	23.40	23.40	23.40
Crit W.S. (ft)	2755.90	Flow Area (sq ft)		96.03	
E.G. Slope (ft/ft)	0.016262	Area (sq ft)		96.03	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	68.14	Top Width (ft)		68.14	
Vel Total (ft/s)	6.77	Avg. Vel. (ft/s)		6.77	
Max Chl Dpth (ft)	1.50	Hydr. Depth (ft)		1.41	
Conv. Total (cfs)	5097.1	Conv. (cfs)		5097.1	
Length Wtd. (ft)	23.40	Wetted Per. (ft)		68.70	
Min Ch El (ft)	2754.40	Shear (lb/sq ft)		1.42	
Alpha	1.00	Stream Power (lb/ft s)	433.30	0.00	0.00
Frctn Loss (ft)	0.28	Cum Volume (acre-ft)		5.76	
C & E Loss (ft)	0.03	Cum SA (acres)		3.66	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2942.6

INPUT
Description: Section 29+42.6
Station Elevation Data num= 25

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2765	105.22	2764	133.32	2764	142.51	2764	183.84	2764.55
225.16	2764	233.85	2763	242.53	2762	248.78	2761	267.5	2761
321.3	2762	331.53	2763	358	2761.5	362	2760	374	2754
434.81	2754	437.79	2755	441.88	2758	445.74	2760	449.54	2762
451.37	2763	459.93	2763	466.32	2764	469.85	2764	480.65	2765

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	358	.03	449.54	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
358	449.54	211.8	211.8	211.8	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2760.29	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.96	Wt. n-Val.		0.030	
W.S. Elev (ft)	2758.33	Reach Len. (ft)	211.80	211.80	211.80
Crit W.S. (ft)	2758.33	Flow Area (sq ft)		300.67	
E.G. Slope (ft/ft)	0.008728	Area (sq ft)		300.67	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	77.16	Top Width (ft)		77.16	
Vel Total (ft/s)	11.24	Avg. Vel. (ft/s)		11.24	

Max Chl Dpth (ft)	4.32	Hydr. Depth (ft)		3.90	
Conv. Total (cfs)	36179.8	Conv. (cfs)		36179.8	
Length Wtd. (ft)	211.80	Wetted Per. (ft)		79.40	
Min Ch El (ft)	2754.00	Shear (lb/sq ft)		2.06	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	1.81	Cum Volume (acre-ft)	0.15	15.85	0.00
C & E Loss (ft)	0.01	Cum SA (acres)	0.33	4.31	0.01

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2759.47	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.85	Wt. n-Val.		0.030	
W.S. Elev (ft)	2757.62	Reach Len. (ft)	211.80	211.80	211.80
Crit W.S. (ft)	2757.74	Flow Area (sq ft)		247.09	
E.G. Slope (ft/ft)	0.010188	Area (sq ft)		247.09	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	74.60	Top Width (ft)		74.60	
Vel Total (ft/s)	10.93	Avg. Vel. (ft/s)		10.93	
Max Chl Dpth (ft)	3.62	Hydr. Depth (ft)		3.31	
Conv. Total (cfs)	26749.4	Conv. (cfs)		26749.4	
Length Wtd. (ft)	211.80	Wetted Per. (ft)		76.47	
Min Ch El (ft)	2754.00	Shear (lb/sq ft)		2.06	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	0.26	Cum Volume (acre-ft)	0.07	13.34	0.00
C & E Loss (ft)	0.02	Cum SA (acres)	0.22	4.17	0.00

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2757.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.44	Wt. n-Val.		0.030	
W.S. Elev (ft)	2756.36	Reach Len. (ft)	211.80	211.80	211.80
Crit W.S. (ft)	2756.56	Flow Area (sq ft)		155.60	
E.G. Slope (ft/ft)	0.013436	Area (sq ft)		155.60	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	70.35	Top Width (ft)		70.35	
Vel Total (ft/s)	9.64	Avg. Vel. (ft/s)		9.64	
Max Chl Dpth (ft)	2.36	Hydr. Depth (ft)		2.21	
Conv. Total (cfs)	12940.9	Conv. (cfs)		12940.9	
Length Wtd. (ft)		Wetted Per. (ft)		71.51	
Min Ch El (ft)	2754.00	Shear (lb/sq ft)		1.83	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	0.32	Cum Volume (acre-ft)		9.18	
C & E Loss (ft)	0.03	Cum SA (acres)		3.92	

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2755.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.030	
W.S. Elev (ft)	2754.82	Reach Len. (ft)	211.80	211.80	211.80
Crit W.S. (ft)	2754.69	Flow Area (sq ft)		51.40	

E.G. Slope (ft/ft)	0.008476	Area (sq ft)		51.40	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	64.88	Top Width (ft)		64.88	
Vel Total (ft/s)	3.89	Avg. Vel. (ft/s)		3.89	
Max Chl Dpth (ft)	0.82	Hydr. Depth (ft)		0.79	
Conv. Total (cfs)	2172.4	Conv. (cfs)		2172.4	
Length Wtd. (ft)	211.80	Wetted Per. (ft)		65.21	
Min Ch El (ft)	2754.00	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	2.00	Cum Volume (acre-ft)		3.11	
C & E Loss (ft)	0.00	Cum SA (acres)		3.34	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2757.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.50	Wt. n-Val.		0.030	
W.S. Elev (ft)	2756.46	Reach Len. (ft)	211.80	211.80	211.80
Crit W.S. (ft)	2756.67	Flow Area (sq ft)		163.06	
E.G. Slope (ft/ft)	0.013180	Area (sq ft)		163.06	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	70.71	Top Width (ft)		70.71	
Vel Total (ft/s)	9.81	Avg. Vel. (ft/s)		9.81	
Max Chl Dpth (ft)	2.46	Hydr. Depth (ft)		2.31	
Conv. Total (cfs)	13936.9	Conv. (cfs)		13936.9	
Length Wtd. (ft)		Wetted Per. (ft)		71.93	
Min Ch El (ft)	2754.00	Shear (lb/sq ft)		1.87	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	0.31	Cum Volume (acre-ft)	0.00	9.66	
C & E Loss (ft)	0.03	Cum SA (acres)	0.02	3.95	

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2757.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.		0.030	
W.S. Elev (ft)	2755.88	Reach Len. (ft)	211.80	211.80	211.80
Crit W.S. (ft)	2756.06	Flow Area (sq ft)		122.44	
E.G. Slope (ft/ft)	0.014671	Area (sq ft)		122.44	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	68.75	Top Width (ft)		68.75	
Vel Total (ft/s)	8.74	Avg. Vel. (ft/s)		8.74	
Max Chl Dpth (ft)	1.88	Hydr. Depth (ft)		1.78	
Conv. Total (cfs)	8834.1	Conv. (cfs)		8834.1	
Length Wtd. (ft)	211.80	Wetted Per. (ft)		69.64	
Min Ch El (ft)	2754.00	Shear (lb/sq ft)		1.61	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	0.34	Cum Volume (acre-ft)		7.61	
C & E Loss (ft)	0.02	Cum SA (acres)		3.80	

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2756.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.85	Wt. n-Val.		0.030	
W.S. Elev (ft)	2755.37	Reach Len. (ft)	211.80	211.80	211.80
Crit W.S. (ft)	2755.49	Flow Area (sq ft)		87.68	
E.G. Slope (ft/ft)	0.015844	Area (sq ft)		87.68	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	67.02	Top Width (ft)		67.02	

Vel Total (ft/s)	7.41	Avg. Vel. (ft/s)		7.41	
Max Chl Dpth (ft)	1.37	Hydr. Depth (ft)		1.31	
Conv. Total (cfs)	5163.9	Conv. (cfs)		5163.9	
Length Wtd. (ft)	211.80	Wetted Per. (ft)		67.63	
Min Ch El (ft)	2754.00	Shear (lb/sq ft)		1.28	
Alpha	1.00	Stream Power (lb/ft s)	480.65	0.00	0.00
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)		5.71	
C & E Loss (ft)	0.01	Cum SA (acres)		3.62	

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2730.8

INPUT
Description: Section 27+30.8
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2760	107.2	2755	108.86	2754	110.61	2753	112.98	2752
173	2752	179	2755	189	2760				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	107.2	.03	179	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
107.2	179	30.8	30.8	30.8	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2758.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.15	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	2756.22	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)	2756.34	Flow Area (sq ft)	1.08	286.26	1.50
E.G. Slope (ft/ft)	0.009195	Area (sq ft)	1.08	286.26	1.50
Q Total (cfs)	3380.00	Flow (cfs)	2.77	3373.16	4.07
Top Width (ft)	76.01	Top Width (ft)	1.76	71.80	2.45
Vel Total (ft/s)	11.70	Avg. Vel. (ft/s)	2.57	11.78	2.72
Max Chl Dpth (ft)	4.22	Hydr. Depth (ft)	0.61	3.99	0.61
Conv. Total (cfs)	35248.4	Conv. (cfs)	28.9	35177.0	42.5
Length Wtd. (ft)	30.80	Wetted Per. (ft)	2.14	73.25	2.74
Min Ch El (ft)	2752.00	Shear (lb/sq ft)	0.29	2.24	0.31
Alpha	1.01	Stream Power (lb/ft s)	189.00	0.00	0.00
Frctn Loss (ft)	1.90	Cum Volume (acre-ft)	0.15	14.42	0.00
C & E Loss (ft)	0.02	Cum SA (acres)	0.32	3.95	0.00

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #100-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2757.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	Wt. n-Val.	0.035	0.030	0.035
W.S. Elev (ft)	2755.68	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)	2755.77	Flow Area (sq ft)	0.34	247.56	0.47
E.G. Slope (ft/ft)	0.009551	Area (sq ft)	0.34	247.56	0.47
Q Total (cfs)	2700.00	Flow (cfs)	0.60	2698.52	0.88
Top Width (ft)	74.15	Top Width (ft)	0.99	71.80	1.37
Vel Total (ft/s)	10.87	Avg. Vel. (ft/s)	1.78	10.90	1.88
Max Chl Dpth (ft)	3.68	Hydr. Depth (ft)	0.34	3.45	0.34
Conv. Total (cfs)	27628.0	Conv. (cfs)	6.1	27612.9	9.0

Length Wtd. (ft)	30.80	Wetted Per. (ft)	1.20	73.25	1.53
Min Ch El (ft)	2752.00	Shear (lb/sq ft)	0.17	2.01	0.18
Alpha	1.00	Stream Power (lb/ft s)	189.00	0.00	0.00
Frctn Loss (ft)	2.00	Cum Volume (acre-ft)	0.07	12.13	0.00
C & E Loss (ft)	0.03	Cum SA (acres)	0.22	3.81	0.00

Warning: The energy equation could not be balanced within the specified number of iterations. The program selected the water
surface that had the least amount of error between computed and assumed values.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2755.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.22	Wt. n-Val.		0.030	
W.S. Elev (ft)	2754.59	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)	2754.59	Flow Area (sq ft)		169.54	
E.G. Slope (ft/ft)	0.010102	Area (sq ft)		169.54	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	70.31	Top Width (ft)		70.31	
Vel Total (ft/s)	8.85	Avg. Vel. (ft/s)		8.85	
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)		2.41	
Conv. Total (cfs)	14924.2	Conv. (cfs)		14924.2	
Length Wtd. (ft)	30.80	Wetted Per. (ft)		71.56	
Min Ch El (ft)	2752.00	Shear (lb/sq ft)		1.49	
Alpha	1.00	Stream Power (lb/ft s)	189.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)		8.39	
C & E Loss (ft)		Cum SA (acres)		3.58	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2753.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.030	
W.S. Elev (ft)	2752.77	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)		Flow Area (sq ft)		47.62	
E.G. Slope (ft/ft)	0.010604	Area (sq ft)		47.62	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	63.39	Top Width (ft)		63.39	
Vel Total (ft/s)	4.20	Avg. Vel. (ft/s)		4.20	
Max Chl Dpth (ft)	0.77	Hydr. Depth (ft)		0.75	
Conv. Total (cfs)	1942.2	Conv. (cfs)		1942.2	
Length Wtd. (ft)	30.80	Wetted Per. (ft)		63.73	
Min Ch El (ft)	2752.00	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	189.00	0.00	0.00
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)		2.87	
C & E Loss (ft)	0.04	Cum SA (acres)		3.02	

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2755.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.27	Wt. n-Val.		0.030	
W.S. Elev (ft)	2754.70	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)	2754.70	Flow Area (sq ft)		177.01	

E.G. Slope (ft/ft)	0.010037	Area (sq ft)		177.01	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	70.70	Top Width (ft)		70.70	
Vel Total (ft/s)	9.04	Avg. Vel. (ft/s)		9.04	
Max Chl Dpth (ft)	2.70	Hydr. Depth (ft)		2.50	
Conv. Total (cfs)	15970.5	Conv. (cfs)		15970.5	
Length Wtd. (ft)	30.80	Wetted Per. (ft)		72.00	
Min Ch El (ft)	2752.00	Shear (lb/sq ft)		1.54	
Alpha	1.00	Stream Power (lb/ft s)	189.00	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.00	8.84	
C & E Loss (ft)		Cum SA (acres)	0.02	3.61	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2755.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.030	
W.S. Elev (ft)	2754.16	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)	2754.08	Flow Area (sq ft)		139.56	
E.G. Slope (ft/ft)	0.009504	Area (sq ft)		139.56	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	68.73	Top Width (ft)		68.73	
Vel Total (ft/s)	7.67	Avg. Vel. (ft/s)		7.67	
Max Chl Dpth (ft)	2.16	Hydr. Depth (ft)		2.03	
Conv. Total (cfs)	10975.9	Conv. (cfs)		10975.9	
Length Wtd. (ft)	30.80	Wetted Per. (ft)		69.76	
Min Ch El (ft)	2752.00	Shear (lb/sq ft)		1.19	
Alpha	1.00	Stream Power (lb/ft s)	189.00	0.00	0.00
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		6.97	
C & E Loss (ft)	0.14	Cum SA (acres)		3.46	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2754.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.030	
W.S. Elev (ft)	2753.61	Reach Len. (ft)	30.80	30.80	30.80
Crit W.S. (ft)	2753.51	Flow Area (sq ft)		102.01	
E.G. Slope (ft/ft)	0.009526	Area (sq ft)		102.01	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	66.67	Top Width (ft)		66.67	
Vel Total (ft/s)	6.37	Avg. Vel. (ft/s)		6.37	
Max Chl Dpth (ft)	1.61	Hydr. Depth (ft)		1.53	
Conv. Total (cfs)	6659.6	Conv. (cfs)		6659.6	
Length Wtd. (ft)	30.80	Wetted Per. (ft)		67.41	
Min Ch El (ft)	2752.00	Shear (lb/sq ft)		0.90	
Alpha	1.00	Stream Power (lb/ft s)	189.00	0.00	0.00
Frctn Loss (ft)	0.21	Cum Volume (acre-ft)		5.25	
C & E Loss (ft)	0.10	Cum SA (acres)		3.30	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION

```
RIVER: Desert Knolls Wa
REACH: Main               RS: 2700.*

INPUT
Description: Boulder Stabilizer #5 (inlet)
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2760   101.3  2759.7     102  2759.5     102    2759     122    2759
   144.1  2751.7   214.1  2751.7     236    2759     256    2759   259.3    2760

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04     102    .016     122    .035     236    .016     256     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           122     236                2       2       2             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     122    2760       T
     236   259.3    2760       T
Left Levee      Station=     122      Elevation=    2760
Right Levee     Station=     236      Elevation=    2760

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2757.77    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.91    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2756.86    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2755.64    Flow Area (sq ft)                    440.91
  E.G. Slope (ft/ft)      0.004675    Area (sq ft)                         440.91
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)            101.07    Top Width (ft)                       101.07
  Vel Total (ft/s)            7.67    Avg. Vel. (ft/s)                       7.67
  Max Chl Dpth (ft)           5.15    Hydr. Depth (ft)                       4.36
  Conv. Total (cfs)        49435.2    Conv. (cfs)                         49435.2
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                     102.74
  Min Ch El (ft)           2751.70    Shear (lb/sq ft)                       1.25
  Alpha                       1.00    Stream Power (lb/ft s)    259.30     122.00     236.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.15      14.16
  C & E Loss (ft)             0.00    Cum SA (acres)              0.32       3.89


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2757.00    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.80    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2756.20    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2755.13    Flow Area (sq ft)                    375.81
  E.G. Slope (ft/ft)      0.004807    Area (sq ft)                         375.81
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             97.11    Top Width (ft)                        97.11
  Vel Total (ft/s)            7.18    Avg. Vel. (ft/s)                       7.18
  Max Chl Dpth (ft)           4.50    Hydr. Depth (ft)                       3.87
  Conv. Total (cfs)        38940.7    Conv. (cfs)                         38940.7
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      98.56
  Min Ch El (ft)           2751.70    Shear (lb/sq ft)                       1.14
  Alpha                       1.00    Stream Power (lb/ft s)    259.30     122.00     236.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.07      11.91
  C & E Loss (ft)             0.00    Cum SA (acres)              0.22       3.75
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Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2755.40	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.56	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.83	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2754.05	Flow Area (sq ft)		248.79	
E.G. Slope (ft/ft)	0.005190	Area (sq ft)		248.79	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	88.88	Top Width (ft)		88.88	
Vel Total (ft/s)	6.03	Avg. Vel. (ft/s)		6.03	
Max Chl Dpth (ft)	3.13	Hydr. Depth (ft)		2.80	
Conv. Total (cfs)	20821.2	Conv. (cfs)		20821.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		89.89	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.90	
Alpha	1.00	Stream Power (lb/ft s)	259.30	122.00	236.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		8.24	
C & E Loss (ft)	0.00	Cum SA (acres)		3.52	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2752.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.65	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2752.32	Flow Area (sq ft)		69.12	
E.G. Slope (ft/ft)	0.005273	Area (sq ft)		69.12	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	75.72	Top Width (ft)		75.72	
Vel Total (ft/s)	2.89	Avg. Vel. (ft/s)		2.89	
Max Chl Dpth (ft)	0.95	Hydr. Depth (ft)		0.91	
Conv. Total (cfs)	2754.2	Conv. (cfs)		2754.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		76.02	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.30	
Alpha	1.00	Stream Power (lb/ft s)	259.30	122.00	236.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		2.83	
C & E Loss (ft)	0.00	Cum SA (acres)		2.97	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2755.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.96	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2754.16	Flow Area (sq ft)		259.81	
E.G. Slope (ft/ft)	0.005170	Area (sq ft)		259.81	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	89.62	Top Width (ft)		89.62	
Vel Total (ft/s)	6.16	Avg. Vel. (ft/s)		6.16	
Max Chl Dpth (ft)	3.26	Hydr. Depth (ft)		2.90	
Conv. Total (cfs)	22252.4	Conv. (cfs)		22252.4	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		90.67	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.92	
Alpha	1.00	Stream Power (lb/ft s)	259.30	122.00	236.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	8.68	

C & E Loss (ft)	0.00	Cum SA (acres)	0.02	3.55

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2754.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.28	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2753.59	Flow Area (sq ft)		200.75	
E.G. Slope (ft/ft)	0.005121	Area (sq ft)		200.75	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	85.56	Top Width (ft)		85.56	
Vel Total (ft/s)	5.33	Avg. Vel. (ft/s)		5.33	
Max Chl Dpth (ft)	2.58	Hydr. Depth (ft)		2.35	
Conv. Total (cfs)	14952.3	Conv. (cfs)		14952.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		86.39	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.74	
Alpha	1.00	Stream Power (lb/ft s)	259.30	122.00	236.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		6.85	
C & E Loss (ft)	0.00	Cum SA (acres)		3.41	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2753.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.035	
W.S. Elev (ft)	2753.62	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2753.04	Flow Area (sq ft)		145.56	
E.G. Slope (ft/ft)	0.005164	Area (sq ft)		145.56	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	81.58	Top Width (ft)		81.58	
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)		4.47	
Max Chl Dpth (ft)	1.92	Hydr. Depth (ft)		1.78	
Conv. Total (cfs)	9045.7	Conv. (cfs)		9045.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		82.20	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.57	
Alpha	1.00	Stream Power (lb/ft s)	259.30	122.00	236.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		5.16	
C & E Loss (ft)	0.00	Cum SA (acres)		3.25	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2698

INPUT
Description: Boulder Stabilizer #5
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2760	101.3	2759.7	102	2759.5	102	2759	122	2759
144.1	2751.7	214.1	2751.7	236	2759	256	2759	259.3	2760

Manning's n Values num= 5

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     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04     102    .016     122    .035     236    .016     256     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           122     236               15      15      15             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     122    2760       T
     236   259.3    2760       T
Left Levee      Station=     122      Elevation=    2760
Right Levee     Station=     236      Elevation=    2760

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2757.76    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.92    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2756.84    Reach Len. (ft)             15.00      15.00      15.00
  Crit W.S. (ft)           2755.64    Flow Area (sq ft)                     439.88
  E.G. Slope (ft/ft)      0.004708    Area (sq ft)                          439.88
  Q Total (cfs)            3380.00    Flow (cfs)                           3380.00
  Top Width (ft)            101.01    Top Width (ft)                        101.01
  Vel Total (ft/s)            7.68    Avg. Vel. (ft/s)                        7.68
  Max Chl Dpth (ft)           5.14    Hydr. Depth (ft)                        4.35
  Conv. Total (cfs)        49262.6    Conv. (cfs)                          49262.6
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                      102.67
  Min Ch El (ft)           2751.70    Shear (lb/sq ft)                        1.26
  Alpha                       1.00    Stream Power (lb/ft s)    259.30     122.00     236.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.15      14.14
  C & E Loss (ft)             0.23    Cum SA (acres)              0.32       3.89


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2756.99    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.81    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2756.19    Reach Len. (ft)             15.00      15.00      15.00
  Crit W.S. (ft)           2755.13    Flow Area (sq ft)                     374.82
  E.G. Slope (ft/ft)      0.004846    Area (sq ft)                          374.82
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             97.05    Top Width (ft)                         97.05
  Vel Total (ft/s)            7.20    Avg. Vel. (ft/s)                        7.20
  Max Chl Dpth (ft)           4.49    Hydr. Depth (ft)                        3.86
  Conv. Total (cfs)        38786.1    Conv. (cfs)                          38786.1
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                       98.50
  Min Ch El (ft)           2751.70    Shear (lb/sq ft)                        1.15
  Alpha                       1.00    Stream Power (lb/ft s)    259.30     122.00     236.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.07      11.90
  C & E Loss (ft)             0.21    Cum SA (acres)              0.22       3.75


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.
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CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2755.39	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.82	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2754.05	Flow Area (sq ft)		247.53	
E.G. Slope (ft/ft)	0.005271	Area (sq ft)		247.53	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	88.79	Top Width (ft)		88.79	
Vel Total (ft/s)	6.06	Avg. Vel. (ft/s)		6.06	
Max Chl Dpth (ft)	3.12	Hydr. Depth (ft)		2.79	
Conv. Total (cfs)	20659.8	Conv. (cfs)		20659.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		89.80	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.91	
Alpha	1.00	Stream Power (lb/ft s)	259.30	122.00	236.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		8.23	
C & E Loss (ft)	0.16	Cum SA (acres)		3.52	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2752.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.64	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2752.32	Flow Area (sq ft)		68.11	
E.G. Slope (ft/ft)	0.005532	Area (sq ft)		68.11	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	75.64	Top Width (ft)		75.64	
Vel Total (ft/s)	2.94	Avg. Vel. (ft/s)		2.94	
Max Chl Dpth (ft)	0.94	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	2689.1	Conv. (cfs)		2689.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		75.94	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.31	
Alpha	1.00	Stream Power (lb/ft s)	259.30	122.00	236.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.82	
C & E Loss (ft)	0.04	Cum SA (acres)		2.97	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2755.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.59	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.94	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2754.16	Flow Area (sq ft)		258.54	
E.G. Slope (ft/ft)	0.005248	Area (sq ft)		258.54	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	89.54	Top Width (ft)		89.54	
Vel Total (ft/s)	6.19	Avg. Vel. (ft/s)		6.19	
Max Chl Dpth (ft)	3.24	Hydr. Depth (ft)		2.89	
Conv. Total (cfs)	22086.2	Conv. (cfs)		22086.2	

Length Wtd. (ft)	15.00	Wetted Per. (ft)		90.58	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.94	
Alpha	1.00	Stream Power (lb/ft s)	259.30	122.00	236.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	8.67	
C & E Loss (ft)	0.16	Cum SA (acres)	0.02	3.55	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2754.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.45	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.27	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2753.59	Flow Area (sq ft)		199.58	
E.G. Slope (ft/ft)	0.005215	Area (sq ft)		199.58	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	85.47	Top Width (ft)		85.47	
Vel Total (ft/s)	5.36	Avg. Vel. (ft/s)		5.36	
Max Chl Dpth (ft)	2.57	Hydr. Depth (ft)		2.33	
Conv. Total (cfs)	14817.4	Conv. (cfs)		14817.4	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		86.30	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)	259.30	122.00	236.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		6.84	
C & E Loss (ft)	0.12	Cum SA (acres)		3.40	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2753.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.035	
W.S. Elev (ft)	2753.61	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2753.04	Flow Area (sq ft)		144.49	
E.G. Slope (ft/ft)	0.005285	Area (sq ft)		144.49	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	81.50	Top Width (ft)		81.50	
Vel Total (ft/s)	4.50	Avg. Vel. (ft/s)		4.50	
Max Chl Dpth (ft)	1.91	Hydr. Depth (ft)		1.77	
Conv. Total (cfs)	8940.7	Conv. (cfs)		8940.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		82.11	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.58	
Alpha	1.00	Stream Power (lb/ft s)	259.30	122.00	236.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		5.15	
C & E Loss (ft)	0.09	Cum SA (acres)		3.24	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2683

INPUT
Description: Boulder Stabilizer #5
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
87	2760	87	2759	107	2759	144.1	2746.7	214.1	2746.7
251	2759	271	2759	271	2760				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
87	.016	107	.035	251	.016	271	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
107	251	2	2	2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
87	107	2760.5	T
251	271	2760.5	T

Left Levee Station= 107 Elevation= 2760.5
Right Levee Station= 251 Elevation= 2760.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2757.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.035	
W.S. Elev (ft)	2757.37	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2750.63	Flow Area (sq ft)		1089.20	
E.G. Slope (ft/ft)	0.000339	Area (sq ft)		1089.20	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	134.19	Top Width (ft)		134.19	
Vel Total (ft/s)	3.10	Avg. Vel. (ft/s)		3.10	
Max Chl Dpth (ft)	10.67	Hydr. Depth (ft)		8.12	
Conv. Total (cfs)	183629.7	Conv. (cfs)		183629.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		137.64	
Min Ch El (ft)	2746.70	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	271.00	107.00	251.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	13.88	
C & E Loss (ft)	0.00	Cum SA (acres)	0.32	3.85	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2756.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.11	Wt. n-Val.		0.035	
W.S. Elev (ft)	2756.66	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2750.10	Flow Area (sq ft)		995.57	
E.G. Slope (ft/ft)	0.000279	Area (sq ft)		995.57	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	129.92	Top Width (ft)		129.92	
Vel Total (ft/s)	2.71	Avg. Vel. (ft/s)		2.71	
Max Chl Dpth (ft)	9.96	Hydr. Depth (ft)		7.66	
Conv. Total (cfs)	161622.2	Conv. (cfs)		161622.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		133.14	
Min Ch El (ft)	2746.70	Shear (lb/sq ft)		0.13	
Alpha	1.00	Stream Power (lb/ft s)	271.00	107.00	251.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.07	11.66	
C & E Loss (ft)	0.00	Cum SA (acres)	0.22	3.71	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2755.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.17	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2749.05	Flow Area (sq ft)		808.91	
E.G. Slope (ft/ft)	0.000156	Area (sq ft)		808.91	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	120.97	Top Width (ft)		120.97	
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)		1.85	
Max Chl Dpth (ft)	8.47	Hydr. Depth (ft)		6.69	
Conv. Total (cfs)	120085.1	Conv. (cfs)		120085.1	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		123.71	
Min Ch El (ft)	2746.70	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	271.00	107.00	251.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		8.05	
C & E Loss (ft)	0.00	Cum SA (acres)		3.48	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2752.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.73	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2747.34	Flow Area (sq ft)		531.12	
E.G. Slope (ft/ft)	0.000009	Area (sq ft)		531.12	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	106.26	Top Width (ft)		106.26	
Vel Total (ft/s)	0.38	Avg. Vel. (ft/s)		0.38	
Max Chl Dpth (ft)	6.03	Hydr. Depth (ft)		5.00	
Conv. Total (cfs)	65123.5	Conv. (cfs)		65123.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		108.21	
Min Ch El (ft)	2746.70	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	271.00	107.00	251.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.72	
C & E Loss (ft)	0.00	Cum SA (acres)		2.94	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2755.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.31	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2749.14	Flow Area (sq ft)		825.56	
E.G. Slope (ft/ft)	0.000167	Area (sq ft)		825.56	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	121.79	Top Width (ft)		121.79	
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)		1.94	
Max Chl Dpth (ft)	8.61	Hydr. Depth (ft)		6.78	
Conv. Total (cfs)	123655.0	Conv. (cfs)		123655.0	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		124.58	
Min Ch El (ft)	2746.70	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	271.00	107.00	251.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.00	8.48	

C & E Loss (ft)	0.00	Cum SA (acres)	0.02	3.51

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2754.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.55	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2748.59	Flow Area (sq ft)		734.91	
E.G. Slope (ft/ft)	0.000105	Area (sq ft)		734.91	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	117.23	Top Width (ft)		117.23	
Vel Total (ft/s)	1.46	Avg. Vel. (ft/s)		1.46	
Max Chl Dpth (ft)	7.85	Hydr. Depth (ft)		6.27	
Conv. Total (cfs)	104571.8	Conv. (cfs)		104571.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		119.77	
Min Ch El (ft)	2746.70	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	271.00	107.00	251.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		6.68	
C & E Loss (ft)	0.00	Cum SA (acres)		3.37	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2753.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2753.81	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2748.07	Flow Area (sq ft)		649.92	
E.G. Slope (ft/ft)	0.000055	Area (sq ft)		649.92	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	112.78	Top Width (ft)		112.78	
Vel Total (ft/s)	1.00	Avg. Vel. (ft/s)		1.00	
Max Chl Dpth (ft)	7.11	Hydr. Depth (ft)		5.76	
Conv. Total (cfs)	87500.2	Conv. (cfs)		87500.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		115.09	
Min Ch El (ft)	2746.70	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	271.00	107.00	251.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		5.02	
C & E Loss (ft)	0.00	Cum SA (acres)		3.21	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2681

INPUT
Description: Boulder Stabilizer #5
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
87	2760	87	2759	107	2759	144.1	2746.7	214.1	2746.7
251	2759	271	2759	271	2760				

Manning's n Values num= 4

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

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      87    .016     107    .035     251    .016     271     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           107     251               15      15      15             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
      87     107  2760.5       T
     251     271  2760.5       T
Left Levee      Station=     107      Elevation=  2760.5
Right Levee     Station=     251      Elevation=  2760.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2757.52    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.15    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2757.37    Reach Len. (ft)            15.00      15.00      15.00
  Crit W.S. (ft)           2750.63    Flow Area (sq ft)                   1089.07
  E.G. Slope (ft/ft)      0.000339    Area (sq ft)                        1089.07
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)            134.18    Top Width (ft)                       134.18
  Vel Total (ft/s)            3.10    Avg. Vel. (ft/s)                       3.10
  Max Chl Dpth (ft)          10.67    Hydr. Depth (ft)                       8.12
  Conv. Total (cfs)       183598.4    Conv. (cfs)                        183598.4
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                     137.63
  Min Ch El (ft)           2746.70    Shear (lb/sq ft)                       0.17
  Alpha                       1.00    Stream Power (lb/ft s)    271.00     107.00     251.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.15      13.83
  C & E Loss (ft)             0.16    Cum SA (acres)              0.32       3.84


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2756.77    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.11    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2756.66    Reach Len. (ft)            15.00      15.00      15.00
  Crit W.S. (ft)           2750.10    Flow Area (sq ft)                    995.51
  E.G. Slope (ft/ft)      0.000279    Area (sq ft)                         995.51
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)            129.92    Top Width (ft)                       129.92
  Vel Total (ft/s)            2.71    Avg. Vel. (ft/s)                       2.71
  Max Chl Dpth (ft)           9.96    Hydr. Depth (ft)                       7.66
  Conv. Total (cfs)       161607.5    Conv. (cfs)                        161607.5
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                     133.14
  Min Ch El (ft)           2746.70    Shear (lb/sq ft)                       0.13
  Alpha                       1.00    Stream Power (lb/ft s)    271.00     107.00     251.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.07      11.62
  C & E Loss (ft)             0.14    Cum SA (acres)              0.22       3.70


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.
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CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2755.23	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.05	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.17	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2749.05	Flow Area (sq ft)		808.88	
E.G. Slope (ft/ft)	0.000156	Area (sq ft)		808.88	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	120.97	Top Width (ft)		120.97	
Vel Total (ft/s)	1.85	Avg. Vel. (ft/s)		1.85	
Max Chl Dpth (ft)	8.47	Hydr. Depth (ft)		6.69	
Conv. Total (cfs)	120078.8	Conv. (cfs)		120078.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		123.71	
Min Ch El (ft)	2746.70	Shear (lb/sq ft)		0.06	
Alpha	1.00	Stream Power (lb/ft s)	271.00	107.00	251.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		8.01	
C & E Loss (ft)	0.09	Cum SA (acres)		3.47	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2752.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.73	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2747.34	Flow Area (sq ft)		531.12	
E.G. Slope (ft/ft)	0.000009	Area (sq ft)		531.12	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	106.26	Top Width (ft)		106.26	
Vel Total (ft/s)	0.38	Avg. Vel. (ft/s)		0.38	
Max Chl Dpth (ft)	6.03	Hydr. Depth (ft)		5.00	
Conv. Total (cfs)	65123.5	Conv. (cfs)		65123.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		108.21	
Min Ch El (ft)	2746.70	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	271.00	107.00	251.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.70	
C & E Loss (ft)	0.02	Cum SA (acres)		2.93	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2755.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.31	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2749.14	Flow Area (sq ft)		825.53	
E.G. Slope (ft/ft)	0.000167	Area (sq ft)		825.53	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	121.79	Top Width (ft)		121.79	
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)		1.94	
Max Chl Dpth (ft)	8.61	Hydr. Depth (ft)		6.78	
Conv. Total (cfs)	123648.5	Conv. (cfs)		123648.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		124.58	

Min Ch El (ft)	2746.70	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	271.00	107.00	251.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	8.45	
C & E Loss (ft)	0.09	Cum SA (acres)	0.02	3.51	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2754.58	Element			
Vel Head (ft)	0.03	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.55	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2748.59	Flow Area (sq ft)		734.88	
E.G. Slope (ft/ft)	0.000105	Area (sq ft)		734.88	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	117.23	Top Width (ft)		117.23	
Vel Total (ft/s)	1.46	Avg. Vel. (ft/s)		1.46	
Max Chl Dpth (ft)	7.85	Hydr. Depth (ft)		6.27	
Conv. Total (cfs)	104565.9	Conv. (cfs)		104565.9	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		119.77	
Min Ch El (ft)	2746.70	Shear (lb/sq ft)		0.04	
Alpha	1.00	Stream Power (lb/ft s)	271.00	107.00	251.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		6.64	
C & E Loss (ft)	0.06	Cum SA (acres)		3.36	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2753.83	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2753.81	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2748.07	Flow Area (sq ft)		649.92	
E.G. Slope (ft/ft)	0.000055	Area (sq ft)		649.92	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	112.78	Top Width (ft)		112.78	
Vel Total (ft/s)	1.00	Avg. Vel. (ft/s)		1.00	
Max Chl Dpth (ft)	7.11	Hydr. Depth (ft)		5.76	
Conv. Total (cfs)	87500.2	Conv. (cfs)		87500.2	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		115.09	
Min Ch El (ft)	2746.70	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	271.00	107.00	251.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		4.99	
C & E Loss (ft)	0.04	Cum SA (acres)		3.20	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2666

INPUT
Description: Boulder Stabilizer #5
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2760	101.3	2759.7	102.7	2759.5	105	2759	122	2759
125	2758	144.1	2751.7	214.1	2751.7	233	2758	236	2759
253	2759	254.9	2759	259.3	2760				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	105	.016	122	.035	236	.016	253	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
122	236	152.1	152.1	152.1	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2757.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.73	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.62	Reach Len. (ft)	152.10	152.10	152.10
Crit W.S. (ft)	2755.62	Flow Area (sq ft)		320.30	
E.G. Slope (ft/ft)	0.012200	Area (sq ft)		320.30	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	93.62	Top Width (ft)		93.62	
Vel Total (ft/s)	10.55	Avg. Vel. (ft/s)		10.55	
Max Chl Dpth (ft)	3.92	Hydr. Depth (ft)		3.42	
Conv. Total (cfs)	30601.4	Conv. (cfs)		30601.4	
Length Wtd. (ft)	152.10	Wetted Per. (ft)		94.88	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		2.57	
Alpha	1.00	Stream Power (lb/ft s)	259.30	0.00	0.00
Frctn Loss (ft)	1.12	Cum Volume (acre-ft)	0.15	13.59	
C & E Loss (ft)	0.19	Cum SA (acres)	0.32	3.80	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2756.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.52	Wt. n-Val.		0.035	
W.S. Elev (ft)	2755.10	Reach Len. (ft)	152.10	152.10	152.10
Crit W.S. (ft)	2755.10	Flow Area (sq ft)		273.01	
E.G. Slope (ft/ft)	0.012655	Area (sq ft)		273.01	

Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	90.52	Top Width (ft)		90.52	
Vel Total (ft/s)	9.89	Avg. Vel. (ft/s)		9.89	
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)		3.02	
Conv. Total (cfs)	24001.7	Conv. (cfs)		24001.7	
Length Wtd. (ft)	152.10	Wetted Per. (ft)		91.62	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		2.35	
Alpha	1.00	Stream Power (lb/ft s)	259.30	0.00	0.00
Frctn Loss (ft)	1.24	Cum Volume (acre-ft)	0.07	11.40	
C & E Loss (ft)	0.15	Cum SA (acres)	0.22	3.67	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2755.13	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.93	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.20	Reach Len. (ft)	152.10	152.10	152.10
Crit W.S. (ft)	2754.03	Flow Area (sq ft)		193.79	
E.G. Slope (ft/ft)	0.011232	Area (sq ft)		193.79	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	85.07	Top Width (ft)		85.07	
Vel Total (ft/s)	7.74	Avg. Vel. (ft/s)		7.74	
Max Chl Dpth (ft)	2.50	Hydr. Depth (ft)		2.28	
Conv. Total (cfs)	14153.6	Conv. (cfs)		14153.6	
Length Wtd. (ft)	152.10	Wetted Per. (ft)		85.88	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		1.58	
Alpha	1.00	Stream Power (lb/ft s)	259.30	0.00	0.00
Frctn Loss (ft)	1.54	Cum Volume (acre-ft)		7.84	
C & E Loss (ft)	0.00	Cum SA (acres)		3.44	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2752.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.55	Reach Len. (ft)	152.10	152.10	152.10
Crit W.S. (ft)		Flow Area (sq ft)		61.54	
E.G. Slope (ft/ft)	0.007681	Area (sq ft)		61.54	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	75.12	Top Width (ft)		75.12	
Vel Total (ft/s)	3.25	Avg. Vel. (ft/s)		3.25	
Max Chl Dpth (ft)	0.85	Hydr. Depth (ft)		0.82	
Conv. Total (cfs)	2282.0	Conv. (cfs)		2282.0	
Length Wtd. (ft)	152.10	Wetted Per. (ft)		75.39	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.39	
Alpha	1.00	Stream Power (lb/ft s)	259.30	0.00	0.00

Frctn Loss (ft)	1.59	Cum Volume (acre-ft)	2.59
C & E Loss (ft)	0.02	Cum SA (acres)	2.90

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2755.27	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.27	Reach Len. (ft)	152.10	152.10	152.10
Crit W.S. (ft)	2754.13	Flow Area (sq ft)		199.51	
E.G. Slope (ft/ft)	0.011674	Area (sq ft)		199.51	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	85.48	Top Width (ft)		85.48	
Vel Total (ft/s)	8.02	Avg. Vel. (ft/s)		8.02	
Max Chl Dpth (ft)	2.57	Hydr. Depth (ft)		2.33	
Conv. Total (cfs)	14808.4	Conv. (cfs)		14808.4	
Length Wtd. (ft)	152.10	Wetted Per. (ft)		86.31	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		1.68	
Alpha	1.00	Stream Power (lb/ft s)	259.30	0.00	0.00
Frctn Loss (ft)	1.52	Cum Volume (acre-ft)	0.00	8.27	
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	3.47	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2754.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.035	
W.S. Elev (ft)	2753.88	Reach Len. (ft)	152.10	152.10	152.10
Crit W.S. (ft)		Flow Area (sq ft)		166.81	
E.G. Slope (ft/ft)	0.009124	Area (sq ft)		166.81	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	83.14	Top Width (ft)		83.14	
Vel Total (ft/s)	6.41	Avg. Vel. (ft/s)		6.41	
Max Chl Dpth (ft)	2.18	Hydr. Depth (ft)		2.01	
Conv. Total (cfs)	11202.0	Conv. (cfs)		11202.0	
Length Wtd. (ft)	152.10	Wetted Per. (ft)		83.84	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		1.13	
Alpha	1.00	Stream Power (lb/ft s)	259.30	0.00	0.00
Frctn Loss (ft)	1.54	Cum Volume (acre-ft)		6.49	
C & E Loss (ft)	0.02	Cum SA (acres)		3.33	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2753.78	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.		0.035	
W.S. Elev (ft)	2753.36	Reach Len. (ft)	152.10	152.10	152.10
Crit W.S. (ft)		Flow Area (sq ft)		124.50	
E.G. Slope (ft/ft)	0.008461	Area (sq ft)		124.50	
Q Total (cfs)	650.00	Flow (cfs)		650.00	

Top Width (ft)	80.01	Top Width (ft)		80.01	
Vel Total (ft/s)	5.22	Avg. Vel. (ft/s)		5.22	
Max Chl Dpth (ft)	1.66	Hydr. Depth (ft)		1.56	
Conv. Total (cfs)	7066.3	Conv. (cfs)		7066.3	
Length Wtd. (ft)	152.10	Wetted Per. (ft)		80.55	
Min Ch El (ft)	2751.70	Shear (lb/sq ft)		0.82	
Alpha	1.00	Stream Power (lb/ft s)	259.30	0.00	0.00
Frctn Loss (ft)	1.52	Cum Volume (acre-ft)		4.85	
C & E Loss (ft)	0.02	Cum SA (acres)		3.17	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2513.9

INPUT
Description: Section 25+13.9
Station Elevation Data num= 32

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2760	107.69	2759	116.25	2758	141.84	2757	163.76	2757
187.19	2755	234.08	2755	289.28	2755	327.06	2755	345.27	2755
383.03	2756	426.7	2756	500.6	2756	520.63	2756	523.4	2755
526.08	2754	528.69	2753	533.04	2752	554.36	2751	562.5	2750
612.94	2750	619.01	2751	622.01	2752	626.07	2753	628.58	2754
635	2756	655	2756	692.43	2756	698.86	2757	707.55	2758
718.12	2759	729.11	2760						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	500.6	.016	520.63	.03	635	.016	655	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
520.63	635	113.9	113.9	113.9	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	520.6	2758	T
635	729.11	2758	T

Left Levee Station= 520.63 Elevation= 2758
Right Levee Station= 635 Elevation= 2758

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2755.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.08	Wt. n-Val.		0.030	
W.S. Elev (ft)	2754.74	Reach Len. (ft)	113.90	113.90	113.90
Crit W.S. (ft)	2754.06	Flow Area (sq ft)		404.49	
E.G. Slope (ft/ft)	0.004895	Area (sq ft)		404.49	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	106.83	Top Width (ft)		106.83	
Vel Total (ft/s)	8.36	Avg. Vel. (ft/s)		8.36	
Max Chl Dpth (ft)	4.74	Hydr. Depth (ft)		3.79	
Conv. Total (cfs)	48311.4	Conv. (cfs)		48311.4	
Length Wtd. (ft)	113.90	Wetted Per. (ft)		108.02	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.14	
Alpha	1.00	Stream Power (lb/ft s)	729.11	520.63	635.00
Frctn Loss (ft)	0.54	Cum Volume (acre-ft)	0.15	12.32	
C & E Loss (ft)	0.03	Cum SA (acres)	0.32	3.45	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2755.07	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.02	Wt. n-Val.		0.030	
W.S. Elev (ft)	2754.05	Reach Len. (ft)	113.90	113.90	113.90
Crit W.S. (ft)	2753.54	Flow Area (sq ft)		332.63	
E.G. Slope (ft/ft)	0.005681	Area (sq ft)		332.63	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	102.80	Top Width (ft)		102.80	
Vel Total (ft/s)	8.12	Avg. Vel. (ft/s)		8.12	
Max Chl Dpth (ft)	4.05	Hydr. Depth (ft)		3.24	
Conv. Total (cfs)	35821.8	Conv. (cfs)		35821.8	
Length Wtd. (ft)	113.90	Wetted Per. (ft)		103.75	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.14	
Alpha	1.00	Stream Power (lb/ft s)	729.11	520.63	635.00
Frctn Loss (ft)	0.59	Cum Volume (acre-ft)	0.07	10.34	
C & E Loss (ft)	0.05	Cum SA (acres)	0.22	3.33	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2753.58	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.91	Wt. n-Val.		0.030	
W.S. Elev (ft)	2752.67	Reach Len. (ft)	113.90	113.90	113.90
Crit W.S. (ft)	2752.56	Flow Area (sq ft)		195.41	
E.G. Slope (ft/ft)	0.009188	Area (sq ft)		195.41	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	94.57	Top Width (ft)		94.57	
Vel Total (ft/s)	7.68	Avg. Vel. (ft/s)		7.68	
Max Chl Dpth (ft)	2.67	Hydr. Depth (ft)		2.07	
Conv. Total (cfs)	15648.4	Conv. (cfs)		15648.4	
Length Wtd. (ft)	113.90	Wetted Per. (ft)		95.05	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.18	
Alpha	1.00	Stream Power (lb/ft s)	729.11	520.63	635.00
Frctn Loss (ft)	0.77	Cum Volume (acre-ft)		7.16	
C & E Loss (ft)	0.09	Cum SA (acres)		3.13	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2751.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.030	
W.S. Elev (ft)	2750.76	Reach Len. (ft)	113.90	113.90	113.90
Crit W.S. (ft)	2750.76	Flow Area (sq ft)		42.17	
E.G. Slope (ft/ft)	0.015093	Area (sq ft)		42.17	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	61.18	Top Width (ft)		61.18	
Vel Total (ft/s)	4.74	Avg. Vel. (ft/s)		4.74	
Max Chl Dpth (ft)	0.76	Hydr. Depth (ft)		0.69	
Conv. Total (cfs)	1627.9	Conv. (cfs)		1627.9	
Length Wtd. (ft)	113.90	Wetted Per. (ft)		61.29	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		0.65	
Alpha	1.00	Stream Power (lb/ft s)	729.11	520.63	635.00
Frctn Loss (ft)	1.13	Cum Volume (acre-ft)		2.41	

C & E Loss (ft)	0.05	Cum SA (acres)	2.67

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2753.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.92	Wt. n-Val.		0.030	
W.S. Elev (ft)	2752.79	Reach Len. (ft)	113.90	113.90	113.90
Crit W.S. (ft)	2752.68	Flow Area (sq ft)		207.46	
E.G. Slope (ft/ft)	0.008696	Area (sq ft)		207.46	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	95.63	Top Width (ft)		95.63	
Vel Total (ft/s)	7.71	Avg. Vel. (ft/s)		7.71	
Max Chl Dpth (ft)	2.79	Hydr. Depth (ft)		2.17	
Conv. Total (cfs)	17158.0	Conv. (cfs)		17158.0	
Length Wtd. (ft)	113.90	Wetted Per. (ft)		96.15	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.17	
Alpha	1.00	Stream Power (lb/ft s)	729.11	520.63	635.00
Frctn Loss (ft)	0.75	Cum Volume (acre-ft)	0.00	7.56	
C & E Loss (ft)	0.09	Cum SA (acres)	0.02	3.16	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2752.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.82	Wt. n-Val.		0.030	
W.S. Elev (ft)	2752.14	Reach Len. (ft)	113.90	113.90	113.90
Crit W.S. (ft)	2752.14	Flow Area (sq ft)		147.17	
E.G. Slope (ft/ft)	0.011273	Area (sq ft)		147.17	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	90.17	Top Width (ft)		90.17	
Vel Total (ft/s)	7.27	Avg. Vel. (ft/s)		7.27	
Max Chl Dpth (ft)	2.14	Hydr. Depth (ft)		1.63	
Conv. Total (cfs)	10077.6	Conv. (cfs)		10077.6	
Length Wtd. (ft)	113.90	Wetted Per. (ft)		90.54	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		1.14	
Alpha	1.00	Stream Power (lb/ft s)	729.11	520.63	635.00
Frctn Loss (ft)	0.86	Cum Volume (acre-ft)		5.94	
C & E Loss (ft)	0.10	Cum SA (acres)		3.03	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2752.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.030	
W.S. Elev (ft)	2751.62	Reach Len. (ft)	113.90	113.90	113.90
Crit W.S. (ft)	2751.62	Flow Area (sq ft)		102.12	
E.G. Slope (ft/ft)	0.011913	Area (sq ft)		102.12	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	79.67	Top Width (ft)		79.67	
Vel Total (ft/s)	6.37	Avg. Vel. (ft/s)		6.37	
Max Chl Dpth (ft)	1.62	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	5955.2	Conv. (cfs)		5955.2	
Length Wtd. (ft)	113.90	Wetted Per. (ft)		79.93	
Min Ch El (ft)	2750.00	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)	729.11	520.63	635.00
Frctn Loss (ft)	0.92	Cum Volume (acre-ft)		4.46	
C & E Loss (ft)	0.08	Cum SA (acres)		2.89	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2400.*

INPUT
Description: Boulder Stabilizer #4 (inlet)
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2756.9	105.6	2756.3	111.8	2755.7	376.5	2756	396.5	2756
418.4	2748.7	478.4	2748.7	500.5	2756	520.5	2756	585.7	2755.3
588.4	2755.7	590.2	2755.9	600	2757.8				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	376.5	.016	396.5	.035	500.5	.016	520.5	.04

```
Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         396.5   500.5                2       2       2             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100   396.5  2757.5       T
   500.5     600  2757.5       T
Left Levee      Station=   396.5      Elevation=  2757.5
Right Levee     Station=   500.5      Elevation=  2757.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2755.24    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.97    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2754.27    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2753.00    Flow Area (sq ft)                    428.03
  E.G. Slope (ft/ft)      0.004675    Area (sq ft)                         428.03
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             93.59    Top Width (ft)                        93.59
  Vel Total (ft/s)            7.90    Avg. Vel. (ft/s)                       7.90
  Max Chl Dpth (ft)           5.57    Hydr. Depth (ft)                       4.57
  Conv. Total (cfs)        49434.2    Conv. (cfs)                         49434.2
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      95.39
  Min Ch El (ft)           2748.70    Shear (lb/sq ft)                       1.31
  Alpha                       1.00    Stream Power (lb/ft s)    600.00     396.50     500.50
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.15      11.23
  C & E Loss (ft)             0.00    Cum SA (acres)              0.32       3.19


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2754.43    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.85    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2753.58    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2752.43    Flow Area (sq ft)                    364.21
  E.G. Slope (ft/ft)      0.004796    Area (sq ft)                         364.21
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             89.39    Top Width (ft)                        89.39
  Vel Total (ft/s)            7.41    Avg. Vel. (ft/s)                       7.41
  Max Chl Dpth (ft)           4.88    Hydr. Depth (ft)                       4.07
  Conv. Total (cfs)        38987.9    Conv. (cfs)                         38987.9
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      90.96
  Min Ch El (ft)           2748.70    Shear (lb/sq ft)                       1.20
  Alpha                       1.00    Stream Power (lb/ft s)    600.00     396.50     500.50
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.07       9.43
  C & E Loss (ft)             0.00    Cum SA (acres)              0.22       3.08


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2752.72    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.61    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2752.11    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2751.27    Flow Area (sq ft)                    239.83
  E.G. Slope (ft/ft)      0.005161    Area (sq ft)                         239.83
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
  Top Width (ft)             80.57    Top Width (ft)                        80.57
  Vel Total (ft/s)            6.25    Avg. Vel. (ft/s)                       6.25
  Max Chl Dpth (ft)           3.41    Hydr. Depth (ft)                       2.98
  Conv. Total (cfs)        20880.1    Conv. (cfs)                         20880.1
```

Length Wtd. (ft)	2.00	Wetted Per. (ft)		81.67	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)	600.00	396.50	500.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		6.59	
C & E Loss (ft)	0.00	Cum SA (acres)		2.90	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2749.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.66	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2749.38	Flow Area (sq ft)		60.10	
E.G. Slope (ft/ft)	0.006970	Area (sq ft)		60.10	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	65.76	Top Width (ft)		65.76	
Vel Total (ft/s)	3.33	Avg. Vel. (ft/s)		3.33	
Max Chl Dpth (ft)	0.96	Hydr. Depth (ft)		0.91	
Conv. Total (cfs)	2395.5	Conv. (cfs)		2395.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		66.07	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	600.00	396.50	500.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		2.28	
C & E Loss (ft)	0.00	Cum SA (acres)		2.50	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2752.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.25	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2751.39	Flow Area (sq ft)		251.16	
E.G. Slope (ft/ft)	0.005108	Area (sq ft)		251.16	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	81.41	Top Width (ft)		81.41	
Vel Total (ft/s)	6.37	Avg. Vel. (ft/s)		6.37	
Max Chl Dpth (ft)	3.55	Hydr. Depth (ft)		3.09	
Conv. Total (cfs)	22387.8	Conv. (cfs)		22387.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		82.56	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		0.97	
Alpha	1.00	Stream Power (lb/ft s)	600.00	396.50	500.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	6.96	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	2.92	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2751.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	2751.47	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2750.78	Flow Area (sq ft)		189.29	
E.G. Slope (ft/ft)	0.005398	Area (sq ft)		189.29	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	76.69	Top Width (ft)		76.69	
Vel Total (ft/s)	5.65	Avg. Vel. (ft/s)		5.65	
Max Chl Dpth (ft)	2.77	Hydr. Depth (ft)		2.47	

Conv. Total (cfs)	14563.6	Conv. (cfs)			14563.6	
Length Wtd. (ft)	2.00	Wetted Per. (ft)			77.59	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)			0.82	
Alpha	1.00	Stream Power (lb/ft s)	600.00	396.50		500.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)			5.50	
C & E Loss (ft)	0.00	Cum SA (acres)			2.81	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2751.09	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.035	
W.S. Elev (ft)	2750.72	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2750.21	Flow Area (sq ft)		133.76	
E.G. Slope (ft/ft)	0.005827	Area (sq ft)		133.76	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	72.20	Top Width (ft)		72.20	
Vel Total (ft/s)	4.86	Avg. Vel. (ft/s)		4.86	
Max Chl Dpth (ft)	2.02	Hydr. Depth (ft)		1.85	
Conv. Total (cfs)	8515.2	Conv. (cfs)		8515.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		72.85	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		0.67	
Alpha	1.00	Stream Power (lb/ft s)	600.00	396.50	500.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		4.15	
C & E Loss (ft)	0.00	Cum SA (acres)		2.69	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2398

INPUT
Description: Boulder Stabilizer #4
Station Elevation Data num= 13

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2756.9	105.6	2756.3	111.8	2755.7	376.5	2756	396.5	2756
418.4	2748.7	478.4	2748.7	500.5	2756	520.5	2756	585.7	2755.3
588.4	2755.7	590.2	2755.9	600	2757.8				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	376.5	.016	396.5	.035	500.5	.016	520.5	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
396.5	500.5	15	15	15	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	396.5	2757.5	T
500.5	600	2757.5	T

Left Levee Station= 396.5 Elevation= 2757.5
Right Levee Station= 500.5 Elevation= 2757.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2755.24	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.97	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.26	Reach Len. (ft)	15.00	15.00	15.00

Crit W.S. (ft)	2753.00	Flow Area (sq ft)		427.07	
E.G. Slope (ft/ft)	0.004706	Area (sq ft)		427.07	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	93.53	Top Width (ft)		93.53	
Vel Total (ft/s)	7.91	Avg. Vel. (ft/s)		7.91	
Max Chl Dpth (ft)	5.56	Hydr. Depth (ft)		4.57	
Conv. Total (cfs)	49272.1	Conv. (cfs)		49272.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		95.33	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		1.32	
Alpha	1.00	Stream Power (lb/ft s)	600.00	396.50	500.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	11.21	
C & E Loss (ft)	0.24	Cum SA (acres)	0.32	3.18	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2754.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.035	
W.S. Elev (ft)	2753.57	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2752.43	Flow Area (sq ft)		363.29	
E.G. Slope (ft/ft)	0.004832	Area (sq ft)		363.29	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	89.33	Top Width (ft)		89.33	
Vel Total (ft/s)	7.43	Avg. Vel. (ft/s)		7.43	
Max Chl Dpth (ft)	4.87	Hydr. Depth (ft)		4.07	
Conv. Total (cfs)	38843.1	Conv. (cfs)		38843.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		90.90	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		1.21	
Alpha	1.00	Stream Power (lb/ft s)	600.00	396.50	500.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	9.41	
C & E Loss (ft)	0.22	Cum SA (acres)	0.22	3.07	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2752.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.61	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.10	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2751.27	Flow Area (sq ft)		238.69	
E.G. Slope (ft/ft)	0.005236	Area (sq ft)		238.69	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	80.48	Top Width (ft)		80.48	
Vel Total (ft/s)	6.28	Avg. Vel. (ft/s)		6.28	
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)		2.97	
Conv. Total (cfs)	20730.1	Conv. (cfs)		20730.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		81.58	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)	600.00	396.50	500.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		6.58	

C & E Loss (ft)	0.17	Cum SA (acres)	2.89

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2749.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.64	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2749.38	Flow Area (sq ft)		58.83	
E.G. Slope (ft/ft)	0.007465	Area (sq ft)		58.83	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	65.64	Top Width (ft)		65.64	
Vel Total (ft/s)	3.40	Avg. Vel. (ft/s)		3.40	
Max Chl Dpth (ft)	0.94	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	2314.8	Conv. (cfs)		2314.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		65.95	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)	600.00	396.50	500.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.28	
C & E Loss (ft)	0.05	Cum SA (acres)		2.50	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2752.87	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.64	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.24	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2751.39	Flow Area (sq ft)		250.01	
E.G. Slope (ft/ft)	0.005179	Area (sq ft)		250.01	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	81.33	Top Width (ft)		81.33	
Vel Total (ft/s)	6.40	Avg. Vel. (ft/s)		6.40	
Max Chl Dpth (ft)	3.54	Hydr. Depth (ft)		3.07	
Conv. Total (cfs)	22233.0	Conv. (cfs)		22233.0	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		82.47	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		0.98	
Alpha	1.00	Stream Power (lb/ft s)	600.00	396.50	500.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	6.95	
C & E Loss (ft)	0.17	Cum SA (acres)	0.02	2.92	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2751.96	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.50	Wt. n-Val.		0.035	
W.S. Elev (ft)	2751.46	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2750.78	Flow Area (sq ft)		188.18	
E.G. Slope (ft/ft)	0.005496	Area (sq ft)		188.18	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	76.61	Top Width (ft)		76.61	
Vel Total (ft/s)	5.69	Avg. Vel. (ft/s)		5.69	
Max Chl Dpth (ft)	2.76	Hydr. Depth (ft)		2.46	
Conv. Total (cfs)	14433.6	Conv. (cfs)		14433.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		77.50	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)	600.00	396.50	500.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		5.49	
C & E Loss (ft)	0.14	Cum SA (acres)		2.80	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2751.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.37	Wt. n-Val.		0.035	
W.S. Elev (ft)	2750.71	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2750.21	Flow Area (sq ft)		132.62	
E.G. Slope (ft/ft)	0.005985	Area (sq ft)		132.62	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	72.10	Top Width (ft)		72.10	
Vel Total (ft/s)	4.90	Avg. Vel. (ft/s)		4.90	
Max Chl Dpth (ft)	2.01	Hydr. Depth (ft)		1.84	
Conv. Total (cfs)	8401.8	Conv. (cfs)		8401.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		72.75	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		0.68	
Alpha	1.00	Stream Power (lb/ft s)	600.00	396.50	500.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		4.14	
C & E Loss (ft)	0.11	Cum SA (acres)		2.69	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2383

INPUT
Description: Boulder Stabilizer #4
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2756.9	105.6	2756.3	111.8	2755.7	130.4	2755	146.4	2754.9
361.5	2756	381.5	2756	418.4	2743.7	478.4	2743.7	506	2752.8
515.5	2756	535.5	2756	585.7	2755.3	588.4	2755.7	590.2	2755.9
600	2757.8								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val

```
     100     .04   361.5    .016   381.5    .035   515.5    .016   535.5     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         381.5   515.5                2       2       2             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100   381.5    2758       T
   515.5     600    2758       T
Left Levee      Station=   381.5      Elevation=    2758
Right Levee     Station=   515.5      Elevation=    2758

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2754.98    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.16    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2754.82    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2748.01    Flow Area (sq ft)                   1039.46
  E.G. Slope (ft/ft)      0.000369    Area (sq ft)                        1039.46
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)            126.93    Top Width (ft)                       126.93
  Vel Total (ft/s)            3.25    Avg. Vel. (ft/s)                       3.25
  Max Chl Dpth (ft)          11.12    Hydr. Depth (ft)                       8.19
  Conv. Total (cfs)       175987.9    Conv. (cfs)                       175987.9
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                     130.52
  Min Ch El (ft)           2743.70    Shear (lb/sq ft)                       0.18
  Alpha                       1.00    Stream Power (lb/ft s)    600.00     381.50     515.50
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.15      10.96
  C & E Loss (ft)             0.00    Cum SA (acres)              0.32       3.15


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2754.19    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.13    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2754.07    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2747.43    Flow Area (sq ft)                    945.95
  E.G. Slope (ft/ft)      0.000307    Area (sq ft)                         945.95
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)            122.45    Top Width (ft)                       122.45
  Vel Total (ft/s)            2.85    Avg. Vel. (ft/s)                       2.85
  Max Chl Dpth (ft)          10.37    Hydr. Depth (ft)                       7.73
  Conv. Total (cfs)       154138.6    Conv. (cfs)                       154138.6
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                     125.80
  Min Ch El (ft)           2743.70    Shear (lb/sq ft)                       0.14
  Alpha                       1.00    Stream Power (lb/ft s)    600.00     381.50     515.50
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.07       9.19
  C & E Loss (ft)             0.00    Cum SA (acres)              0.22       3.04


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2752.54    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.06    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2752.48    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2746.28    Flow Area (sq ft)                    759.01
  E.G. Slope (ft/ft)      0.000177    Area (sq ft)                         759.01
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
  Top Width (ft)            112.95    Top Width (ft)                       112.95
  Vel Total (ft/s)            1.98    Avg. Vel. (ft/s)                       1.98
```

Max Chl Dpth (ft)	8.78	Hydr. Depth (ft)		6.72	
Conv. Total (cfs)	112866.9	Conv. (cfs)		112866.9	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		115.79	
Min Ch El (ft)	2743.70	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	600.00	381.50	515.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		6.41	
C & E Loss (ft)	0.00	Cum SA (acres)		2.86	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2749.76	Element			
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.76	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2744.37	Flow Area (sq ft)		474.24	
E.G. Slope (ft/ft)	0.000012	Area (sq ft)		474.24	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	96.55	Top Width (ft)		96.55	
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.42	
Max Chl Dpth (ft)	6.06	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	57404.3	Conv. (cfs)		57404.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		98.51	
Min Ch El (ft)	2743.70	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	600.00	381.50	515.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.18	
C & E Loss (ft)	0.00	Cum SA (acres)		2.47	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2752.70	Element			
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.63	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2746.39	Flow Area (sq ft)		776.23	
E.G. Slope (ft/ft)	0.000189	Area (sq ft)		776.23	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	113.87	Top Width (ft)		113.87	
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)		2.06	
Max Chl Dpth (ft)	8.93	Hydr. Depth (ft)		6.82	
Conv. Total (cfs)	116520.8	Conv. (cfs)		116520.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		116.75	
Min Ch El (ft)	2743.70	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	600.00	381.50	515.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.00	6.77	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	2.89	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2751.81	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2751.77	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2745.77	Flow Area (sq ft)		680.92	
E.G. Slope (ft/ft)	0.000122	Area (sq ft)		680.92	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	108.70	Top Width (ft)		108.70	

Vel Total (ft/s)	1.57	Avg. Vel. (ft/s)		1.57	
Max Chl Dpth (ft)	8.07	Hydr. Depth (ft)		6.26	
Conv. Total (cfs)	96695.1	Conv. (cfs)		96695.1	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		111.31	
Min Ch El (ft)	2743.70	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	600.00	381.50	515.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		5.34	
C & E Loss (ft)	0.00	Cum SA (acres)		2.77	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2750.97	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2750.95	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2745.21	Flow Area (sq ft)		593.83	
E.G. Slope (ft/ft)	0.000067	Area (sq ft)		593.83	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	103.75	Top Width (ft)		103.75	
Vel Total (ft/s)	1.09	Avg. Vel. (ft/s)		1.09	
Max Chl Dpth (ft)	7.25	Hydr. Depth (ft)		5.72	
Conv. Total (cfs)	79475.1	Conv. (cfs)		79475.1	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		106.10	
Min Ch El (ft)	2743.70	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	600.00	381.50	515.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		4.02	
C & E Loss (ft)	0.00	Cum SA (acres)		2.66	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2381

INPUT
Description: Boulder Stabilizer #4
Station Elevation Data num= 16

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2756.9	105.6	2756.3	111.8	2755.7	130.4	2755	146.4	2754.9
361.5	2756	381.5	2756	418.4	2743.7	478.4	2743.7	506	2752.8
515.5	2756	535.5	2756	585.7	2755.3	588.4	2755.7	590.2	2755.9
600	2757.8								

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	361.5	.016	381.5	.035	515.5	.016	535.5	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
381.5	515.5	15	15	15	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	381.5	2758	T
515.5	600	2758	T

Left Levee Station= 381.5 Elevation= 2758
Right Levee Station= 515.5 Elevation= 2758

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2754.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.81	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2748.01	Flow Area (sq ft)		1039.34	
E.G. Slope (ft/ft)	0.000369	Area (sq ft)		1039.34	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	126.92	Top Width (ft)		126.92	
Vel Total (ft/s)	3.25	Avg. Vel. (ft/s)		3.25	
Max Chl Dpth (ft)	11.11	Hydr. Depth (ft)		8.19	
Conv. Total (cfs)	175958.4	Conv. (cfs)		175958.4	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		130.52	
Min Ch El (ft)	2743.70	Shear (lb/sq ft)		0.18	
Alpha	1.00	Stream Power (lb/ft s)	600.00	381.50	515.50
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.15	10.91	
C & E Loss (ft)	0.16	Cum SA (acres)	0.32	3.14	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2754.19	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2754.06	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2747.43	Flow Area (sq ft)		945.86	
E.G. Slope (ft/ft)	0.000307	Area (sq ft)		945.86	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	122.45	Top Width (ft)		122.45	
Vel Total (ft/s)	2.85	Avg. Vel. (ft/s)		2.85	
Max Chl Dpth (ft)	10.36	Hydr. Depth (ft)		7.72	
Conv. Total (cfs)	154118.0	Conv. (cfs)		154118.0	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		125.80	
Min Ch El (ft)	2743.70	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	600.00	381.50	515.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	9.14	
C & E Loss (ft)	0.15	Cum SA (acres)	0.22	3.03	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2752.54	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.48	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2746.28	Flow Area (sq ft)		758.98	
E.G. Slope (ft/ft)	0.000177	Area (sq ft)		758.98	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	112.95	Top Width (ft)		112.95	
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)		1.98	
Max Chl Dpth (ft)	8.78	Hydr. Depth (ft)		6.72	
Conv. Total (cfs)	112861.1	Conv. (cfs)		112861.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		115.78	

Min Ch El (ft)	2743.70	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	600.00	381.50	515.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		6.37	
C & E Loss (ft)	0.11	Cum SA (acres)		2.85	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2749.76	Element			
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.76	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2744.37	Flow Area (sq ft)		474.24	
E.G. Slope (ft/ft)	0.000012	Area (sq ft)		474.24	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	96.55	Top Width (ft)		96.55	
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.42	
Max Chl Dpth (ft)	6.06	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	57404.3	Conv. (cfs)		57404.3	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		98.51	
Min Ch El (ft)	2743.70	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	600.00	381.50	515.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.16	
C & E Loss (ft)	0.03	Cum SA (acres)		2.46	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2752.69	Element			
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.63	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2746.39	Flow Area (sq ft)		776.17	
E.G. Slope (ft/ft)	0.000189	Area (sq ft)		776.17	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	113.86	Top Width (ft)		113.86	
Vel Total (ft/s)	2.06	Avg. Vel. (ft/s)		2.06	
Max Chl Dpth (ft)	8.93	Hydr. Depth (ft)		6.82	
Conv. Total (cfs)	116508.9	Conv. (cfs)		116508.9	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		116.75	
Min Ch El (ft)	2743.70	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	600.00	381.50	515.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	6.74	
C & E Loss (ft)	0.11	Cum SA (acres)	0.02	2.88	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2751.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2751.77	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2745.77	Flow Area (sq ft)		680.89	
E.G. Slope (ft/ft)	0.000122	Area (sq ft)		680.89	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	108.70	Top Width (ft)		108.70	
Vel Total (ft/s)	1.57	Avg. Vel. (ft/s)		1.57	
Max Chl Dpth (ft)	8.07	Hydr. Depth (ft)		6.26	
Conv. Total (cfs)	96689.7	Conv. (cfs)		96689.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		111.31	
Min Ch El (ft)	2743.70	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	600.00	381.50	515.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		5.31	
C & E Loss (ft)	0.09	Cum SA (acres)		2.77	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2750.97	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2750.95	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2745.21	Flow Area (sq ft)		593.81	
E.G. Slope (ft/ft)	0.000067	Area (sq ft)		593.81	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	103.75	Top Width (ft)		103.75	
Vel Total (ft/s)	1.09	Avg. Vel. (ft/s)		1.09	
Max Chl Dpth (ft)	7.25	Hydr. Depth (ft)		5.72	
Conv. Total (cfs)	79470.3	Conv. (cfs)		79470.3	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		106.10	
Min Ch El (ft)	2743.70	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	600.00	381.50	515.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.99	
C & E Loss (ft)	0.07	Cum SA (acres)		2.66	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2366

INPUT
Description: Boulder Stabilizer #4
Station Elevation Data num= 17

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

```
     100  2756.9   105.6  2756.3   111.8  2755.7   130.4    2755   146.4  2754.9
   379.5    2755   399.5    2755     406  2752.8   418.4  2748.7   478.4  2748.7
   497.5    2755   517.5    2755   577.2  2754.9   585.7  2755.3   588.4  2755.7
   590.2  2755.9     600  2757.8

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04   379.5    .016   399.5    .035   497.5    .016   517.5     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         399.5   497.5            105.6   105.6   105.6             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100   399.5    2756       T
   497.5     600    2756       T
Left Levee      Station=   399.5      Elevation=    2756
Right Levee     Station=   497.5      Elevation=    2756

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2754.80    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               1.80    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2753.00    Reach Len. (ft)            105.60     105.60     105.60
  Crit W.S. (ft)           2753.00    Flow Area (sq ft)                     314.22
  E.G. Slope (ft/ft)      0.011661    Area (sq ft)                          314.22
  Q Total (cfs)            3380.00    Flow (cfs)                           3380.00
  Top Width (ft)             86.04    Top Width (ft)                         86.04
  Vel Total (ft/s)           10.76    Avg. Vel. (ft/s)                       10.76
  Max Chl Dpth (ft)           4.30    Hydr. Depth (ft)                        3.65
  Conv. Total (cfs)        31300.6    Conv. (cfs)                          31300.6
  Length Wtd. (ft)          105.60    Wetted Per. (ft)                       87.43
  Min Ch El (ft)           2748.70    Shear (lb/sq ft)                        2.62
  Alpha                       1.00    Stream Power (lb/ft s)     600.00     399.50     497.50
  Frctn Loss (ft)             0.77    Cum Volume (acre-ft)         0.15      10.68
  C & E Loss (ft)             0.17    Cum SA (acres)               0.32       3.10


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2754.03    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               1.59    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2752.44    Reach Len. (ft)            105.60     105.60     105.60
  Crit W.S. (ft)           2752.44    Flow Area (sq ft)                     266.79
  E.G. Slope (ft/ft)      0.012143    Area (sq ft)                          266.79
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             82.65    Top Width (ft)                         82.65
```

Vel Total (ft/s)	10.12	Avg. Vel. (ft/s)		10.12	
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)		3.23	
Conv. Total (cfs)	24501.9	Conv. (cfs)		24501.9	
Length Wtd. (ft)	105.60	Wetted Per. (ft)		83.86	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		2.41	
Alpha	1.00	Stream Power (lb/ft s)	600.00	399.50	497.50
Frctn Loss (ft)	0.84	Cum Volume (acre-ft)	0.07	8.93	
C & E Loss (ft)	0.13	Cum SA (acres)	0.22	3.00	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2752.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2751.29	Reach Len. (ft)	105.60	105.60	105.60
Crit W.S. (ft)	2751.29	Flow Area (sq ft)		175.50	
E.G. Slope (ft/ft)	0.013396	Area (sq ft)		175.50	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	75.67	Top Width (ft)		75.67	
Vel Total (ft/s)	8.55	Avg. Vel. (ft/s)		8.55	
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)		2.32	
Conv. Total (cfs)	12959.9	Conv. (cfs)		12959.9	
Length Wtd. (ft)	105.60	Wetted Per. (ft)		76.50	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		1.92	
Alpha	1.00	Stream Power (lb/ft s)	600.00	399.50	497.50
Frctn Loss (ft)	1.11	Cum Volume (acre-ft)		6.21	
C & E Loss (ft)	0.03	Cum SA (acres)		2.82	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2749.73	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.31	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.42	Reach Len. (ft)	105.60	105.60	105.60

Crit W.S. (ft)	2749.39	Flow Area (sq ft)		44.77	
E.G. Slope (ft/ft)	0.018053	Area (sq ft)		44.77	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	64.36	Top Width (ft)		64.36	
Vel Total (ft/s)	4.47	Avg. Vel. (ft/s)		4.47	
Max Chl Dpth (ft)	0.72	Hydr. Depth (ft)		0.70	
Conv. Total (cfs)	1488.5	Conv. (cfs)		1488.5	
Length Wtd. (ft)	105.60	Wetted Per. (ft)		64.59	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		0.78	
Alpha	1.00	Stream Power (lb/ft s)	600.00	399.50	497.50
Frctn Loss (ft)	1.72	Cum Volume (acre-ft)		2.07	
C & E Loss (ft)	0.00	Cum SA (acres)		2.44	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2752.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.19	Wt. n-Val.		0.035	
W.S. Elev (ft)	2751.38	Reach Len. (ft)	105.60	105.60	105.60
Crit W.S. (ft)	2751.38	Flow Area (sq ft)		182.64	
E.G. Slope (ft/ft)	0.013484	Area (sq ft)		182.64	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	76.24	Top Width (ft)		76.24	
Vel Total (ft/s)	8.76	Avg. Vel. (ft/s)		8.76	
Max Chl Dpth (ft)	2.68	Hydr. Depth (ft)		2.40	
Conv. Total (cfs)	13778.6	Conv. (cfs)		13778.6	
Length Wtd. (ft)	105.60	Wetted Per. (ft)		77.10	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		1.99	
Alpha	1.00	Stream Power (lb/ft s)	600.00	399.50	497.50
Frctn Loss (ft)	1.08	Cum Volume (acre-ft)	0.00	6.57	
C & E Loss (ft)	0.05	Cum SA (acres)	0.02	2.85	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2751.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.93	Wt. n-Val.		0.035	
W.S. Elev (ft)	2750.78	Reach Len. (ft)	105.60	105.60	105.60
Crit W.S. (ft)	2750.78	Flow Area (sq ft)		138.03	
E.G. Slope (ft/ft)	0.014331	Area (sq ft)		138.03	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	72.61	Top Width (ft)		72.61	
Vel Total (ft/s)	7.75	Avg. Vel. (ft/s)		7.75	
Max Chl Dpth (ft)	2.08	Hydr. Depth (ft)		1.90	
Conv. Total (cfs)	8938.0	Conv. (cfs)		8938.0	

Length Wtd. (ft)	105.60	Wetted Per. (ft)		73.28	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		1.69	
Alpha	1.00	Stream Power (lb/ft s)	600.00	399.50	497.50
Frctn Loss (ft)	1.31	Cum Volume (acre-ft)		5.17	
C & E Loss (ft)	0.00	Cum SA (acres)		2.74	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2750.90	Element			
Vel Head (ft)	0.69	Wt. n-Val.		0.035	
W.S. Elev (ft)	2750.21	Reach Len. (ft)	105.60	105.60	105.60
Crit W.S. (ft)	2750.21	Flow Area (sq ft)		97.17	
E.G. Slope (ft/ft)	0.015912	Area (sq ft)		97.17	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	69.12	Top Width (ft)		69.12	
Vel Total (ft/s)	6.69	Avg. Vel. (ft/s)		6.69	
Max Chl Dpth (ft)	1.51	Hydr. Depth (ft)		1.41	
Conv. Total (cfs)	5153.0	Conv. (cfs)		5153.0	
Length Wtd. (ft)	105.60	Wetted Per. (ft)		69.60	
Min Ch El (ft)	2748.70	Shear (lb/sq ft)		1.39	
Alpha	1.00	Stream Power (lb/ft s)	600.00	399.50	497.50
Frctn Loss (ft)	1.42	Cum Volume (acre-ft)		3.87	
C & E Loss (ft)	0.00	Cum SA (acres)		2.63	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2260.4

INPUT
Description: Section 22+60.4
Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2754	226.5	2754	246.5	2754	266.66	2747.49	267.7	2747

```
     330    2747  331.99    2748   333.9    2749     351    2754     371    2754
  441.68    2755

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04   226.5    .016   246.5     .03     351    .016     371    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         246.5     351             60.4    60.4    60.4             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100   246.5  2755.5       T
     351  441.68  2755.5       T
Left Levee      Station=   246.5      Elevation=  2755.5
Right Levee     Station=     351      Elevation=  2755.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2753.24    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               1.23    Wt. n-Val.                             0.030
  W.S. Elev (ft)           2752.01    Reach Len. (ft)             60.40      60.40      60.40
  Crit W.S. (ft)           2751.28    Flow Area (sq ft)                     380.24
  E.G. Slope (ft/ft)      0.004947    Area (sq ft)                          380.24
  Q Total (cfs)            3380.00    Flow (cfs)                           3380.00
  Top Width (ft)             91.56    Top Width (ft)                         91.56
  Vel Total (ft/s)            8.89    Avg. Vel. (ft/s)                        8.89
  Max Chl Dpth (ft)           5.01    Hydr. Depth (ft)                        4.15
  Conv. Total (cfs)        48055.3    Conv. (cfs)                         48055.3
  Length Wtd. (ft)           60.40    Wetted Per. (ft)                       93.29
  Min Ch El (ft)           2747.00    Shear (lb/sq ft)                        1.26
  Alpha                       1.00    Stream Power (lb/ft s)    441.68     246.50     351.00
  Frctn Loss (ft)             0.26    Cum Volume (acre-ft)        0.15       9.84
  C & E Loss (ft)             0.12    Cum SA (acres)              0.32       2.89


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2752.48    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               2.35    Wt. n-Val.                             0.030
  W.S. Elev (ft)           2750.13    Reach Len. (ft)             60.40      60.40      60.40
  Crit W.S. (ft)           2750.71    Flow Area (sq ft)                     219.54
  E.G. Slope (ft/ft)      0.016171    Area (sq ft)                          219.54
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             79.30    Top Width (ft)                         79.30
  Vel Total (ft/s)           12.30    Avg. Vel. (ft/s)                       12.30
  Max Chl Dpth (ft)           3.13    Hydr. Depth (ft)                        2.77
  Conv. Total (cfs)        21232.0    Conv. (cfs)                         21232.0
  Length Wtd. (ft)           60.40    Wetted Per. (ft)                       80.47
  Min Ch El (ft)           2747.00    Shear (lb/sq ft)                        2.75
  Alpha                       1.00    Stream Power (lb/ft s)    441.68     246.50     351.00
  Frctn Loss (ft)             1.47    Cum Volume (acre-ft)        0.07       8.35
  C & E Loss (ft)             0.08    Cum SA (acres)              0.22       2.80


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.
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CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2750.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.60	Wt. n-Val.		0.030	
W.S. Elev (ft)	2749.19	Reach Len. (ft)	60.40	60.40	60.40
Crit W.S. (ft)	2749.56	Flow Area (sq ft)		147.73	
E.G. Slope (ft/ft)	0.016733	Area (sq ft)		147.73	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	73.16	Top Width (ft)		73.16	
Vel Total (ft/s)	10.15	Avg. Vel. (ft/s)		10.15	
Max Chl Dpth (ft)	2.19	Hydr. Depth (ft)		2.02	
Conv. Total (cfs)	11595.8	Conv. (cfs)		11595.8	
Length Wtd. (ft)	60.40	Wetted Per. (ft)		74.05	
Min Ch El (ft)	2747.00	Shear (lb/sq ft)		2.08	
Alpha	1.00	Stream Power (lb/ft s)	441.68	246.50	351.00
Frctn Loss (ft)	1.58	Cum Volume (acre-ft)		5.82	
C & E Loss (ft)	0.05	Cum SA (acres)		2.64	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2748.01	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.		0.030	
W.S. Elev (ft)	2747.68	Reach Len. (ft)	60.40	60.40	60.40
Crit W.S. (ft)	2747.68	Flow Area (sq ft)		43.55	
E.G. Slope (ft/ft)	0.014843	Area (sq ft)		43.55	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	65.30	Top Width (ft)		65.30	
Vel Total (ft/s)	4.59	Avg. Vel. (ft/s)		4.59	
Max Chl Dpth (ft)	0.68	Hydr. Depth (ft)		0.67	
Conv. Total (cfs)	1641.6	Conv. (cfs)		1641.6	
Length Wtd. (ft)	60.40	Wetted Per. (ft)		65.60	
Min Ch El (ft)	2747.00	Shear (lb/sq ft)		0.62	
Alpha	1.00	Stream Power (lb/ft s)	441.68	246.50	351.00
Frctn Loss (ft)	0.58	Cum Volume (acre-ft)		1.97	
C & E Loss (ft)	0.05	Cum SA (acres)		2.28	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2750.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.66	Wt. n-Val.		0.030	
W.S. Elev (ft)	2749.29	Reach Len. (ft)	60.40	60.40	60.40
Crit W.S. (ft)	2749.66	Flow Area (sq ft)		154.69	

E.G. Slope (ft/ft)	0.016521	Area (sq ft)		154.69	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	73.78	Top Width (ft)		73.78	
Vel Total (ft/s)	10.34	Avg. Vel. (ft/s)		10.34	
Max Chl Dpth (ft)	2.29	Hydr. Depth (ft)		2.10	
Conv. Total (cfs)	12448.3	Conv. (cfs)		12448.3	
Length Wtd. (ft)	60.40	Wetted Per. (ft)		74.69	
Min Ch El (ft)	2747.00	Shear (lb/sq ft)		2.14	
Alpha	1.00	Stream Power (lb/ft s)	441.68	246.50	351.00
Frctn Loss (ft)	1.57	Cum Volume (acre-ft)	0.00	6.16	
C & E Loss (ft)	0.05	Cum SA (acres)	0.02	2.67	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2750.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.26	Wt. n-Val.		0.030	
W.S. Elev (ft)	2748.79	Reach Len. (ft)	60.40	60.40	60.40
Crit W.S. (ft)	2749.01	Flow Area (sq ft)		118.96	
E.G. Slope (ft/ft)	0.016764	Area (sq ft)		118.96	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	70.87	Top Width (ft)		70.87	
Vel Total (ft/s)	8.99	Avg. Vel. (ft/s)		8.99	
Max Chl Dpth (ft)	1.79	Hydr. Depth (ft)		1.68	
Conv. Total (cfs)	8264.1	Conv. (cfs)		8264.1	
Length Wtd. (ft)	60.40	Wetted Per. (ft)		71.61	
Min Ch El (ft)	2747.00	Shear (lb/sq ft)		1.74	
Alpha	1.00	Stream Power (lb/ft s)	441.68	246.50	351.00
Frctn Loss (ft)	1.63	Cum Volume (acre-ft)		4.86	
C & E Loss (ft)	0.03	Cum SA (acres)		2.56	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2749.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.85	Wt. n-Val.		0.030	
W.S. Elev (ft)	2748.35	Reach Len. (ft)	60.40	60.40	60.40
Crit W.S. (ft)	2748.49	Flow Area (sq ft)		87.93	
E.G. Slope (ft/ft)	0.016187	Area (sq ft)		87.93	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	68.64	Top Width (ft)		68.64	
Vel Total (ft/s)	7.39	Avg. Vel. (ft/s)		7.39	
Max Chl Dpth (ft)	1.35	Hydr. Depth (ft)		1.28	
Conv. Total (cfs)	5108.9	Conv. (cfs)		5108.9	
Length Wtd. (ft)	60.40	Wetted Per. (ft)		69.21	
Min Ch El (ft)	2747.00	Shear (lb/sq ft)		1.28	
Alpha	1.00	Stream Power (lb/ft s)	441.68	246.50	351.00
Frctn Loss (ft)	1.69	Cum Volume (acre-ft)		3.65	
C & E Loss (ft)	0.02	Cum SA (acres)		2.46	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

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         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 2200.*

INPUT
Description: Boulder Stabilizer #3 (inlet)
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2754   256.5    2754   276.5    2754   301.5  2746.1   361.5  2746.1
   385.5    2754   405.5    2754     471  2753.9

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04   256.5    .016   276.5    .035   385.5    .016   405.5     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         276.5   385.5                2       2       2             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     276  2755.5       T
     386     471  2755.5       T
Left Levee      Station=   276.5      Elevation=  2755.5
Right Levee     Station=   385.5      Elevation=  2755.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2752.86    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.82    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2752.05    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2750.36    Flow Area (sq ft)                    466.27
  E.G. Slope (ft/ft)      0.003680    Area (sq ft)                         466.27
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             96.87    Top Width (ft)                        96.87
  Vel Total (ft/s)            7.25    Avg. Vel. (ft/s)                       7.25
  Max Chl Dpth (ft)           5.94    Hydr. Depth (ft)                       4.81
  Conv. Total (cfs)        55716.8    Conv. (cfs)                         55716.8
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      98.74
  Min Ch El (ft)           2746.10    Shear (lb/sq ft)                       1.08
  Alpha                       1.00    Stream Power (lb/ft s)    471.00     276.50     385.50
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.15       9.25
  C & E Loss (ft)             0.00    Cum SA (acres)              0.32       2.76


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2752.00    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.73    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2751.27    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2749.82    Flow Area (sq ft)                    392.77
  E.G. Slope (ft/ft)      0.003877    Area (sq ft)                         392.77
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             92.05    Top Width (ft)                        92.05
  Vel Total (ft/s)            6.87    Avg. Vel. (ft/s)                       6.87
  Max Chl Dpth (ft)           5.17    Hydr. Depth (ft)                       4.27
  Conv. Total (cfs)        43360.3    Conv. (cfs)                         43360.3
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      93.67
```

Min Ch El (ft)	2746.10	Shear (lb/sq ft)		1.02	
Alpha	1.00	Stream Power (lb/ft s)	471.00	276.50	385.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	7.92	
C & E Loss (ft)	0.00	Cum SA (acres)	0.22	2.68	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2750.21	Element			
Vel Head (ft)	0.55	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.66	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2748.67	Flow Area (sq ft)		252.71	
E.G. Slope (ft/ft)	0.004443	Area (sq ft)		252.71	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	82.07	Top Width (ft)		82.07	
Vel Total (ft/s)	5.94	Avg. Vel. (ft/s)		5.94	
Max Chl Dpth (ft)	3.56	Hydr. Depth (ft)		3.08	
Conv. Total (cfs)	22504.2	Conv. (cfs)		22504.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		83.19	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		0.84	
Alpha	1.00	Stream Power (lb/ft s)	471.00	276.50	385.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		5.54	
C & E Loss (ft)	0.00	Cum SA (acres)		2.53	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2747.24	Element			
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2747.07	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2746.80	Flow Area (sq ft)		61.00	
E.G. Slope (ft/ft)	0.006665	Area (sq ft)		61.00	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	66.01	Top Width (ft)		66.01	
Vel Total (ft/s)	3.28	Avg. Vel. (ft/s)		3.28	
Max Chl Dpth (ft)	0.97	Hydr. Depth (ft)		0.92	
Conv. Total (cfs)	2449.8	Conv. (cfs)		2449.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		66.31	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		0.38	
Alpha	1.00	Stream Power (lb/ft s)	471.00	276.50	385.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		1.89	
C & E Loss (ft)	0.00	Cum SA (acres)		2.19	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2750.37	Element			
Vel Head (ft)	0.57	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.81	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2748.78	Flow Area (sq ft)		265.02	
E.G. Slope (ft/ft)	0.004381	Area (sq ft)		265.02	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	82.99	Top Width (ft)		82.99	

Vel Total (ft/s)	6.04	Avg. Vel. (ft/s)		6.04	
Max Chl Dpth (ft)	3.71	Hydr. Depth (ft)		3.19	
Conv. Total (cfs)	24172.9	Conv. (cfs)		24172.9	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		84.16	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		0.86	
Alpha	1.00	Stream Power (lb/ft s)	471.00	276.50	385.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	5.87	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	2.56	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2749.42	Element			
Vel Head (ft)	0.46	Wt. n-Val.		0.035	
W.S. Elev (ft)	2748.97	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2748.18	Flow Area (sq ft)		197.41	
E.G. Slope (ft/ft)	0.004780	Area (sq ft)		197.41	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	77.77	Top Width (ft)		77.77	
Vel Total (ft/s)	5.42	Avg. Vel. (ft/s)		5.42	
Max Chl Dpth (ft)	2.87	Hydr. Depth (ft)		2.54	
Conv. Total (cfs)	15475.9	Conv. (cfs)		15475.9	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		78.68	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		0.75	
Alpha	1.00	Stream Power (lb/ft s)	471.00	276.50	385.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		4.64	
C & E Loss (ft)	0.00	Cum SA (acres)		2.46	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2748.52	Element			
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2748.18	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2747.61	Flow Area (sq ft)		138.26	
E.G. Slope (ft/ft)	0.005287	Area (sq ft)		138.26	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	72.90	Top Width (ft)		72.90	
Vel Total (ft/s)	4.70	Avg. Vel. (ft/s)		4.70	
Max Chl Dpth (ft)	2.08	Hydr. Depth (ft)		1.90	
Conv. Total (cfs)	8939.7	Conv. (cfs)		8939.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		73.56	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		0.62	
Alpha	1.00	Stream Power (lb/ft s)	471.00	276.50	385.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		3.49	
C & E Loss (ft)	0.00	Cum SA (acres)		2.36	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2198

```
INPUT
Description: Boulder Stabilizer #3
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2754   256.5    2754   276.5    2754   301.5  2746.1   361.5  2746.1
   385.5    2754   405.5    2754     471  2753.9

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04   256.5    .016   276.5    .035   385.5    .016   405.5     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         276.5   385.5               15      15      15             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     276  2755.5       T
     386     471  2755.5       T
Left Levee      Station=   276.5      Elevation=  2755.5
Right Levee     Station=   385.5      Elevation=  2755.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2752.86    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.82    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2752.04    Reach Len. (ft)            15.00      15.00      15.00
  Crit W.S. (ft)           2750.36    Flow Area (sq ft)                    465.51
  E.G. Slope (ft/ft)      0.003698    Area (sq ft)                         465.51
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             96.82    Top Width (ft)                        96.82
  Vel Total (ft/s)            7.26    Avg. Vel. (ft/s)                       7.26
  Max Chl Dpth (ft)           5.94    Hydr. Depth (ft)                       4.81
  Conv. Total (cfs)        55585.3    Conv. (cfs)                         55585.3
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                      98.69
  Min Ch El (ft)           2746.10    Shear (lb/sq ft)                       1.09
  Alpha                       1.00    Stream Power (lb/ft s)    471.00     276.50     385.50
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.15       9.23
  C & E Loss (ft)             0.20    Cum SA (acres)              0.32       2.75


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2752.00    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.74    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2751.26    Reach Len. (ft)            15.00      15.00      15.00
  Crit W.S. (ft)           2749.82    Flow Area (sq ft)                    392.01
  E.G. Slope (ft/ft)      0.003900    Area (sq ft)                         392.01
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             91.99    Top Width (ft)                        91.99
  Vel Total (ft/s)            6.89    Avg. Vel. (ft/s)                       6.89
  Max Chl Dpth (ft)           5.16    Hydr. Depth (ft)                       4.26
  Conv. Total (cfs)        43236.5    Conv. (cfs)                         43236.5
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                      93.62
  Min Ch El (ft)           2746.10    Shear (lb/sq ft)                       1.02
  Alpha                       1.00    Stream Power (lb/ft s)    471.00     276.50     385.50
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.07       7.90
  C & E Loss (ft)             0.19    Cum SA (acres)              0.22       2.68
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2750.20	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.55	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.65	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2748.67	Flow Area (sq ft)		251.95	
E.G. Slope (ft/ft)	0.004483	Area (sq ft)		251.95	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	82.01	Top Width (ft)		82.01	
Vel Total (ft/s)	5.95	Avg. Vel. (ft/s)		5.95	
Max Chl Dpth (ft)	3.55	Hydr. Depth (ft)		3.07	
Conv. Total (cfs)	22402.2	Conv. (cfs)		22402.2	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		83.13	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		0.85	
Alpha	1.00	Stream Power (lb/ft s)	471.00	276.50	385.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		5.53	
C & E Loss (ft)	0.15	Cum SA (acres)		2.53	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2747.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2747.05	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2746.80	Flow Area (sq ft)		59.80	
E.G. Slope (ft/ft)	0.007107	Area (sq ft)		59.80	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	65.89	Top Width (ft)		65.89	
Vel Total (ft/s)	3.34	Avg. Vel. (ft/s)		3.34	
Max Chl Dpth (ft)	0.95	Hydr. Depth (ft)		0.91	
Conv. Total (cfs)	2372.3	Conv. (cfs)		2372.3	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		66.19	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	471.00	276.50	385.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.89	
C & E Loss (ft)	0.05	Cum SA (acres)		2.19	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2750.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.57	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.80	Reach Len. (ft)	15.00	15.00	15.00

Crit W.S. (ft)	2748.78	Flow Area (sq ft)		264.27	
E.G. Slope (ft/ft)	0.004419	Area (sq ft)		264.27	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	82.94	Top Width (ft)		82.94	
Vel Total (ft/s)	6.05	Avg. Vel. (ft/s)		6.05	
Max Chl Dpth (ft)	3.70	Hydr. Depth (ft)		3.19	
Conv. Total (cfs)	24070.3	Conv. (cfs)		24070.3	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		84.10	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)	471.00	276.50	385.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	5.86	
C & E Loss (ft)	0.15	Cum SA (acres)	0.02	2.55	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2749.42	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.46	Wt. n-Val.		0.035	
W.S. Elev (ft)	2748.96	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2748.18	Flow Area (sq ft)		196.63	
E.G. Slope (ft/ft)	0.004838	Area (sq ft)		196.63	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	77.71	Top Width (ft)		77.71	
Vel Total (ft/s)	5.44	Avg. Vel. (ft/s)		5.44	
Max Chl Dpth (ft)	2.86	Hydr. Depth (ft)		2.53	
Conv. Total (cfs)	15382.8	Conv. (cfs)		15382.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		78.61	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		0.76	
Alpha	1.00	Stream Power (lb/ft s)	471.00	276.50	385.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		4.63	
C & E Loss (ft)	0.13	Cum SA (acres)		2.46	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2748.52	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.35	Wt. n-Val.		0.035	
W.S. Elev (ft)	2748.17	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2747.61	Flow Area (sq ft)		137.24	
E.G. Slope (ft/ft)	0.005409	Area (sq ft)		137.24	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	72.82	Top Width (ft)		72.82	
Vel Total (ft/s)	4.74	Avg. Vel. (ft/s)		4.74	
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)		1.88	
Conv. Total (cfs)	8838.0	Conv. (cfs)		8838.0	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		73.47	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		0.63	
Alpha	1.00	Stream Power (lb/ft s)	471.00	276.50	385.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.48	
C & E Loss (ft)	0.10	Cum SA (acres)		2.36	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2183

INPUT
Description: Boulder Stabilizer #3
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2754	242.5	2754	262.5	2754	301.5	2741.1	361.5	2741.1
400.5	2754	420.5	2754	471	2753.9				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	242.5	.016	262.5	.035	400.5	.016	420.5	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
262.5	400.5	2	2	2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	262	2755.5	T
401	471	2755.5	T

Left Levee Station= 262.5 Elevation= 2755.5
Right Levee Station= 400.5 Elevation= 2755.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2752.64	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.15	Wt. n-Val.		0.035	
W.S. Elev (ft)	2752.49	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2745.40	Flow Area (sq ft)		1075.67	
E.G. Slope (ft/ft)	0.000336	Area (sq ft)		1075.67	
Q Total (cfs)	3380.00	Flow (cfs)		3380.00	
Top Width (ft)	128.87	Top Width (ft)		128.87	
Vel Total (ft/s)	3.14	Avg. Vel. (ft/s)		3.14	
Max Chl Dpth (ft)	11.39	Hydr. Depth (ft)		8.35	
Conv. Total (cfs)	184424.7	Conv. (cfs)		184424.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		132.54	
Min Ch El (ft)	2741.10	Shear (lb/sq ft)		0.17	
Alpha	1.00	Stream Power (lb/ft s)	471.00	262.50	400.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	8.96	
C & E Loss (ft)	0.00	Cum SA (acres)	0.32	2.71	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2751.80	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.12	Wt. n-Val.		0.035	
W.S. Elev (ft)	2751.68	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2744.84	Flow Area (sq ft)		973.13	
E.G. Slope (ft/ft)	0.000284	Area (sq ft)		973.13	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	123.97	Top Width (ft)		123.97	
Vel Total (ft/s)	2.77	Avg. Vel. (ft/s)		2.77	

Max Chl Dpth (ft)	10.58	Hydr. Depth (ft)		7.85	
Conv. Total (cfs)	160258.3	Conv. (cfs)		160258.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		127.38	
Min Ch El (ft)	2741.10	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	471.00	262.50	400.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.07	7.67	
C & E Loss (ft)	0.00	Cum SA (acres)	0.22	2.64	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2750.04	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.99	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2743.68	Flow Area (sq ft)		771.80	
E.G. Slope (ft/ft)	0.000169	Area (sq ft)		771.80	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	113.73	Top Width (ft)		113.73	
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)		1.94	
Max Chl Dpth (ft)	8.89	Hydr. Depth (ft)		6.79	
Conv. Total (cfs)	115521.5	Conv. (cfs)		115521.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		116.59	
Min Ch El (ft)	2741.10	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	471.00	262.50	400.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		5.36	
C & E Loss (ft)	0.00	Cum SA (acres)		2.50	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2747.17	Element			
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2747.17	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2741.79	Flow Area (sq ft)		475.41	
E.G. Slope (ft/ft)	0.000012	Area (sq ft)		475.41	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	96.69	Top Width (ft)		96.69	
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.42	
Max Chl Dpth (ft)	6.07	Hydr. Depth (ft)		4.92	
Conv. Total (cfs)	57586.5	Conv. (cfs)		57586.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		98.65	
Min Ch El (ft)	2741.10	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	471.00	262.50	400.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.80	
C & E Loss (ft)	0.00	Cum SA (acres)		2.16	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2750.21	Element			
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2750.14	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2743.77	Flow Area (sq ft)		789.92	
E.G. Slope (ft/ft)	0.000180	Area (sq ft)		789.92	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	114.68	Top Width (ft)		114.68	

Vel Total (ft/s)	2.03	Avg. Vel. (ft/s)		2.03	
Max Chl Dpth (ft)	9.04	Hydr. Depth (ft)		6.89	
Conv. Total (cfs)	119388.9	Conv. (cfs)		119388.9	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		117.60	
Min Ch El (ft)	2741.10	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	471.00	262.50	400.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.00	5.68	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	2.52	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2749.28	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.25	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2743.18	Flow Area (sq ft)		689.30	
E.G. Slope (ft/ft)	0.000118	Area (sq ft)		689.30	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	109.25	Top Width (ft)		109.25	
Vel Total (ft/s)	1.55	Avg. Vel. (ft/s)		1.55	
Max Chl Dpth (ft)	8.15	Hydr. Depth (ft)		6.31	
Conv. Total (cfs)	98351.6	Conv. (cfs)		98351.6	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		111.88	
Min Ch El (ft)	2741.10	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	471.00	262.50	400.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		4.48	
C & E Loss (ft)	0.00	Cum SA (acres)		2.42	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2748.41	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2748.39	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2742.61	Flow Area (sq ft)		598.30	
E.G. Slope (ft/ft)	0.000066	Area (sq ft)		598.30	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	104.09	Top Width (ft)		104.09	
Vel Total (ft/s)	1.09	Avg. Vel. (ft/s)		1.09	
Max Chl Dpth (ft)	7.29	Hydr. Depth (ft)		5.75	
Conv. Total (cfs)	80300.5	Conv. (cfs)		80300.5	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		106.44	
Min Ch El (ft)	2741.10	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	471.00	262.50	400.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.36	
C & E Loss (ft)	0.00	Cum SA (acres)		2.33	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 2181

INPUT
Description: Boulder Stabilizer #3

```
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100    2754   242.5    2754   262.5    2754   301.5  2741.1   361.5  2741.1
   400.5    2754   420.5    2754     471  2753.9

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04   242.5    .016   262.5    .035   400.5    .016   420.5     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         262.5   400.5               15      15      15             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100   262.5  2755.5       T
   400.5     471  2755.5       T
Left Levee      Station=   262.5      Elevation=  2755.5
Right Levee     Station=   400.5      Elevation=  2755.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2752.64    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.15    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2752.49    Reach Len. (ft)             15.00      15.00      15.00
  Crit W.S. (ft)           2745.40    Flow Area (sq ft)                    1075.57
  E.G. Slope (ft/ft)      0.000336    Area (sq ft)                         1075.57
  Q Total (cfs)            3380.00    Flow (cfs)                           3380.00
  Top Width (ft)            128.87    Top Width (ft)                        128.87
  Vel Total (ft/s)            3.14    Avg. Vel. (ft/s)                        3.14
  Max Chl Dpth (ft)          11.39    Hydr. Depth (ft)                        8.35
  Conv. Total (cfs)       184402.1    Conv. (cfs)                        184402.1
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                      132.54
  Min Ch El (ft)           2741.10    Shear (lb/sq ft)                        0.17
  Alpha                       1.00    Stream Power (lb/ft s)    471.00     262.50     400.50
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.15       8.91
  C & E Loss (ft)             0.18    Cum SA (acres)              0.32       2.71


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2751.80    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.12    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2751.68    Reach Len. (ft)             15.00      15.00      15.00
  Crit W.S. (ft)           2744.84    Flow Area (sq ft)                     973.07
  E.G. Slope (ft/ft)      0.000284    Area (sq ft)                          973.07
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)            123.97    Top Width (ft)                        123.97
  Vel Total (ft/s)            2.77    Avg. Vel. (ft/s)                        2.77
  Max Chl Dpth (ft)          10.58    Hydr. Depth (ft)                        7.85
  Conv. Total (cfs)       160244.3    Conv. (cfs)                        160244.3
  Length Wtd. (ft)           15.00    Wetted Per. (ft)                      127.37
  Min Ch El (ft)           2741.10    Shear (lb/sq ft)                        0.14
  Alpha                       1.00    Stream Power (lb/ft s)    471.00     262.50     400.50
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.07       7.62
  C & E Loss (ft)             0.16    Cum SA (acres)              0.22       2.63
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2750.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.99	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2743.68	Flow Area (sq ft)		771.77	
E.G. Slope (ft/ft)	0.000169	Area (sq ft)		771.77	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	113.72	Top Width (ft)		113.72	
Vel Total (ft/s)	1.94	Avg. Vel. (ft/s)		1.94	
Max Chl Dpth (ft)	8.89	Hydr. Depth (ft)		6.79	
Conv. Total (cfs)	115515.5	Conv. (cfs)		115515.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		116.59	
Min Ch El (ft)	2741.10	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	471.00	262.50	400.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		5.32	
C & E Loss (ft)	0.11	Cum SA (acres)		2.49	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2747.17	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2747.17	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2741.79	Flow Area (sq ft)		475.41	
E.G. Slope (ft/ft)	0.000012	Area (sq ft)		475.41	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	96.69	Top Width (ft)		96.69	
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.42	
Max Chl Dpth (ft)	6.07	Hydr. Depth (ft)		4.92	
Conv. Total (cfs)	57586.5	Conv. (cfs)		57586.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		98.65	
Min Ch El (ft)	2741.10	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	471.00	262.50	400.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.78	
C & E Loss (ft)	0.03	Cum SA (acres)		2.15	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2750.21	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2750.14	Reach Len. (ft)	15.00	15.00	15.00

Crit W.S. (ft)	2743.77	Flow Area (sq ft)		789.89	
E.G. Slope (ft/ft)	0.000180	Area (sq ft)		789.89	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	114.68	Top Width (ft)		114.68	
Vel Total (ft/s)	2.03	Avg. Vel. (ft/s)		2.03	
Max Chl Dpth (ft)	9.04	Hydr. Depth (ft)		6.89	
Conv. Total (cfs)	119382.9	Conv. (cfs)		119382.9	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		117.60	
Min Ch El (ft)	2741.10	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	471.00	262.50	400.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	5.64	
C & E Loss (ft)	0.12	Cum SA (acres)	0.02	2.51	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2749.28	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.25	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2743.18	Flow Area (sq ft)		689.27	
E.G. Slope (ft/ft)	0.000118	Area (sq ft)		689.27	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	109.25	Top Width (ft)		109.25	
Vel Total (ft/s)	1.55	Avg. Vel. (ft/s)		1.55	
Max Chl Dpth (ft)	8.15	Hydr. Depth (ft)		6.31	
Conv. Total (cfs)	98346.2	Conv. (cfs)		98346.2	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		111.87	
Min Ch El (ft)	2741.10	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	471.00	262.50	400.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		4.45	
C & E Loss (ft)	0.09	Cum SA (acres)		2.42	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2748.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2748.39	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2742.61	Flow Area (sq ft)		598.28	
E.G. Slope (ft/ft)	0.000066	Area (sq ft)		598.28	
Q Total (cfs)	650.00	Flow (cfs)		650.00	
Top Width (ft)	104.09	Top Width (ft)		104.09	
Vel Total (ft/s)	1.09	Avg. Vel. (ft/s)		1.09	
Max Chl Dpth (ft)	7.29	Hydr. Depth (ft)		5.75	
Conv. Total (cfs)	80295.6	Conv. (cfs)		80295.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		106.44	
Min Ch El (ft)	2741.10	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	471.00	262.50	400.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.33	

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  C & E Loss (ft)             0.07    Cum SA (acres)                        2.32


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 2166

INPUT
Description: Boulder Stabilizer #3 (exit)
Station Elevation Data    num=      16
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2752.3   116.1  2751.8   132.2  2751.3   143.4  2751.1   153.6  2751.1
   170.7    2751   187.4  2751.1   191.1    2751     271  2751.5     291  2751.5
   301.5  2746.1   361.5  2746.1     372  2751.5     392  2751.5   462.3  2751.5
     471  2753.9

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04     271    .016     291    .035     372    .016     392     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           291     372            179.4   179.4   179.4             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     291  2753.8       T
     372     471  2753.8       T
Left Levee      Station=     291      Elevation=  2753.8
Right Levee     Station=     372      Elevation=  2753.8

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2752.45    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.94    Wt. n-Val.                           0.035
  W.S. Elev (ft)           2750.51    Reach Len. (ft)           179.40     179.40     179.40
  Crit W.S. (ft)           2750.51    Flow Area (sq ft)                    302.39
  E.G. Slope (ft/ft)      0.011632    Area (sq ft)                         302.39
  Q Total (cfs)            3380.00    Flow (cfs)                          3380.00
  Top Width (ft)             77.15    Top Width (ft)                        77.15
  Vel Total (ft/s)           11.18    Avg. Vel. (ft/s)                      11.18
  Max Chl Dpth (ft)           4.41    Hydr. Depth (ft)                       3.92
  Conv. Total (cfs)        31339.0    Conv. (cfs)                         31339.0
  Length Wtd. (ft)          179.40    Wetted Per. (ft)                      79.28
  Min Ch El (ft)           2746.10    Shear (lb/sq ft)                       2.77
  Alpha                       1.00    Stream Power (lb/ft s)    471.00     291.00     372.00
  Frctn Loss (ft)             0.95    Cum Volume (acre-ft)        0.15       8.68
  C & E Loss (ft)             0.35    Cum SA (acres)              0.32       2.67


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
```

This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2751.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.72	Wt. n-Val.		0.035	
W.S. Elev (ft)	2749.91	Reach Len. (ft)	179.40	179.40	179.40
Crit W.S. (ft)	2749.91	Flow Area (sq ft)		256.87	
E.G. Slope (ft/ft)	0.012226	Area (sq ft)		256.87	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	74.82	Top Width (ft)		74.82	
Vel Total (ft/s)	10.51	Avg. Vel. (ft/s)		10.51	
Max Chl Dpth (ft)	3.81	Hydr. Depth (ft)		3.43	
Conv. Total (cfs)	24418.2	Conv. (cfs)		24418.2	
Length Wtd. (ft)	179.40	Wetted Per. (ft)		76.66	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		2.56	
Alpha	1.00	Stream Power (lb/ft s)	471.00	291.00	372.00
Frctn Loss (ft)	1.09	Cum Volume (acre-ft)	0.07	7.41	
C & E Loss (ft)	0.30	Cum SA (acres)	0.22	2.60	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2749.92	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.20	Wt. n-Val.		0.035	
W.S. Elev (ft)	2748.72	Reach Len. (ft)	179.40	179.40	179.40
Crit W.S. (ft)	2748.72	Flow Area (sq ft)		170.38	
E.G. Slope (ft/ft)	0.013496	Area (sq ft)		170.38	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	70.18	Top Width (ft)		70.18	
Vel Total (ft/s)	8.80	Avg. Vel. (ft/s)		8.80	
Max Chl Dpth (ft)	2.62	Hydr. Depth (ft)		2.43	
Conv. Total (cfs)	12911.8	Conv. (cfs)		12911.8	
Length Wtd. (ft)	179.40	Wetted Per. (ft)		71.45	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		2.01	
Alpha	1.00	Stream Power (lb/ft s)	471.00	291.00	372.00

Frctn Loss (ft)	1.57	Cum Volume (acre-ft)	5.16
C & E Loss (ft)	0.16	Cum SA (acres)	2.46

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2747.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2746.80	Reach Len. (ft)	179.40	179.40	179.40
Crit W.S. (ft)	2746.80	Flow Area (sq ft)		42.97	
E.G. Slope (ft/ft)	0.020053	Area (sq ft)		42.97	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	62.72	Top Width (ft)		62.72	
Vel Total (ft/s)	4.65	Avg. Vel. (ft/s)		4.65	
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	1412.3	Conv. (cfs)		1412.3	
Length Wtd. (ft)	179.40	Wetted Per. (ft)		63.06	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		0.85	
Alpha	1.00	Stream Power (lb/ft s)	471.00	291.00	372.00
Frctn Loss (ft)		Cum Volume (acre-ft)		1.69	
C & E Loss (ft)		Cum SA (acres)		2.13	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2750.08	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.25	Wt. n-Val.		0.035	
W.S. Elev (ft)	2748.83	Reach Len. (ft)	179.40	179.40	179.40
Crit W.S. (ft)	2748.83	Flow Area (sq ft)		178.53	
E.G. Slope (ft/ft)	0.013266	Area (sq ft)		178.53	
Q Total (cfs)	1600.00	Flow (cfs)		1600.00	
Top Width (ft)	70.63	Top Width (ft)		70.63	
Vel Total (ft/s)	8.96	Avg. Vel. (ft/s)		8.96	
Max Chl Dpth (ft)	2.73	Hydr. Depth (ft)		2.53	
Conv. Total (cfs)	13891.6	Conv. (cfs)		13891.6	
Length Wtd. (ft)	179.40	Wetted Per. (ft)		71.95	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		2.05	

Alpha	1.00	Stream Power (lb/ft s)	471.00	291.00	372.00
Frctn Loss (ft)	1.47	Cum Volume (acre-ft)	0.00	5.47	
C & E Loss (ft)	0.17	Cum SA (acres)	0.02	2.48	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2749.18	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.98	Wt. n-Val.		0.035	
W.S. Elev (ft)	2748.20	Reach Len. (ft)	179.40	179.40	179.40
Crit W.S. (ft)	2748.20	Flow Area (sq ft)		134.35	
E.G. Slope (ft/ft)	0.014522	Area (sq ft)		134.35	
Q Total (cfs)	1070.00	Flow (cfs)		1070.00	
Top Width (ft)	68.15	Top Width (ft)		68.15	
Vel Total (ft/s)	7.96	Avg. Vel. (ft/s)		7.96	
Max Chl Dpth (ft)	2.10	Hydr. Depth (ft)		1.97	
Conv. Total (cfs)	8879.2	Conv. (cfs)		8879.2	
Length Wtd. (ft)	179.40	Wetted Per. (ft)		69.17	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)		1.76	
Alpha	1.00	Stream Power (lb/ft s)	471.00	291.00	372.00
Frctn Loss (ft)	1.90	Cum Volume (acre-ft)		4.30	
C & E Loss (ft)	0.10	Cum SA (acres)		2.39	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2748.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.72	Wt. n-Val.		0.035	
W.S. Elev (ft)	2747.61	Reach Len. (ft)	179.40	179.40	179.40
Crit W.S. (ft)	2747.61	Flow Area (sq ft)		95.24	
E.G. Slope (ft/ft)	0.016044	Area (sq ft)		95.24	
Q Total (cfs)	650.00	Flow (cfs)		650.00	

Top Width (ft)	65.88	Top Width (ft)			65.88	
Vel Total (ft/s)	6.82	Avg. Vel. (ft/s)			6.82	
Max Chl Dpth (ft)	1.51	Hydr. Depth (ft)			1.45	
Conv. Total (cfs)	5131.7	Conv. (cfs)			5131.7	
Length Wtd. (ft)	179.40	Wetted Per. (ft)			66.62	
Min Ch El (ft)	2746.10	Shear (lb/sq ft)			1.43	
Alpha	1.00	Stream Power (lb/ft s)	471.00	291.00	372.00	
Frctn Loss (ft)	2.55	Cum Volume (acre-ft)			3.21	
C & E Loss (ft)	0.04	Cum SA (acres)			2.29	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1986.6

INPUT
Description: Section 19+86.6
Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2750	125.77	2749	401	2749	421.26	2749	440.72	2743
530.82	2743	549	2749	569	2749	574.4	2750		

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.035	401	.016	421.26	.03	549	.016	569	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
421.26	549	86.6	86.6	86.6	.1	.3

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2748.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.60	Wt. n-Val.		0.030	
W.S. Elev (ft)	2745.35	Reach Len. (ft)	86.60	86.60	86.60
Crit W.S. (ft)	2746.43	Flow Area (sq ft)		228.58	
E.G. Slope (ft/ft)	0.033717	Area (sq ft)		228.58	
Q Total (cfs)	3480.00	Flow (cfs)		3480.00	
Top Width (ft)	104.81	Top Width (ft)		104.81	
Vel Total (ft/s)	15.22	Avg. Vel. (ft/s)		15.22	
Max Chl Dpth (ft)	2.35	Hydr. Depth (ft)		2.18	
Conv. Total (cfs)	18951.9	Conv. (cfs)		18951.9	
Length Wtd. (ft)	86.60	Wetted Per. (ft)		105.54	
Min Ch El (ft)	2743.00	Shear (lb/sq ft)		4.56	
Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	3.34	Cum Volume (acre-ft)	0.15	7.58	
C & E Loss (ft)	0.17	Cum SA (acres)	0.32	2.30	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2748.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.04	Wt. n-Val.		0.030	
W.S. Elev (ft)	2745.00	Reach Len. (ft)	86.60	86.60	86.60
Crit W.S. (ft)	2745.92	Flow Area (sq ft)		193.05	
E.G. Slope (ft/ft)	0.034634	Area (sq ft)		193.05	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	102.67	Top Width (ft)		102.67	
Vel Total (ft/s)	13.99	Avg. Vel. (ft/s)		13.99	
Max Chl Dpth (ft)	2.00	Hydr. Depth (ft)		1.88	
Conv. Total (cfs)	14508.1	Conv. (cfs)		14508.1	
Length Wtd. (ft)	86.60	Wetted Per. (ft)		103.29	
Min Ch El (ft)	2743.00	Shear (lb/sq ft)		4.04	
Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	3.45	Cum Volume (acre-ft)	0.07	6.48	
C & E Loss (ft)	0.13	Cum SA (acres)	0.22	2.23	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2746.30	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.85	Wt. n-Val.		0.030	
W.S. Elev (ft)	2744.45	Reach Len. (ft)	86.60	86.60	86.60
Crit W.S. (ft)	2745.00	Flow Area (sq ft)		137.38	
E.G. Slope (ft/ft)	0.031674	Area (sq ft)		137.38	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	99.21	Top Width (ft)		99.21	
Vel Total (ft/s)	10.92	Avg. Vel. (ft/s)		10.92	
Max Chl Dpth (ft)	1.45	Hydr. Depth (ft)		1.38	
Conv. Total (cfs)	8428.3	Conv. (cfs)		8428.3	
Length Wtd. (ft)	86.60	Wetted Per. (ft)		99.66	
Min Ch El (ft)	2743.00	Shear (lb/sq ft)		2.73	
Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	3.55	Cum Volume (acre-ft)		4.52	
C & E Loss (ft)	0.06	Cum SA (acres)		2.11	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2743.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.27	Wt. n-Val.		0.030	
W.S. Elev (ft)	2743.52	Reach Len. (ft)	86.60	86.60	86.60
Crit W.S. (ft)	2743.53	Flow Area (sq ft)		48.02	
E.G. Slope (ft/ft)	0.017202	Area (sq ft)		48.02	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	93.38	Top Width (ft)		93.38	
Vel Total (ft/s)	4.16	Avg. Vel. (ft/s)		4.16	
Max Chl Dpth (ft)	0.52	Hydr. Depth (ft)		0.51	
Conv. Total (cfs)	1524.9	Conv. (cfs)		1524.9	
Length Wtd. (ft)	86.60	Wetted Per. (ft)		93.55	
Min Ch El (ft)	2743.00	Shear (lb/sq ft)		0.55	
Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	3.33	Cum Volume (acre-ft)		1.50	
C & E Loss (ft)	0.02	Cum SA (acres)		1.80	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2746.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.96	Wt. n-Val.		0.030	
W.S. Elev (ft)	2744.55	Reach Len. (ft)	86.60	86.60	86.60
Crit W.S. (ft)	2745.12	Flow Area (sq ft)		146.98	
E.G. Slope (ft/ft)	0.030862	Area (sq ft)		146.98	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	99.81	Top Width (ft)		99.81	
Vel Total (ft/s)	11.23	Avg. Vel. (ft/s)		11.23	
Max Chl Dpth (ft)	1.55	Hydr. Depth (ft)		1.47	
Conv. Total (cfs)	9392.4	Conv. (cfs)		9392.4	
Length Wtd. (ft)	86.60	Wetted Per. (ft)		100.29	
Min Ch El (ft)	2743.00	Shear (lb/sq ft)		2.82	
Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	3.50	Cum Volume (acre-ft)	0.00	4.80	
C & E Loss (ft)	0.07	Cum SA (acres)	0.02	2.13	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2745.63	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.36	Wt. n-Val.		0.030	

W.S. Elev (ft)	2744.27	Reach Len. (ft)	86.60	86.60	86.60
Crit W.S. (ft)	2744.65	Flow Area (sq ft)		119.80	
E.G. Slope (ft/ft)	0.027436	Area (sq ft)		119.80	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	98.09	Top Width (ft)		98.09	
Vel Total (ft/s)	9.35	Avg. Vel. (ft/s)		9.35	
Max Chl Dpth (ft)	1.27	Hydr. Depth (ft)		1.22	
Conv. Total (cfs)	6761.7	Conv. (cfs)		6761.7	
Length Wtd. (ft)	86.60	Wetted Per. (ft)		98.48	
Min Ch El (ft)	2743.00	Shear (lb/sq ft)		2.08	
Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	3.52	Cum Volume (acre-ft)		3.78	
C & E Loss (ft)	0.04	Cum SA (acres)		2.05	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2744.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.85	Wt. n-Val.		0.030	
W.S. Elev (ft)	2743.99	Reach Len. (ft)	86.60	86.60	86.60
Crit W.S. (ft)	2744.19	Flow Area (sq ft)		91.99	
E.G. Slope (ft/ft)	0.023774	Area (sq ft)		91.99	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	96.29	Top Width (ft)		96.29	
Vel Total (ft/s)	7.39	Avg. Vel. (ft/s)		7.39	
Max Chl Dpth (ft)	0.99	Hydr. Depth (ft)		0.96	
Conv. Total (cfs)	4410.2	Conv. (cfs)		4410.2	
Length Wtd. (ft)	86.60	Wetted Per. (ft)		96.60	
Min Ch El (ft)	2743.00	Shear (lb/sq ft)		1.41	
Alpha	1.00	Stream Power (lb/ft s)	574.40	0.00	0.00
Frctn Loss (ft)	3.49	Cum Volume (acre-ft)		2.83	
C & E Loss (ft)	0.01	Cum SA (acres)		1.96	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1900.*

INPUT
Description: Boulder Stabilizer #2 (inlet)
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2748.5	266	2748.5	286	2748.5	307	2741.5	367	2741.5
388	2748.5	408	2748.5	496.8	2748.5				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	266	.016	286	.035	388	.016	408	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
286	388	2	2	2	.1	.3

```
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     286  2750.5       T
     388   496.8  2750.5       T
Left Levee      Station=     286      Elevation=  2750.5
Right Levee     Station=     388      Elevation=  2750.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2748.15    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.99    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2747.15    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2745.86    Flow Area (sq ft)                    435.17
  E.G. Slope (ft/ft)      0.004714    Area (sq ft)                         435.17
  Q Total (cfs)            3480.00    Flow (cfs)                          3480.00
  Top Width (ft)             93.93    Top Width (ft)                        93.93
  Vel Total (ft/s)            8.00    Avg. Vel. (ft/s)                       8.00
  Max Chl Dpth (ft)           5.65    Hydr. Depth (ft)                       4.63
  Conv. Total (cfs)        50687.6    Conv. (cfs)                         50687.6
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      95.76
  Min Ch El (ft)           2741.50    Shear (lb/sq ft)                       1.34
  Alpha                       1.00    Stream Power (lb/ft s)    496.80     286.00     388.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.15       6.92
  C & E Loss (ft)             0.00    Cum SA (acres)              0.32       2.10


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2747.22    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.86    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2746.36    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2745.24    Flow Area (sq ft)                    362.66
  E.G. Slope (ft/ft)      0.004849    Area (sq ft)                         362.66
  Q Total (cfs)            2700.00    Flow (cfs)                          2700.00
  Top Width (ft)             89.17    Top Width (ft)                        89.17
  Vel Total (ft/s)            7.44    Avg. Vel. (ft/s)                       7.44
  Max Chl Dpth (ft)           4.86    Hydr. Depth (ft)                       4.07
  Conv. Total (cfs)        38773.2    Conv. (cfs)                         38773.2
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      90.75
  Min Ch El (ft)           2741.50    Shear (lb/sq ft)                       1.21
  Alpha                       1.00    Stream Power (lb/ft s)    496.80     286.00     388.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)        0.07       5.93
  C & E Loss (ft)             0.00    Cum SA (acres)              0.22       2.04


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2745.52    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.61    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2744.91    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2744.09    Flow Area (sq ft)                    239.36
  E.G. Slope (ft/ft)      0.005185    Area (sq ft)                         239.36
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
  Top Width (ft)             80.45    Top Width (ft)                        80.45
  Vel Total (ft/s)            6.27    Avg. Vel. (ft/s)                       6.27
  Max Chl Dpth (ft)           3.41    Hydr. Depth (ft)                       2.98
  Conv. Total (cfs)        20830.7    Conv. (cfs)                         20830.7
```

Length Wtd. (ft)	2.00	Wetted Per. (ft)		81.56	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		0.95	
Alpha	1.00	Stream Power (lb/ft s)	496.80	286.00	388.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		4.15	
C & E Loss (ft)	0.00	Cum SA (acres)		1.93	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2742.63	Element			
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2742.46	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2742.19	Flow Area (sq ft)		60.07	
E.G. Slope (ft/ft)	0.006978	Area (sq ft)		60.07	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	65.73	Top Width (ft)		65.73	
Vel Total (ft/s)	3.33	Avg. Vel. (ft/s)		3.33	
Max Chl Dpth (ft)	0.96	Hydr. Depth (ft)		0.91	
Conv. Total (cfs)	2394.3	Conv. (cfs)		2394.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		66.04	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		0.40	
Alpha	1.00	Stream Power (lb/ft s)	496.80	286.00	388.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		1.39	
C & E Loss (ft)	0.00	Cum SA (acres)		1.65	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2745.76	Element			
Vel Head (ft)	0.65	Wt. n-Val.		0.035	
W.S. Elev (ft)	2745.11	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2744.20	Flow Area (sq ft)		255.88	
E.G. Slope (ft/ft)	0.005129	Area (sq ft)		255.88	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	81.67	Top Width (ft)		81.67	
Vel Total (ft/s)	6.45	Avg. Vel. (ft/s)		6.45	
Max Chl Dpth (ft)	3.61	Hydr. Depth (ft)		3.13	
Conv. Total (cfs)	23040.2	Conv. (cfs)		23040.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		82.85	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		0.99	
Alpha	1.00	Stream Power (lb/ft s)	496.80	286.00	388.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	4.40	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	1.95	

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2744.86	Element			
Vel Head (ft)	0.51	Wt. n-Val.		0.035	
W.S. Elev (ft)	2744.34	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2743.63	Flow Area (sq ft)		194.87	
E.G. Slope (ft/ft)	0.005405	Area (sq ft)		194.87	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	

```
  Top Width (ft)             77.06    Top Width (ft)                        77.06
  Vel Total (ft/s)            5.75    Avg. Vel. (ft/s)                       5.75
  Max Chl Dpth (ft)           2.84    Hydr. Depth (ft)                       2.53
  Conv. Total (cfs)        15234.2    Conv. (cfs)                         15234.2
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      77.98
  Min Ch El (ft)           2741.50    Shear (lb/sq ft)                       0.84
  Alpha                       1.00    Stream Power (lb/ft s)    496.80     286.00     388.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)                   3.47
  C & E Loss (ft)             0.00    Cum SA (acres)                         1.87


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #2-yr SBCFCD

  E.G. Elev (ft)           2743.96    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.38    Wt. n-Val.                            0.035
  W.S. Elev (ft)           2743.58    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2743.05    Flow Area (sq ft)                    137.73
  E.G. Slope (ft/ft)      0.005817    Area (sq ft)                         137.73
  Q Total (cfs)             680.00    Flow (cfs)                           680.00
  Top Width (ft)             72.48    Top Width (ft)                        72.48
  Vel Total (ft/s)            4.94    Avg. Vel. (ft/s)                       4.94
  Max Chl Dpth (ft)           2.08    Hydr. Depth (ft)                       1.90
  Conv. Total (cfs)         8916.0    Conv. (cfs)                          8916.0
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      73.15
  Min Ch El (ft)           2741.50    Shear (lb/sq ft)                       0.68
  Alpha                       1.00    Stream Power (lb/ft s)    496.80     286.00     388.00
  Frctn Loss (ft)             0.01    Cum Volume (acre-ft)                   2.60
  C & E Loss (ft)             0.00    Cum SA (acres)                         1.79


Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 1898

INPUT
Description: Boulder Stabilizer #2
Station Elevation Data    num=       8
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2748.5     266  2748.5     286  2748.5     307  2741.5     367  2741.5
     388  2748.5     408  2748.5   496.8  2748.5

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04     266    .016     286    .035     388    .016     408     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           286     388               15      15      15             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     286  2750.5       T
     388   496.8  2750.5       T
Left Levee      Station=     286      Elevation=  2750.5
Right Levee     Station=     388      Elevation=  2750.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD
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E.G. Elev (ft)	2748.14	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2747.14	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2745.86	Flow Area (sq ft)		434.21	
E.G. Slope (ft/ft)	0.004744	Area (sq ft)		434.21	
Q Total (cfs)	3480.00	Flow (cfs)		3480.00	
Top Width (ft)	93.86	Top Width (ft)		93.86	
Vel Total (ft/s)	8.01	Avg. Vel. (ft/s)		8.01	
Max Chl Dpth (ft)	5.64	Hydr. Depth (ft)		4.63	
Conv. Total (cfs)	50523.6	Conv. (cfs)		50523.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		95.70	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		1.34	
Alpha	1.00	Stream Power (lb/ft s)	496.80	286.00	388.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	6.90	
C & E Loss (ft)	0.25	Cum SA (acres)	0.32	2.10	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2747.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.87	Wt. n-Val.		0.035	
W.S. Elev (ft)	2746.35	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2745.24	Flow Area (sq ft)		361.73	
E.G. Slope (ft/ft)	0.004886	Area (sq ft)		361.73	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	89.11	Top Width (ft)		89.11	
Vel Total (ft/s)	7.46	Avg. Vel. (ft/s)		7.46	
Max Chl Dpth (ft)	4.85	Hydr. Depth (ft)		4.06	
Conv. Total (cfs)	38625.4	Conv. (cfs)		38625.4	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		90.69	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		1.22	
Alpha	1.00	Stream Power (lb/ft s)	496.80	286.00	388.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	5.92	
C & E Loss (ft)	0.22	Cum SA (acres)	0.22	2.04	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2745.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.		0.035	
W.S. Elev (ft)	2744.89	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2744.09	Flow Area (sq ft)		238.22	
E.G. Slope (ft/ft)	0.005261	Area (sq ft)		238.22	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	80.37	Top Width (ft)		80.37	
Vel Total (ft/s)	6.30	Avg. Vel. (ft/s)		6.30	
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)		2.96	
Conv. Total (cfs)	20681.0	Conv. (cfs)		20681.0	

Length Wtd. (ft)	15.00	Wetted Per. (ft)		81.47	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)	496.80	286.00	388.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		4.14	
C & E Loss (ft)	0.17	Cum SA (acres)		1.93	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

			Left OB	Channel	Right OB
E.G. Elev (ft)	2742.62	Element			
Vel Head (ft)	0.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2742.44	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2742.19	Flow Area (sq ft)		58.81	
E.G. Slope (ft/ft)	0.007473	Area (sq ft)		58.81	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	65.62	Top Width (ft)		65.62	
Vel Total (ft/s)	3.40	Avg. Vel. (ft/s)		3.40	
Max Chl Dpth (ft)	0.94	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	2313.6	Conv. (cfs)		2313.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		65.92	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		0.42	
Alpha	1.00	Stream Power (lb/ft s)	496.80	286.00	388.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.39	
C & E Loss (ft)	0.05	Cum SA (acres)		1.64	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2745.75	Element			
Vel Head (ft)	0.65	Wt. n-Val.		0.035	
W.S. Elev (ft)	2745.10	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2744.20	Flow Area (sq ft)		254.73	
E.G. Slope (ft/ft)	0.005199	Area (sq ft)		254.73	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	81.59	Top Width (ft)		81.59	
Vel Total (ft/s)	6.48	Avg. Vel. (ft/s)		6.48	
Max Chl Dpth (ft)	3.60	Hydr. Depth (ft)		3.12	
Conv. Total (cfs)	22883.4	Conv. (cfs)		22883.4	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		82.76	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		1.00	
Alpha	1.00	Stream Power (lb/ft s)	496.80	286.00	388.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	4.39	
C & E Loss (ft)	0.17	Cum SA (acres)	0.02	1.95	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2744.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.035	
W.S. Elev (ft)	2744.33	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2743.63	Flow Area (sq ft)		193.76	
E.G. Slope (ft/ft)	0.005500	Area (sq ft)		193.76	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	76.97	Top Width (ft)		76.97	
Vel Total (ft/s)	5.78	Avg. Vel. (ft/s)		5.78	
Max Chl Dpth (ft)	2.83	Hydr. Depth (ft)		2.52	
Conv. Total (cfs)	15101.7	Conv. (cfs)		15101.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		77.89	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		0.85	
Alpha	1.00	Stream Power (lb/ft s)	496.80	286.00	388.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		3.46	
C & E Loss (ft)	0.14	Cum SA (acres)		1.87	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2743.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.035	
W.S. Elev (ft)	2743.56	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2743.05	Flow Area (sq ft)		136.58	
E.G. Slope (ft/ft)	0.005971	Area (sq ft)		136.58	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	72.38	Top Width (ft)		72.38	
Vel Total (ft/s)	4.98	Avg. Vel. (ft/s)		4.98	
Max Chl Dpth (ft)	2.06	Hydr. Depth (ft)		1.89	
Conv. Total (cfs)	8800.4	Conv. (cfs)		8800.4	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		73.05	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)	496.80	286.00	388.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.59	
C & E Loss (ft)	0.11	Cum SA (acres)		1.79	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1883

INPUT
Description: Boulder Stabilizer #2
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2748.5	249	2749	269	2749	307	2736.5	367	2736.5
405	2749	425	2749	496.8	2748.5				

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Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04     249    .016     269    .035     405    .016     425     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           269     405               2       2       2             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     269    2751       T
     405   496.8    2751       T
Left Levee      Station=     269      Elevation=    2751
Right Levee     Station=     405      Elevation=    2751

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2747.88    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.17    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2747.71    Reach Len. (ft)              2.00       2.00       2.00
  Crit W.S. (ft)           2740.86    Flow Area (sq ft)                    1054.55
  E.G. Slope (ft/ft)      0.000377    Area (sq ft)                         1054.55
  Q Total (cfs)            3480.00    Flow (cfs)                           3480.00
  Top Width (ft)            128.15    Top Width (ft)                        128.15
  Vel Total (ft/s)            3.30    Avg. Vel. (ft/s)                        3.30
  Max Chl Dpth (ft)          11.21    Hydr. Depth (ft)                        8.23
  Conv. Total (cfs)       179149.0    Conv. (cfs)                         179149.0
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      131.75
  Min Ch El (ft)           2736.50    Shear (lb/sq ft)                        0.19
  Alpha                       1.00    Stream Power (lb/ft s)    496.80     269.00     405.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.15       6.65
  C & E Loss (ft)             0.00    Cum SA (acres)              0.32       2.06


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2746.98    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.13    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2746.86    Reach Len. (ft)              2.00       2.00       2.00
  Crit W.S. (ft)           2740.22    Flow Area (sq ft)                     947.50
  E.G. Slope (ft/ft)      0.000307    Area (sq ft)                          947.50
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)            122.97    Top Width (ft)                        122.97
  Vel Total (ft/s)            2.85    Avg. Vel. (ft/s)                        2.85
  Max Chl Dpth (ft)          10.36    Hydr. Depth (ft)                        7.71
  Conv. Total (cfs)       154164.6    Conv. (cfs)                         154164.6
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      126.29
  Min Ch El (ft)           2736.50    Shear (lb/sq ft)                        0.14
  Alpha                       1.00    Stream Power (lb/ft s)    496.80     269.00     405.00
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.07       5.69
  C & E Loss (ft)             0.00    Cum SA (acres)              0.22       2.00


Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2745.34    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               0.06    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2745.28    Reach Len. (ft)              2.00       2.00       2.00
  Crit W.S. (ft)           2739.07    Flow Area (sq ft)                     760.60
  E.G. Slope (ft/ft)      0.000176    Area (sq ft)                          760.60
```

Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	113.35	Top Width (ft)		113.35	
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)		1.97	
Max Chl Dpth (ft)	8.78	Hydr. Depth (ft)		6.71	
Conv. Total (cfs)	113014.8	Conv. (cfs)		113014.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		116.17	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	496.80	269.00	405.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.97	
C & E Loss (ft)	0.00	Cum SA (acres)		1.90	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2742.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2742.56	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2737.20	Flow Area (sq ft)		475.08	
E.G. Slope (ft/ft)	0.000012	Area (sq ft)		475.08	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	96.83	Top Width (ft)		96.83	
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.42	
Max Chl Dpth (ft)	6.06	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	57469.3	Conv. (cfs)		57469.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		98.78	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	496.80	269.00	405.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.30	
C & E Loss (ft)	0.00	Cum SA (acres)		1.61	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2745.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2745.50	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2739.24	Flow Area (sq ft)		785.99	
E.G. Slope (ft/ft)	0.000194	Area (sq ft)		785.99	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	114.71	Top Width (ft)		114.71	
Vel Total (ft/s)	2.10	Avg. Vel. (ft/s)		2.10	
Max Chl Dpth (ft)	9.00	Hydr. Depth (ft)		6.85	
Conv. Total (cfs)	118405.6	Conv. (cfs)		118405.6	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		117.59	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	496.80	269.00	405.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.00	4.21	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	1.91	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2744.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2744.66	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2738.63	Flow Area (sq ft)		691.64	

E.G. Slope (ft/ft)	0.000129	Area (sq ft)		691.64	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	109.59	Top Width (ft)		109.59	
Vel Total (ft/s)	1.62	Avg. Vel. (ft/s)		1.62	
Max Chl Dpth (ft)	8.16	Hydr. Depth (ft)		6.31	
Conv. Total (cfs)	98714.3	Conv. (cfs)		98714.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		112.21	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	496.80	269.00	405.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		3.31	
C & E Loss (ft)	0.00	Cum SA (acres)		1.84	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2743.84	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2743.82	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2738.05	Flow Area (sq ft)		601.64	
E.G. Slope (ft/ft)	0.000071	Area (sq ft)		601.64	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	104.48	Top Width (ft)		104.48	
Vel Total (ft/s)	1.13	Avg. Vel. (ft/s)		1.13	
Max Chl Dpth (ft)	7.32	Hydr. Depth (ft)		5.76	
Conv. Total (cfs)	80855.1	Conv. (cfs)		80855.1	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		106.82	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	496.80	269.00	405.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.46	
C & E Loss (ft)	0.00	Cum SA (acres)		1.76	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1881

INPUT
Description: Boulder Stabilizer #2
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2748.5	249	2749	269	2749	307	2736.5	367	2736.5
405	2749	425	2749	496.8	2748.5				

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	249	.016	269	.035	405	.016	425	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
269	405	15	15	15	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	269	2751	T
405	496.8	2751	T

Left Levee Station= 269 Elevation= 2751
Right Levee Station= 405 Elevation= 2751

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2747.88	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2747.71	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2740.86	Flow Area (sq ft)		1054.46	
E.G. Slope (ft/ft)	0.000377	Area (sq ft)		1054.46	
Q Total (cfs)	3480.00	Flow (cfs)		3480.00	
Top Width (ft)	128.15	Top Width (ft)		128.15	
Vel Total (ft/s)	3.30	Avg. Vel. (ft/s)		3.30	
Max Chl Dpth (ft)	11.21	Hydr. Depth (ft)		8.23	
Conv. Total (cfs)	179126.7	Conv. (cfs)		179126.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		131.74	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	496.80	269.00	405.00
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.15	6.60	
C & E Loss (ft)	0.17	Cum SA (acres)	0.32	2.05	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2746.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2746.86	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2740.22	Flow Area (sq ft)		947.38	
E.G. Slope (ft/ft)	0.000307	Area (sq ft)		947.38	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	122.96	Top Width (ft)		122.96	
Vel Total (ft/s)	2.85	Avg. Vel. (ft/s)		2.85	
Max Chl Dpth (ft)	10.36	Hydr. Depth (ft)		7.70	
Conv. Total (cfs)	154137.1	Conv. (cfs)		154137.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		126.28	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	496.80	269.00	405.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	5.65	
C & E Loss (ft)	0.15	Cum SA (acres)	0.22	2.00	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2745.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2745.28	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2739.07	Flow Area (sq ft)		760.57	
E.G. Slope (ft/ft)	0.000176	Area (sq ft)		760.57	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	113.35	Top Width (ft)		113.35	
Vel Total (ft/s)	1.97	Avg. Vel. (ft/s)		1.97	
Max Chl Dpth (ft)	8.77	Hydr. Depth (ft)		6.71	
Conv. Total (cfs)	113008.9	Conv. (cfs)		113008.9	

Length Wtd. (ft)	15.00	Wetted Per. (ft)		116.16	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	496.80	269.00	405.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		3.93	
C & E Loss (ft)	0.11	Cum SA (acres)		1.89	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2742.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2742.56	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2737.20	Flow Area (sq ft)		475.08	
E.G. Slope (ft/ft)	0.000012	Area (sq ft)		475.08	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	96.83	Top Width (ft)		96.83	
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.42	
Max Chl Dpth (ft)	6.06	Hydr. Depth (ft)		4.91	
Conv. Total (cfs)	57469.3	Conv. (cfs)		57469.3	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		98.78	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	496.80	269.00	405.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.28	
C & E Loss (ft)	0.03	Cum SA (acres)		1.61	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2745.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2745.50	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2739.24	Flow Area (sq ft)		785.93	
E.G. Slope (ft/ft)	0.000194	Area (sq ft)		785.93	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	114.70	Top Width (ft)		114.70	
Vel Total (ft/s)	2.10	Avg. Vel. (ft/s)		2.10	
Max Chl Dpth (ft)	9.00	Hydr. Depth (ft)		6.85	
Conv. Total (cfs)	118393.6	Conv. (cfs)		118393.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		117.59	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	496.80	269.00	405.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	4.18	
C & E Loss (ft)	0.11	Cum SA (acres)	0.02	1.91	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2744.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2744.66	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2738.63	Flow Area (sq ft)		691.61	
E.G. Slope (ft/ft)	0.000129	Area (sq ft)		691.61	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	109.59	Top Width (ft)		109.59	
Vel Total (ft/s)	1.62	Avg. Vel. (ft/s)		1.62	
Max Chl Dpth (ft)	8.16	Hydr. Depth (ft)		6.31	
Conv. Total (cfs)	98708.8	Conv. (cfs)		98708.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		112.20	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	496.80	269.00	405.00
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		3.28	
C & E Loss (ft)	0.09	Cum SA (acres)		1.83	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2743.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2743.82	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2738.05	Flow Area (sq ft)		601.61	
E.G. Slope (ft/ft)	0.000071	Area (sq ft)		601.61	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	104.48	Top Width (ft)		104.48	
Vel Total (ft/s)	1.13	Avg. Vel. (ft/s)		1.13	
Max Chl Dpth (ft)	7.32	Hydr. Depth (ft)		5.76	
Conv. Total (cfs)	80850.1	Conv. (cfs)		80850.1	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		106.82	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.02	
Alpha	1.00	Stream Power (lb/ft s)	496.80	269.00	405.00
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.44	
C & E Loss (ft)	0.07	Cum SA (acres)		1.75	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1866

INPUT
Description: Boulder Stabilizer #2 (exit)

```
Station Elevation Data    num=       9
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2748.5   121.5  2747.8     267    2748     287    2748     307  2741.5
     367  2741.5     387    2748     407    2748   496.8  2748.5

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100     .04     267    .016     287    .035     387    .016     407     .04

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           287     387            166.8   166.8   166.8             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     287    2749       T
     387   496.8    2749       T
Left Levee      Station=     287      Elevation=    2749
Right Levee     Station=     387      Elevation=    2749

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2747.70    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               1.83    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2745.86    Reach Len. (ft)            166.80     166.80     166.80
  Crit W.S. (ft)           2745.86    Flow Area (sq ft)                     320.38
  E.G. Slope (ft/ft)      0.011730    Area (sq ft)                          320.38
  Q Total (cfs)            3480.00    Flow (cfs)                           3480.00
  Top Width (ft)             86.85    Top Width (ft)                         86.85
  Vel Total (ft/s)           10.86    Avg. Vel. (ft/s)                       10.86
  Max Chl Dpth (ft)           4.36    Hydr. Depth (ft)                        3.69
  Conv. Total (cfs)        32132.0    Conv. (cfs)                         32132.0
  Length Wtd. (ft)          166.80    Wetted Per. (ft)                       88.23
  Min Ch El (ft)           2741.50    Shear (lb/sq ft)                        2.66
  Alpha                       1.00    Stream Power (lb/ft s)     496.80     287.00     387.00
  Frctn Loss (ft)             1.66    Cum Volume (acre-ft)         0.15       6.36
  C & E Loss (ft)             0.00    Cum SA (acres)               0.32       2.02


Warning: The energy equation could not be balanced within the specified number of iterations.  The
program used critical depth
         for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to
critical depth, the calculated
         water surface came back below critical depth.  This indicates that there is not a valid
subcritical answer.  The program
         defaulted to critical depth.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2746.82    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               1.59    Wt. n-Val.                             0.035
  W.S. Elev (ft)           2745.24    Reach Len. (ft)            166.80     166.80     166.80
  Crit W.S. (ft)           2745.24    Flow Area (sq ft)                     267.17
  E.G. Slope (ft/ft)      0.012148    Area (sq ft)                          267.17
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             83.00    Top Width (ft)                         83.00
  Vel Total (ft/s)           10.11    Avg. Vel. (ft/s)                       10.11
  Max Chl Dpth (ft)           3.74    Hydr. Depth (ft)                        3.22
  Conv. Total (cfs)        24497.0    Conv. (cfs)                         24497.0
  Length Wtd. (ft)          166.80    Wetted Per. (ft)                       84.18
  Min Ch El (ft)           2741.50    Shear (lb/sq ft)                        2.41
```

Alpha	1.00	Stream Power (lb/ft s)	496.80	287.00	387.00
Frctn Loss (ft)	1.73	Cum Volume (acre-ft)	0.07	5.44	
C & E Loss (ft)	0.00	Cum SA (acres)	0.22	1.96	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2745.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.16	Wt. n-Val.		0.035	
W.S. Elev (ft)	2744.06	Reach Len. (ft)	166.80	166.80	166.80
Crit W.S. (ft)	2744.06	Flow Area (sq ft)		173.73	
E.G. Slope (ft/ft)	0.013870	Area (sq ft)		173.73	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	75.75	Top Width (ft)		75.75	
Vel Total (ft/s)	8.63	Avg. Vel. (ft/s)		8.63	
Max Chl Dpth (ft)	2.56	Hydr. Depth (ft)		2.29	
Conv. Total (cfs)	12736.6	Conv. (cfs)		12736.6	
Length Wtd. (ft)	166.80	Wetted Per. (ft)		76.56	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		1.96	
Alpha	1.00	Stream Power (lb/ft s)	496.80	287.00	387.00
Frctn Loss (ft)	1.94	Cum Volume (acre-ft)		3.77	
C & E Loss (ft)	0.01	Cum SA (acres)		1.86	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2742.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.33	Wt. n-Val.		0.035	
W.S. Elev (ft)	2742.20	Reach Len. (ft)	166.80	166.80	166.80
Crit W.S. (ft)	2742.20	Flow Area (sq ft)		43.63	
E.G. Slope (ft/ft)	0.019650	Area (sq ft)		43.63	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	64.32	Top Width (ft)		64.32	
Vel Total (ft/s)	4.58	Avg. Vel. (ft/s)		4.58	
Max Chl Dpth (ft)	0.70	Hydr. Depth (ft)		0.68	
Conv. Total (cfs)	1426.7	Conv. (cfs)		1426.7	
Length Wtd. (ft)	166.80	Wetted Per. (ft)		64.54	

Min Ch El (ft)	2741.50	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)	496.80	287.00	387.00
Frctn Loss (ft)	2.83	Cum Volume (acre-ft)		1.19	
C & E Loss (ft)	0.00	Cum SA (acres)		1.58	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2745.44	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	2744.24	Reach Len. (ft)	166.80	166.80	166.80
Crit W.S. (ft)	2744.24	Flow Area (sq ft)		187.09	
E.G. Slope (ft/ft)	0.013371	Area (sq ft)		187.09	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	76.83	Top Width (ft)		76.83	
Vel Total (ft/s)	8.82	Avg. Vel. (ft/s)		8.82	
Max Chl Dpth (ft)	2.73	Hydr. Depth (ft)		2.44	
Conv. Total (cfs)	14269.4	Conv. (cfs)		14269.4	
Length Wtd. (ft)	166.80	Wetted Per. (ft)		77.69	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		2.01	
Alpha	1.00	Stream Power (lb/ft s)	496.80	287.00	387.00
Frctn Loss (ft)	1.89	Cum Volume (acre-ft)	0.00	4.01	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	1.88	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2744.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.95	Wt. n-Val.		0.035	
W.S. Elev (ft)	2743.65	Reach Len. (ft)	166.80	166.80	166.80
Crit W.S. (ft)	2743.65	Flow Area (sq ft)		142.97	
E.G. Slope (ft/ft)	0.014123	Area (sq ft)		142.97	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	73.21	Top Width (ft)		73.21	
Vel Total (ft/s)	7.83	Avg. Vel. (ft/s)		7.83	
Max Chl Dpth (ft)	2.15	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	9424.5	Conv. (cfs)		9424.5	

Length Wtd. (ft)	166.80	Wetted Per. (ft)		73.89	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		1.71	
Alpha	1.00	Stream Power (lb/ft s)	496.80	287.00	387.00
Frctn Loss (ft)	2.04	Cum Volume (acre-ft)		3.13	
C & E Loss (ft)	0.00	Cum SA (acres)		1.80	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2743.76	Element			
Vel Head (ft)	0.71	Wt. n-Val.		0.035	
W.S. Elev (ft)	2743.05	Reach Len. (ft)	166.80	166.80	166.80
Crit W.S. (ft)	2743.05	Flow Area (sq ft)		100.55	
E.G. Slope (ft/ft)	0.015670	Area (sq ft)		100.55	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	69.55	Top Width (ft)		69.55	
Vel Total (ft/s)	6.76	Avg. Vel. (ft/s)		6.76	
Max Chl Dpth (ft)	1.55	Hydr. Depth (ft)		1.45	
Conv. Total (cfs)	5432.2	Conv. (cfs)		5432.2	
Length Wtd. (ft)	166.80	Wetted Per. (ft)		70.04	
Min Ch El (ft)	2741.50	Shear (lb/sq ft)		1.40	
Alpha	1.00	Stream Power (lb/ft s)	496.80	287.00	387.00
Frctn Loss (ft)	2.25	Cum Volume (acre-ft)		2.31	
C & E Loss (ft)	0.00	Cum SA (acres)		1.72	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1699.2

INPUT
Description: Section 16+99.2
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2745	120.67	2745	124.65	2742	199	2742	219	2742

```
     231    2738     291    2738     303    2742     323    2742     332    2745

Manning's n Values        num=       5
     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035     199    .016     219     .03     303    .016     323    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
           219     303             99.2    99.2    99.2             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100     219  2744.5       T
     303     332  2744.5       T
Left Levee      Station=     219      Elevation=  2744.5
Right Levee     Station=     303      Elevation=  2744.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2744.85    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               3.56    Wt. n-Val.                             0.030
  W.S. Elev (ft)           2741.29    Reach Len. (ft)             99.20      99.20      99.20
  Crit W.S. (ft)           2742.35    Flow Area (sq ft)                     229.88
  E.G. Slope (ft/ft)      0.023176    Area (sq ft)                          229.88
  Q Total (cfs)            3480.00    Flow (cfs)                           3480.00
  Top Width (ft)             79.74    Top Width (ft)                         79.74
  Vel Total (ft/s)           15.14    Avg. Vel. (ft/s)                       15.14
  Max Chl Dpth (ft)           3.29    Hydr. Depth (ft)                        2.88
  Conv. Total (cfs)        22859.1    Conv. (cfs)                          22859.1
  Length Wtd. (ft)           99.20    Wetted Per. (ft)                       80.81
  Min Ch El (ft)           2738.00    Shear (lb/sq ft)                        4.12
  Alpha                       1.00    Stream Power (lb/ft s)    332.00     219.00     303.00
  Frctn Loss (ft)             2.67    Cum Volume (acre-ft)        0.15       5.31
  C & E Loss (ft)             0.17    Cum SA (acres)              0.32       1.70


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2743.89    Element                    Left OB    Channel   Right OB
  Vel Head (ft)               3.09    Wt. n-Val.                             0.030
  W.S. Elev (ft)           2740.80    Reach Len. (ft)             99.20      99.20      99.20
  Crit W.S. (ft)           2741.74    Flow Area (sq ft)                     191.49
  E.G. Slope (ft/ft)      0.024348    Area (sq ft)                          191.49
  Q Total (cfs)            2700.00    Flow (cfs)                           2700.00
  Top Width (ft)             76.80    Top Width (ft)                         76.80
  Vel Total (ft/s)           14.10    Avg. Vel. (ft/s)                       14.10
  Max Chl Dpth (ft)           2.80    Hydr. Depth (ft)                        2.49
  Conv. Total (cfs)        17303.5    Conv. (cfs)                          17303.5
  Length Wtd. (ft)           99.20    Wetted Per. (ft)                       77.71
  Min Ch El (ft)           2738.00    Shear (lb/sq ft)                        3.75
  Alpha                       1.00    Stream Power (lb/ft s)    332.00     219.00     303.00
  Frctn Loss (ft)             2.78    Cum Volume (acre-ft)        0.07       4.56
  C & E Loss (ft)             0.15    Cum SA (acres)              0.22       1.65
```

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2742.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.10	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.96	Reach Len. (ft)	99.20	99.20	99.20
Crit W.S. (ft)	2740.58	Flow Area (sq ft)		128.88	
E.G. Slope (ft/ft)	0.025584	Area (sq ft)		128.88	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	71.74	Top Width (ft)		71.74	
Vel Total (ft/s)	11.64	Avg. Vel. (ft/s)		11.64	
Max Chl Dpth (ft)	1.96	Hydr. Depth (ft)		1.80	
Conv. Total (cfs)	9378.0	Conv. (cfs)		9378.0	
Length Wtd. (ft)	99.20	Wetted Per. (ft)		72.37	
Min Ch El (ft)	2738.00	Shear (lb/sq ft)		2.84	
Alpha	1.00	Stream Power (lb/ft s)	332.00	219.00	303.00
Frctn Loss (ft)	3.07	Cum Volume (acre-ft)		3.19	
C & E Loss (ft)	0.09	Cum SA (acres)		1.58	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2739.04	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.43	Wt. n-Val.		0.030	
W.S. Elev (ft)	2738.62	Reach Len. (ft)	99.20	99.20	99.20
Crit W.S. (ft)	2738.70	Flow Area (sq ft)		38.19	
E.G. Slope (ft/ft)	0.022210	Area (sq ft)		38.19	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	63.70	Top Width (ft)		63.70	
Vel Total (ft/s)	5.24	Avg. Vel. (ft/s)		5.24	
Max Chl Dpth (ft)	0.62	Hydr. Depth (ft)		0.60	
Conv. Total (cfs)	1342.0	Conv. (cfs)		1342.0	
Length Wtd. (ft)	99.20	Wetted Per. (ft)		63.90	
Min Ch El (ft)	2738.00	Shear (lb/sq ft)		0.83	
Alpha	1.00	Stream Power (lb/ft s)	332.00	219.00	303.00
Frctn Loss (ft)	3.48	Cum Volume (acre-ft)		1.03	
C & E Loss (ft)	0.01	Cum SA (acres)		1.34	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2742.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.26	Wt. n-Val.		0.030	
W.S. Elev (ft)	2740.07	Reach Len. (ft)	99.20	99.20	99.20
Crit W.S. (ft)	2740.75	Flow Area (sq ft)		136.79	
E.G. Slope (ft/ft)	0.025702	Area (sq ft)		136.79	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	72.40	Top Width (ft)		72.40	
Vel Total (ft/s)	12.06	Avg. Vel. (ft/s)		12.06	
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)		1.89	
Conv. Total (cfs)	10292.0	Conv. (cfs)		10292.0	
Length Wtd. (ft)	99.20	Wetted Per. (ft)		73.07	
Min Ch El (ft)	2738.00	Shear (lb/sq ft)		3.00	
Alpha	1.00	Stream Power (lb/ft s)	332.00	219.00	303.00
Frctn Loss (ft)	3.01	Cum Volume (acre-ft)	0.00	3.39	
C & E Loss (ft)	0.11	Cum SA (acres)	0.02	1.59	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2741.37	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.74	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.63	Reach Len. (ft)	99.20	99.20	99.20
Crit W.S. (ft)	2740.13	Flow Area (sq ft)		105.73	
E.G. Slope (ft/ft)	0.026548	Area (sq ft)		105.73	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	69.78	Top Width (ft)		69.78	
Vel Total (ft/s)	10.59	Avg. Vel. (ft/s)		10.59	
Max Chl Dpth (ft)	1.63	Hydr. Depth (ft)		1.52	
Conv. Total (cfs)	6873.9	Conv. (cfs)		6873.9	
Length Wtd. (ft)	99.20	Wetted Per. (ft)		70.31	
Min Ch El (ft)	2738.00	Shear (lb/sq ft)		2.49	
Alpha	1.00	Stream Power (lb/ft s)	332.00	219.00	303.00
Frctn Loss (ft)	3.15	Cum Volume (acre-ft)		2.66	
C & E Loss (ft)	0.08	Cum SA (acres)		1.53	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2740.41	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.18	Wt. n-Val.		0.030	
W.S. Elev (ft)	2739.22	Reach Len. (ft)	99.20	99.20	99.20
Crit W.S. (ft)	2739.54	Flow Area (sq ft)		77.89	
E.G. Slope (ft/ft)	0.025785	Area (sq ft)		77.89	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	67.34	Top Width (ft)		67.34	
Vel Total (ft/s)	8.73	Avg. Vel. (ft/s)		8.73	
Max Chl Dpth (ft)	1.22	Hydr. Depth (ft)		1.16	
Conv. Total (cfs)	4234.7	Conv. (cfs)		4234.7	
Length Wtd. (ft)	99.20	Wetted Per. (ft)		67.74	

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  Min Ch El (ft)           2738.00    Shear (lb/sq ft)                        1.85
  Alpha                       1.00    Stream Power (lb/ft s)    332.00     219.00     303.00
  Frctn Loss (ft)             3.30    Cum Volume (acre-ft)                    1.97
  C & E Loss (ft)             0.05    Cum SA (acres)                          1.46


Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.

CROSS SECTION


RIVER: Desert Knolls Wa
REACH: Main               RS: 1600.*

INPUT
Description: Boulder Stabilizer #1 (inlet)
Station Elevation Data    num=      10
     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev     Sta    Elev
     100  2743.9   108.8  2743.5   113.9  2743.1   118.9  2743.1   186.5    2743
     206  2736.5     266  2736.5   285.5    2743   315.7    2743   322.7  2743.9

Manning's n Values        num=       3
     Sta   n Val     Sta   n Val     Sta   n Val
     100    .035   186.5    .035   285.5    .035

Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
         186.5   285.5                2       2       2             .1       .3
Ineffective Flow     num=       2
   Sta L   Sta R    Elev  Permanent
     100   186.5  2745.5       T
   285.5   322.7  2745.5       T
Left Levee      Station=   186.5      Elevation=  2745.5
Right Levee     Station=   285.5      Elevation=  2745.5

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2743.15    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.99    Wt. n-Val.                           0.035
  W.S. Elev (ft)           2742.16    Reach Len. (ft)             2.00       2.00       2.00
  Crit W.S. (ft)           2740.86    Flow Area (sq ft)                    435.72
  E.G. Slope (ft/ft)      0.004696    Area (sq ft)                         435.72
  Q Total (cfs)            3480.00    Flow (cfs)                          3480.00
  Top Width (ft)             93.96    Top Width (ft)                        93.96
  Vel Total (ft/s)            7.99    Avg. Vel. (ft/s)                       7.99
  Max Chl Dpth (ft)           5.66    Hydr. Depth (ft)                       4.64
  Conv. Total (cfs)        50781.4    Conv. (cfs)                         50781.4
  Length Wtd. (ft)            2.00    Wetted Per. (ft)                      95.80
  Min Ch El (ft)           2736.50    Shear (lb/sq ft)                       1.33
  Alpha                       1.00    Stream Power (lb/ft s)    322.70     186.50     285.50
  Frctn Loss (ft)             0.00    Cum Volume (acre-ft)        0.15       4.55
  C & E Loss (ft)             0.25    Cum SA (acres)              0.32       1.50


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Note:    Hydraulic jump has occurred between this cross section and the previous upstream section.
Note:    Multiple critical depths were found at this location.  The critical depth with the lowest,
valid, energy was used.
```

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2742.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.86	Wt. n-Val.		0.035	
W.S. Elev (ft)	2741.36	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2740.24	Flow Area (sq ft)		362.79	
E.G. Slope (ft/ft)	0.004844	Area (sq ft)		362.79	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	89.18	Top Width (ft)		89.18	
Vel Total (ft/s)	7.44	Avg. Vel. (ft/s)		7.44	
Max Chl Dpth (ft)	4.86	Hydr. Depth (ft)		4.07	
Conv. Total (cfs)	38793.8	Conv. (cfs)		38793.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		90.76	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		1.21	
Alpha	1.00	Stream Power (lb/ft s)	322.70	186.50	285.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.07	3.93	
C & E Loss (ft)	0.22	Cum SA (acres)	0.22	1.47	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2740.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.62	Wt. n-Val.		0.035	
W.S. Elev (ft)	2739.90	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2739.09	Flow Area (sq ft)		238.30	
E.G. Slope (ft/ft)	0.005255	Area (sq ft)		238.30	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	80.37	Top Width (ft)		80.37	
Vel Total (ft/s)	6.29	Avg. Vel. (ft/s)		6.29	
Max Chl Dpth (ft)	3.40	Hydr. Depth (ft)		2.96	
Conv. Total (cfs)	20691.3	Conv. (cfs)		20691.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		81.47	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.96	
Alpha	1.00	Stream Power (lb/ft s)	322.70	186.50	285.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.77	
C & E Loss (ft)	0.17	Cum SA (acres)		1.40	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2737.62	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.		0.035	
W.S. Elev (ft)	2737.44	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2737.19	Flow Area (sq ft)		58.95	
E.G. Slope (ft/ft)	0.007414	Area (sq ft)		58.95	
Q Total (cfs)	200.00	Flow (cfs)		200.00	

Top Width (ft)	65.63	Top Width (ft)		65.63	
Vel Total (ft/s)	3.39	Avg. Vel. (ft/s)		3.39	
Max Chl Dpth (ft)	0.94	Hydr. Depth (ft)		0.90	
Conv. Total (cfs)	2322.7	Conv. (cfs)		2322.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		65.94	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.41	
Alpha	1.00	Stream Power (lb/ft s)	322.70	186.50	285.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.92	
C & E Loss (ft)	0.05	Cum SA (acres)		1.19	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2740.75	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.65	Wt. n-Val.		0.035	
W.S. Elev (ft)	2740.10	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2739.20	Flow Area (sq ft)		255.05	
E.G. Slope (ft/ft)	0.005180	Area (sq ft)		255.05	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	81.61	Top Width (ft)		81.61	
Vel Total (ft/s)	6.47	Avg. Vel. (ft/s)		6.47	
Max Chl Dpth (ft)	3.60	Hydr. Depth (ft)		3.13	
Conv. Total (cfs)	22926.6	Conv. (cfs)		22926.6	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		82.78	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		1.00	
Alpha	1.00	Stream Power (lb/ft s)	322.70	186.50	285.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.00	2.94	
C & E Loss (ft)	0.17	Cum SA (acres)	0.02	1.41	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2739.85	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.52	Wt. n-Val.		0.035	
W.S. Elev (ft)	2739.33	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2738.63	Flow Area (sq ft)		194.02	
E.G. Slope (ft/ft)	0.005477	Area (sq ft)		194.02	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	77.00	Top Width (ft)		77.00	
Vel Total (ft/s)	5.77	Avg. Vel. (ft/s)		5.77	
Max Chl Dpth (ft)	2.83	Hydr. Depth (ft)		2.52	
Conv. Total (cfs)	15133.1	Conv. (cfs)		15133.1	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		77.91	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.85	
Alpha	1.00	Stream Power (lb/ft s)	322.70	186.50	285.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.31	
C & E Loss (ft)	0.14	Cum SA (acres)		1.36	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2738.95	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.38	Wt. n-Val.		0.035	
W.S. Elev (ft)	2738.56	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2738.05	Flow Area (sq ft)		136.64	
E.G. Slope (ft/ft)	0.005963	Area (sq ft)		136.64	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	72.39	Top Width (ft)		72.39	
Vel Total (ft/s)	4.98	Avg. Vel. (ft/s)		4.98	
Max Chl Dpth (ft)	2.06	Hydr. Depth (ft)		1.89	
Conv. Total (cfs)	8805.7	Conv. (cfs)		8805.7	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		73.06	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)	322.70	186.50	285.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.73	
C & E Loss (ft)	0.11	Cum SA (acres)		1.30	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Hydraulic jump has occurred between this cross section and the previous upstream section.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1598

INPUT
Description: Boulder Stabilizer #1
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2743.9	108.8	2743.5	113.9	2743.1	118.9	2743.1	148.5	2744
168.5	2744	206	2731.5	266	2731.5	303.5	2744	323	2743.9

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	148.5	.016	168.5	.035	303.5	.016	323	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
168.5	303.5	15	15	15	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	168.5	2746	T
303.5	323	2746	T

Left Levee Station= 168.5 Elevation= 2746
Right Levee Station= 303.5 Elevation= 2746

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2742.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2742.73	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2735.87	Flow Area (sq ft)		1052.45	

E.G. Slope (ft/ft)	0.000377	Area (sq ft)		1052.45	
Q Total (cfs)	3480.00	Flow (cfs)		3480.00	
Top Width (ft)	127.39	Top Width (ft)		127.39	
Vel Total (ft/s)	3.31	Avg. Vel. (ft/s)		3.31	
Max Chl Dpth (ft)	11.23	Hydr. Depth (ft)		8.26	
Conv. Total (cfs)	179194.6	Conv. (cfs)		179194.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		131.04	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.15	4.52	
C & E Loss (ft)	0.00	Cum SA (acres)	0.32	1.49	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2742.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2741.88	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2735.24	Flow Area (sq ft)		945.39	
E.G. Slope (ft/ft)	0.000307	Area (sq ft)		945.39	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	122.25	Top Width (ft)		122.25	
Vel Total (ft/s)	2.86	Avg. Vel. (ft/s)		2.86	
Max Chl Dpth (ft)	10.37	Hydr. Depth (ft)		7.73	
Conv. Total (cfs)	154140.8	Conv. (cfs)		154140.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		125.62	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.07	3.90	
C & E Loss (ft)	0.00	Cum SA (acres)	0.22	1.46	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2740.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2740.28	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2734.08	Flow Area (sq ft)		758.29	
E.G. Slope (ft/ft)	0.000177	Area (sq ft)		758.29	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	112.69	Top Width (ft)		112.69	
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)		1.98	
Max Chl Dpth (ft)	8.78	Hydr. Depth (ft)		6.73	
Conv. Total (cfs)	112847.3	Conv. (cfs)		112847.3	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		115.54	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.75	
C & E Loss (ft)	0.00	Cum SA (acres)		1.40	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2737.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2737.56	Reach Len. (ft)	15.00	15.00	15.00

Crit W.S. (ft)	2732.19	Flow Area (sq ft)		473.85	
E.G. Slope (ft/ft)	0.000012	Area (sq ft)		473.85	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	96.36	Top Width (ft)		96.36	
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.42	
Max Chl Dpth (ft)	6.06	Hydr. Depth (ft)		4.92	
Conv. Total (cfs)	57393.3	Conv. (cfs)		57393.3	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		98.33	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.91	
C & E Loss (ft)	0.00	Cum SA (acres)		1.19	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2740.58	Element			
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2740.51	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2734.24	Flow Area (sq ft)		783.86	
E.G. Slope (ft/ft)	0.000195	Area (sq ft)		783.86	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	114.05	Top Width (ft)		114.05	
Vel Total (ft/s)	2.10	Avg. Vel. (ft/s)		2.10	
Max Chl Dpth (ft)	9.01	Hydr. Depth (ft)		6.87	
Conv. Total (cfs)	118289.8	Conv. (cfs)		118289.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		116.97	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.00	2.92	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	1.41	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2739.71	Element			
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2739.66	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2733.63	Flow Area (sq ft)		689.77	
E.G. Slope (ft/ft)	0.000129	Area (sq ft)		689.77	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	108.98	Top Width (ft)		108.98	
Vel Total (ft/s)	1.62	Avg. Vel. (ft/s)		1.62	
Max Chl Dpth (ft)	8.16	Hydr. Depth (ft)		6.33	
Conv. Total (cfs)	98607.6	Conv. (cfs)		98607.6	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		111.63	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.29	
C & E Loss (ft)	0.00	Cum SA (acres)		1.35	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

			Left OB	Channel	Right OB
E.G. Elev (ft)	2738.84	Element			
Vel Head (ft)	0.02	Wt. n-Val.		0.035	

W.S. Elev (ft)	2738.82	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2733.06	Flow Area (sq ft)		599.83	
E.G. Slope (ft/ft)	0.000071	Area (sq ft)		599.83	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	103.91	Top Width (ft)		103.91	
Vel Total (ft/s)	1.13	Avg. Vel. (ft/s)		1.13	
Max Chl Dpth (ft)	7.32	Hydr. Depth (ft)		5.77	
Conv. Total (cfs)	80719.8	Conv. (cfs)		80719.8	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		106.29	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.71	
C & E Loss (ft)	0.00	Cum SA (acres)		1.30	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1583

INPUT
Description: Boulder Stabilizer #1
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2743.9	108.8	2743.5	113.9	2743.1	118.9	2743.1	148.5	2744
168.5	2744	206	2731.5	266	2731.5	303.5	2744	323	2743.9

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	148.5	.016	168.5	.035	303.5	.016	323	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
168.5	303.5	2	2	2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	168.5	2746	T
303.5	323	2746	T

Left Levee Station= 168.5 Elevation= 2746
Right Levee Station= 303.5 Elevation= 2746

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2742.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2742.73	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2735.87	Flow Area (sq ft)		1051.70	
E.G. Slope (ft/ft)	0.000378	Area (sq ft)		1051.70	
Q Total (cfs)	3480.00	Flow (cfs)		3480.00	
Top Width (ft)	127.36	Top Width (ft)		127.36	
Vel Total (ft/s)	3.31	Avg. Vel. (ft/s)		3.31	
Max Chl Dpth (ft)	11.23	Hydr. Depth (ft)		8.26	
Conv. Total (cfs)	179016.6	Conv. (cfs)		179016.6	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		131.00	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.15	4.16	
C & E Loss (ft)	0.00	Cum SA (acres)	0.32	1.45	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2742.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2741.87	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2735.24	Flow Area (sq ft)		944.83	
E.G. Slope (ft/ft)	0.000307	Area (sq ft)		944.83	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	122.22	Top Width (ft)		122.22	
Vel Total (ft/s)	2.86	Avg. Vel. (ft/s)		2.86	
Max Chl Dpth (ft)	10.37	Hydr. Depth (ft)		7.73	
Conv. Total (cfs)	154010.8	Conv. (cfs)		154010.8	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		125.59	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.07	3.57	
C & E Loss (ft)	0.00	Cum SA (acres)	0.22	1.42	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2740.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2740.28	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2734.08	Flow Area (sq ft)		757.99	
E.G. Slope (ft/ft)	0.000177	Area (sq ft)		757.99	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	112.68	Top Width (ft)		112.68	
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)		1.98	
Max Chl Dpth (ft)	8.78	Hydr. Depth (ft)		6.73	
Conv. Total (cfs)	112783.3	Conv. (cfs)		112783.3	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		115.53	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.49	
C & E Loss (ft)	0.00	Cum SA (acres)		1.36	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2737.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2737.56	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2732.19	Flow Area (sq ft)		473.82	
E.G. Slope (ft/ft)	0.000012	Area (sq ft)		473.82	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	96.36	Top Width (ft)		96.36	
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.42	
Max Chl Dpth (ft)	6.06	Hydr. Depth (ft)		4.92	
Conv. Total (cfs)	57389.2	Conv. (cfs)		57389.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		98.33	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.74	
C & E Loss (ft)	0.00	Cum SA (acres)		1.15	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2740.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2740.51	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2734.24	Flow Area (sq ft)		783.53	
E.G. Slope (ft/ft)	0.000195	Area (sq ft)		783.53	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	114.03	Top Width (ft)		114.03	
Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)		2.11	
Max Chl Dpth (ft)	9.00	Hydr. Depth (ft)		6.87	
Conv. Total (cfs)	118218.2	Conv. (cfs)		118218.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		116.95	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)	0.00	2.65	
C & E Loss (ft)	0.00	Cum SA (acres)	0.02	1.37	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2739.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2739.66	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2733.63	Flow Area (sq ft)		689.56	
E.G. Slope (ft/ft)	0.000129	Area (sq ft)		689.56	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	108.97	Top Width (ft)		108.97	
Vel Total (ft/s)	1.62	Avg. Vel. (ft/s)		1.62	
Max Chl Dpth (ft)	8.16	Hydr. Depth (ft)		6.33	
Conv. Total (cfs)	98564.1	Conv. (cfs)		98564.1	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		111.62	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		2.06	
C & E Loss (ft)	0.00	Cum SA (acres)		1.32	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2738.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2738.82	Reach Len. (ft)	2.00	2.00	2.00
Crit W.S. (ft)	2733.06	Flow Area (sq ft)		599.73	
E.G. Slope (ft/ft)	0.000071	Area (sq ft)		599.73	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	103.91	Top Width (ft)		103.91	
Vel Total (ft/s)	1.13	Avg. Vel. (ft/s)		1.13	
Max Chl Dpth (ft)	7.32	Hydr. Depth (ft)		5.77	
Conv. Total (cfs)	80700.2	Conv. (cfs)		80700.2	
Length Wtd. (ft)	2.00	Wetted Per. (ft)		106.28	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.03	
Alpha	1.00	Stream Power (lb/ft s)	323.00	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		1.51	
C & E Loss (ft)	0.00	Cum SA (acres)		1.26	

Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1581

INPUT
Description: Boulder Stabilizer #1
Station Elevation Data num= 10

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2743.9	108.8	2743.5	113.9	2743.1	118.9	2743.1	148.5	2744
168.5	2744	206	2731.5	266	2731.5	303.5	2744	323.5	2743.9

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	148.5	.016	168.5	.035	303.5	.016	323.5	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
168.5	303.5	15	15	15	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	168.5	2746	T
303.5	323.5	2746	T

Left Levee Station= 168.5 Elevation= 2746
Right Levee Station= 303.5 Elevation= 2746

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2742.90	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.17	Wt. n-Val.		0.035	
W.S. Elev (ft)	2742.73	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2735.87	Flow Area (sq ft)		1051.58	
E.G. Slope (ft/ft)	0.000378	Area (sq ft)		1051.58	
Q Total (cfs)	3480.00	Flow (cfs)		3480.00	
Top Width (ft)	127.35	Top Width (ft)		127.35	
Vel Total (ft/s)	3.31	Avg. Vel. (ft/s)		3.31	
Max Chl Dpth (ft)	11.23	Hydr. Depth (ft)		8.26	
Conv. Total (cfs)	178987.0	Conv. (cfs)		178987.0	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		131.00	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.19	
Alpha	1.00	Stream Power (lb/ft s)	323.50	168.50	303.50
Frctn Loss (ft)	0.02	Cum Volume (acre-ft)	0.15	4.11	
C & E Loss (ft)	0.17	Cum SA (acres)	0.32	1.44	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2742.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.13	Wt. n-Val.		0.035	
W.S. Elev (ft)	2741.87	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2735.24	Flow Area (sq ft)		944.71	
E.G. Slope (ft/ft)	0.000307	Area (sq ft)		944.71	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	

Top Width (ft)	122.21	Top Width (ft)		122.21	
Vel Total (ft/s)	2.86	Avg. Vel. (ft/s)		2.86	
Max Chl Dpth (ft)	10.37	Hydr. Depth (ft)		7.73	
Conv. Total (cfs)	153983.4	Conv. (cfs)		153983.4	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		125.58	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.14	
Alpha	1.00	Stream Power (lb/ft s)	323.50	168.50	303.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.07	3.53	
C & E Loss (ft)	0.15	Cum SA (acres)	0.22	1.41	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2740.34	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.06	Wt. n-Val.		0.035	
W.S. Elev (ft)	2740.28	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2734.08	Flow Area (sq ft)		757.96	
E.G. Slope (ft/ft)	0.000177	Area (sq ft)		757.96	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	112.67	Top Width (ft)		112.67	
Vel Total (ft/s)	1.98	Avg. Vel. (ft/s)		1.98	
Max Chl Dpth (ft)	8.78	Hydr. Depth (ft)		6.73	
Conv. Total (cfs)	112777.5	Conv. (cfs)		112777.5	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		115.52	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.07	
Alpha	1.00	Stream Power (lb/ft s)	323.50	168.50	303.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		2.45	
C & E Loss (ft)	0.11	Cum SA (acres)		1.35	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2737.56	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.00	Wt. n-Val.		0.035	
W.S. Elev (ft)	2737.56	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2732.19	Flow Area (sq ft)		473.82	
E.G. Slope (ft/ft)	0.000012	Area (sq ft)		473.82	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	96.36	Top Width (ft)		96.36	
Vel Total (ft/s)	0.42	Avg. Vel. (ft/s)		0.42	
Max Chl Dpth (ft)	6.06	Hydr. Depth (ft)		4.92	
Conv. Total (cfs)	57389.2	Conv. (cfs)		57389.2	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		98.33	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.00	
Alpha	1.00	Stream Power (lb/ft s)	323.50	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)		0.72	
C & E Loss (ft)	0.03	Cum SA (acres)		1.15	

Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2740.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.07	Wt. n-Val.		0.035	
W.S. Elev (ft)	2740.50	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2734.24	Flow Area (sq ft)		783.47	
E.G. Slope (ft/ft)	0.000195	Area (sq ft)		783.47	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	114.02	Top Width (ft)		114.02	
Vel Total (ft/s)	2.11	Avg. Vel. (ft/s)		2.11	
Max Chl Dpth (ft)	9.00	Hydr. Depth (ft)		6.87	
Conv. Total (cfs)	118206.3	Conv. (cfs)		118206.3	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		116.95	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.08	
Alpha	1.00	Stream Power (lb/ft s)	323.50	168.50	303.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.00	2.61	
C & E Loss (ft)	0.11	Cum SA (acres)	0.02	1.37	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2739.70	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.04	Wt. n-Val.		0.035	
W.S. Elev (ft)	2739.66	Reach Len. (ft)	15.00	15.00	15.00
Crit W.S. (ft)	2733.63	Flow Area (sq ft)		689.53	
E.G. Slope (ft/ft)	0.000129	Area (sq ft)		689.53	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	108.97	Top Width (ft)		108.97	
Vel Total (ft/s)	1.62	Avg. Vel. (ft/s)		1.62	
Max Chl Dpth (ft)	8.16	Hydr. Depth (ft)		6.33	
Conv. Total (cfs)	98558.7	Conv. (cfs)		98558.7	
Length Wtd. (ft)	15.00	Wetted Per. (ft)		111.62	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)		0.05	
Alpha	1.00	Stream Power (lb/ft s)	323.50	168.50	303.50
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)		2.02	
C & E Loss (ft)	0.09	Cum SA (acres)		1.31	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2738.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.02	Wt. n-Val.		0.035	
W.S. Elev (ft)	2738.82	Reach Len. (ft)	15.00	15.00	15.00

Crit W.S. (ft)	2733.06	Flow Area (sq ft)			599.70	
E.G. Slope (ft/ft)	0.000071	Area (sq ft)			599.70	
Q Total (cfs)	680.00	Flow (cfs)			680.00	
Top Width (ft)	103.91	Top Width (ft)			103.91	
Vel Total (ft/s)	1.13	Avg. Vel. (ft/s)			1.13	
Max Chl Dpth (ft)	7.32	Hydr. Depth (ft)			5.77	
Conv. Total (cfs)	80695.3	Conv. (cfs)			80695.3	
Length Wtd. (ft)	15.00	Wetted Per. (ft)			106.28	
Min Ch El (ft)	2731.50	Shear (lb/sq ft)			0.03	
Alpha	1.00	Stream Power (lb/ft s)		323.50	168.50	303.50
Frctn Loss (ft)	0.00	Cum Volume (acre-ft)			1.48	
C & E Loss (ft)	0.07	Cum SA (acres)			1.26	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1566

INPUT
Description: Boulder Stabilizer #1 (exit)
Station Elevation Data num= 12

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2743.9	108.8	2743.5	113.9	2743.1	118.9	2743.1	169.5	2742
189.5	2742	206	2736.5	266	2736.5	282.5	2742	302.5	2742
315.7	2742.6	322.7	2743.9						

Manning's n Values num= 5

Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val	Sta	n Val
100	.04	169.5	.016	189.5	.035	282.5	.016	302.5	.04

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
189.5	282.5	126.2	126.2	126.2	.1	.3

Ineffective Flow num= 2

Sta L	Sta R	Elev	Permanent
100	189.5	2744	T
282.5	322.7	2744	T

Left Levee Station= 189.5 Elevation= 2744
Right Levee Station= 282.5 Elevation= 2744

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2742.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.84	Wt. n-Val.		0.035	
W.S. Elev (ft)	2740.87	Reach Len. (ft)	126.20	126.20	126.20
Crit W.S. (ft)	2740.87	Flow Area (sq ft)		319.61	
E.G. Slope (ft/ft)	0.011719	Area (sq ft)		319.61	
Q Total (cfs)	3480.00	Flow (cfs)		3480.00	
Top Width (ft)	86.23	Top Width (ft)		86.23	
Vel Total (ft/s)	10.89	Avg. Vel. (ft/s)		10.89	
Max Chl Dpth (ft)	4.37	Hydr. Depth (ft)		3.71	
Conv. Total (cfs)	32146.1	Conv. (cfs)		32146.1	
Length Wtd. (ft)	126.20	Wetted Per. (ft)		87.65	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		2.67	
Alpha	1.00	Stream Power (lb/ft s)	322.70	189.50	282.50
Frctn Loss (ft)	1.27	Cum Volume (acre-ft)	0.15	3.87	

C & E Loss (ft)	0.04	Cum SA (acres)	0.32	1.41

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2741.84	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.60	Wt. n-Val.		0.035	
W.S. Elev (ft)	2740.24	Reach Len. (ft)	126.20	126.20	126.20
Crit W.S. (ft)	2740.24	Flow Area (sq ft)		266.26	
E.G. Slope (ft/ft)	0.012184	Area (sq ft)		266.26	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	82.43	Top Width (ft)		82.43	
Vel Total (ft/s)	10.14	Avg. Vel. (ft/s)		10.14	
Max Chl Dpth (ft)	3.74	Hydr. Depth (ft)		3.23	
Conv. Total (cfs)	24461.2	Conv. (cfs)		24461.2	
Length Wtd. (ft)	126.20	Wetted Per. (ft)		83.65	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		2.42	
Alpha	1.00	Stream Power (lb/ft s)	322.70	189.50	282.50
Frctn Loss (ft)	1.34	Cum Volume (acre-ft)	0.07	3.32	
C & E Loss (ft)	0.02	Cum SA (acres)	0.22	1.38	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2740.22	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.14	Wt. n-Val.		0.035	
W.S. Elev (ft)	2739.09	Reach Len. (ft)	126.20	126.20	126.20
Crit W.S. (ft)	2739.09	Flow Area (sq ft)		175.40	
E.G. Slope (ft/ft)	0.013390	Area (sq ft)		175.40	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	75.53	Top Width (ft)		75.53	
Vel Total (ft/s)	8.55	Avg. Vel. (ft/s)		8.55	
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)		2.32	
Conv. Total (cfs)	12962.9	Conv. (cfs)		12962.9	
Length Wtd. (ft)	126.20	Wetted Per. (ft)		76.37	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		1.92	
Alpha	1.00	Stream Power (lb/ft s)	322.70	189.50	282.50

Frctn Loss (ft)	1.48	Cum Volume (acre-ft)	2.29
C & E Loss (ft)	0.02	Cum SA (acres)	1.32

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2737.53	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.34	Wt. n-Val.		0.035	
W.S. Elev (ft)	2737.19	Reach Len. (ft)	126.20	126.20	126.20
Crit W.S. (ft)	2737.19	Flow Area (sq ft)		42.64	
E.G. Slope (ft/ft)	0.021132	Area (sq ft)		42.64	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	64.12	Top Width (ft)		64.12	
Vel Total (ft/s)	4.69	Avg. Vel. (ft/s)		4.69	
Max Chl Dpth (ft)	0.69	Hydr. Depth (ft)		0.66	
Conv. Total (cfs)	1375.8	Conv. (cfs)		1375.8	
Length Wtd. (ft)	126.20	Wetted Per. (ft)		64.35	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)	322.70	189.50	282.50
Frctn Loss (ft)	2.21	Cum Volume (acre-ft)		0.63	
C & E Loss (ft)	0.01	Cum SA (acres)		1.12	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2740.45	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.21	Wt. n-Val.		0.035	
W.S. Elev (ft)	2739.24	Reach Len. (ft)	126.20	126.20	126.20
Crit W.S. (ft)	2739.24	Flow Area (sq ft)		187.22	
E.G. Slope (ft/ft)	0.013261	Area (sq ft)		187.22	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	76.46	Top Width (ft)		76.46	
Vel Total (ft/s)	8.81	Avg. Vel. (ft/s)		8.81	
Max Chl Dpth (ft)	2.74	Hydr. Depth (ft)		2.45	
Conv. Total (cfs)	14328.3	Conv. (cfs)		14328.3	
Length Wtd. (ft)	126.20	Wetted Per. (ft)		77.35	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		2.00	

Alpha	1.00	Stream Power (lb/ft s)	322.70	189.50	282.50
Frctn Loss (ft)	1.44	Cum Volume (acre-ft)	0.00	2.45	
C & E Loss (ft)	0.02	Cum SA (acres)	0.02	1.33	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2739.60	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.96	Wt. n-Val.		0.035	
W.S. Elev (ft)	2738.64	Reach Len. (ft)	126.20	126.20	126.20
Crit W.S. (ft)	2738.64	Flow Area (sq ft)		142.18	
E.G. Slope (ft/ft)	0.014292	Area (sq ft)		142.18	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	72.84	Top Width (ft)		72.84	
Vel Total (ft/s)	7.88	Avg. Vel. (ft/s)		7.88	
Max Chl Dpth (ft)	2.14	Hydr. Depth (ft)		1.95	
Conv. Total (cfs)	9368.5	Conv. (cfs)		9368.5	
Length Wtd. (ft)	126.20	Wetted Per. (ft)		73.54	
Min Ch El (ft)	2736.50	Shear (lb/sq ft)		1.73	
Alpha	1.00	Stream Power (lb/ft s)	322.70	189.50	282.50
Frctn Loss (ft)	1.57	Cum Volume (acre-ft)		1.88	
C & E Loss (ft)	0.02	Cum SA (acres)		1.28	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2738.77	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.71	Wt. n-Val.		0.035	
W.S. Elev (ft)	2738.06	Reach Len. (ft)	126.20	126.20	126.20
Crit W.S. (ft)	2738.06	Flow Area (sq ft)		100.79	
E.G. Slope (ft/ft)	0.015492	Area (sq ft)		100.79	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	69.35	Top Width (ft)		69.35	
Vel Total (ft/s)	6.75	Avg. Vel. (ft/s)		6.75	
Max Chl Dpth (ft)	1.56	Hydr. Depth (ft)		1.45	
Conv. Total (cfs)	5463.4	Conv. (cfs)		5463.4	
Length Wtd. (ft)	126.20	Wetted Per. (ft)		69.86	

Min Ch El (ft)	2736.50	Shear (lb/sq ft)		1.40	
Alpha	1.00	Stream Power (lb/ft s)	322.70	189.50	282.50
Frctn Loss (ft)	1.69	Cum Volume (acre-ft)		1.36	
C & E Loss (ft)	0.02	Cum SA (acres)		1.23	

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Warning: During the standard step iterations, when the assumed water surface was set equal to critical depth, the calculated
water surface came back below critical depth. This indicates that there is not a valid subcritical answer. The program
defaulted to critical depth.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 1439.8

INPUT
Description: Section 14+39.8
Station Elevation Data num= 19

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2742	107.5	2741	111.85	2740	143.55	2740	147.09	2740
165.85	2739	188.8	2738	209	2738	212.85	2737	215.92	2736
220.42	2735	235.4	2734	295.44	2734	296.47	2735	298.51	2737
303.47	2738	309	2740.5	325.51	2741	332.31	2742		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	209	.03	309	.035

Bank Sta: Left	Right	Lengths: Left	Channel	Right	Coeff Contr.	Expan.
209	309	482.3	482.3	482.3	.1	.3

Ineffective Flow num= 1

Sta L	Sta R	Elev	Permanent
100	209	2740.5	T

Left Levee Station= 209 Elevation= 2740.5
Right Levee Station= 309 Elevation= 2740.5

CROSS SECTION OUTPUT Profile #100-yr SBCFCD

E.G. Elev (ft)	2740.49	Element	Left OB	Channel	Right OB
Vel Head (ft)	3.45	Wt. n-Val.		0.030	
W.S. Elev (ft)	2737.04	Reach Len. (ft)	482.30	482.30	482.30
Crit W.S. (ft)	2738.11	Flow Area (sq ft)		233.49	
E.G. Slope (ft/ft)	0.024466	Area (sq ft)		233.49	
Q Total (cfs)	3480.00	Flow (cfs)		3480.00	
Top Width (ft)	85.97	Top Width (ft)		85.97	
Vel Total (ft/s)	14.90	Avg. Vel. (ft/s)		14.90	
Max Chl Dpth (ft)	3.04	Hydr. Depth (ft)		2.72	
Conv. Total (cfs)	22248.4	Conv. (cfs)		22248.4	
Length Wtd. (ft)	482.30	Wetted Per. (ft)		87.50	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		4.08	
Alpha	1.00	Stream Power (lb/ft s)	332.31	209.00	309.00
Frctn Loss (ft)	2.07	Cum Volume (acre-ft)	0.15	3.07	
C & E Loss (ft)	0.16	Cum SA (acres)	0.32	1.16	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #100-yr FIS

E.G. Elev (ft)	2739.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.95	Wt. n-Val.		0.030	
W.S. Elev (ft)	2736.59	Reach Len. (ft)	482.30	482.30	482.30
Crit W.S. (ft)	2737.49	Flow Area (sq ft)		195.76	
E.G. Slope (ft/ft)	0.025606	Area (sq ft)		195.76	
Q Total (cfs)	2700.00	Flow (cfs)		2700.00	
Top Width (ft)	83.99	Top Width (ft)		83.99	
Vel Total (ft/s)	13.79	Avg. Vel. (ft/s)		13.79	
Max Chl Dpth (ft)	2.59	Hydr. Depth (ft)		2.33	
Conv. Total (cfs)	16873.1	Conv. (cfs)		16873.1	
Length Wtd. (ft)	482.30	Wetted Per. (ft)		85.28	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		3.67	
Alpha	1.00	Stream Power (lb/ft s)	332.31	209.00	309.00
Frctn Loss (ft)	2.15	Cum Volume (acre-ft)	0.07	2.65	
C & E Loss (ft)	0.14	Cum SA (acres)	0.22	1.14	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #50-yr FIS

E.G. Elev (ft)	2737.81	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.98	Wt. n-Val.		0.030	
W.S. Elev (ft)	2735.83	Reach Len. (ft)	482.30	482.30	482.30
Crit W.S. (ft)	2736.40	Flow Area (sq ft)		132.80	
E.G. Slope (ft/ft)	0.027114	Area (sq ft)		132.80	
Q Total (cfs)	1500.00	Flow (cfs)		1500.00	
Top Width (ft)	80.61	Top Width (ft)		80.61	
Vel Total (ft/s)	11.30	Avg. Vel. (ft/s)		11.30	
Max Chl Dpth (ft)	1.83	Hydr. Depth (ft)		1.65	
Conv. Total (cfs)	9109.5	Conv. (cfs)		9109.5	
Length Wtd. (ft)	482.30	Wetted Per. (ft)		81.48	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		2.76	
Alpha	1.00	Stream Power (lb/ft s)	332.31	209.00	309.00
Frctn Loss (ft)	2.33	Cum Volume (acre-ft)		1.85	
C & E Loss (ft)	0.08	Cum SA (acres)		1.09	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.

This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2735.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.36	Wt. n-Val.		0.030	
W.S. Elev (ft)	2734.64	Reach Len. (ft)	482.30	482.30	482.30
Crit W.S. (ft)	2734.68	Flow Area (sq ft)		41.61	
E.G. Slope (ft/ft)	0.019036	Area (sq ft)		41.61	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	70.27	Top Width (ft)		70.27	
Vel Total (ft/s)	4.81	Avg. Vel. (ft/s)		4.81	
Max Chl Dpth (ft)	0.64	Hydr. Depth (ft)		0.59	
Conv. Total (cfs)	1449.6	Conv. (cfs)		1449.6	
Length Wtd. (ft)	482.30	Wetted Per. (ft)		70.55	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		0.70	
Alpha	1.00	Stream Power (lb/ft s)	332.31	209.00	309.00
Frctn Loss (ft)	2.53	Cum Volume (acre-ft)		0.51	
C & E Loss (ft)	0.00	Cum SA (acres)		0.93	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2738.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	2.12	Wt. n-Val.		0.030	
W.S. Elev (ft)	2735.93	Reach Len. (ft)	482.30	482.30	482.30
Crit W.S. (ft)	2736.56	Flow Area (sq ft)		141.37	
E.G. Slope (ft/ft)	0.026912	Area (sq ft)		141.37	
Q Total (cfs)	1650.00	Flow (cfs)		1650.00	
Top Width (ft)	81.20	Top Width (ft)		81.20	
Vel Total (ft/s)	11.67	Avg. Vel. (ft/s)		11.67	
Max Chl Dpth (ft)	1.93	Hydr. Depth (ft)		1.74	
Conv. Total (cfs)	10057.9	Conv. (cfs)		10057.9	
Length Wtd. (ft)		Wetted Per. (ft)		82.12	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		2.89	
Alpha	1.00	Stream Power (lb/ft s)	332.31	209.00	309.00
Frctn Loss (ft)	2.31	Cum Volume (acre-ft)	0.00	1.97	
C & E Loss (ft)	0.09	Cum SA (acres)	0.02	1.10	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2737.14	Element	Left OB	Channel	Right OB

Vel Head (ft)	1.58	Wt. n-Val.		0.030	
W.S. Elev (ft)	2735.55	Reach Len. (ft)	482.30	482.30	482.30
Crit W.S. (ft)	2736.00	Flow Area (sq ft)		110.92	
E.G. Slope (ft/ft)	0.026800	Area (sq ft)		110.92	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	79.10	Top Width (ft)		79.10	
Vel Total (ft/s)	10.10	Avg. Vel. (ft/s)		10.10	
Max Chl Dpth (ft)	1.55	Hydr. Depth (ft)		1.40	
Conv. Total (cfs)	6841.5	Conv. (cfs)		6841.5	
Length Wtd. (ft)	482.30	Wetted Per. (ft)		79.83	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		2.32	
Alpha	1.00	Stream Power (lb/ft s)	332.31	209.00	309.00
Frctn Loss (ft)	2.41	Cum Volume (acre-ft)		1.51	
C & E Loss (ft)	0.06	Cum SA (acres)		1.06	

Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2736.25	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.06	Wt. n-Val.		0.030	
W.S. Elev (ft)	2735.19	Reach Len. (ft)	482.30	482.30	482.30
Crit W.S. (ft)	2735.48	Flow Area (sq ft)		82.33	
E.G. Slope (ft/ft)	0.025708	Area (sq ft)		82.33	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	77.08	Top Width (ft)		77.08	
Vel Total (ft/s)	8.26	Avg. Vel. (ft/s)		8.26	
Max Chl Dpth (ft)	1.19	Hydr. Depth (ft)		1.07	
Conv. Total (cfs)	4241.0	Conv. (cfs)		4241.0	
Length Wtd. (ft)		Wetted Per. (ft)		77.62	
Min Ch El (ft)	2734.00	Shear (lb/sq ft)		1.70	
Alpha	1.00	Stream Power (lb/ft s)	332.31	209.00	309.00
Frctn Loss (ft)	2.48	Cum Volume (acre-ft)		1.09	
C & E Loss (ft)	0.04	Cum SA (acres)		1.01	

Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.
Note: Multiple critical depths were found at this location. The critical depth with the lowest, valid, energy was used.

CROSS SECTION

RIVER: Desert Knolls Wa
REACH: Main RS: 957.5

INPUT
Description: Section 9+57.5 - D/S Boundary
Station Elevation Data num= 8

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
100	2731	118.37	2730	179.97	2729	197.72	2727	264.51	2727
287.05	2727	303.36	2730	308.76	2731				

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
100	.035	179.97	.03	303.36	.035

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Bank Sta: Left   Right    Lengths: Left Channel   Right     Coeff Contr.   Expan.
        179.97  303.36                0       0       0             .1       .3

CROSS SECTION OUTPUT  Profile #100-yr SBCFCD

  E.G. Elev (ft)           2731.65    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.71    Wt. n-Val.                 0.035      0.030
  W.S. Elev (ft)           2729.94    Reach Len. (ft)
  Crit W.S. (ft)           2730.35    Flow Area (sq ft)          27.42     321.00
  E.G. Slope (ft/ft)      0.012792    Area (sq ft)               27.42     321.00
  Q Total (cfs)            3480.00    Flow (cfs)                 79.80    3400.20
  Top Width (ft)            181.21    Top Width (ft)             58.13     123.08
  Vel Total (ft/s)            9.99    Avg. Vel. (ft/s)            2.91      10.59
  Max Chl Dpth (ft)           2.94    Hydr. Depth (ft)            0.47       2.61
  Conv. Total (cfs)        30768.6    Conv. (cfs)                705.5    30063.0
  Length Wtd. (ft)                    Wetted Per. (ft)           58.13     123.46
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)            0.38       2.08
  Alpha                       1.10    Stream Power (lb/ft s)    308.76       0.00       0.00
  Frctn Loss (ft)             8.31    Cum Volume (acre-ft)
  C & E Loss (ft)             0.52    Cum SA (acres)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #100-yr FIS

  E.G. Elev (ft)           2731.01    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               1.37    Wt. n-Val.                 0.035      0.030
  W.S. Elev (ft)           2729.63    Reach Len. (ft)
  Crit W.S. (ft)           2729.88    Flow Area (sq ft)          12.39     283.19
  E.G. Slope (ft/ft)      0.011788    Area (sq ft)               12.39     283.19
  Q Total (cfs)            2700.00    Flow (cfs)                 26.56    2673.44
  Top Width (ft)            160.47    Top Width (ft)             39.07     121.40
  Vel Total (ft/s)            9.13    Avg. Vel. (ft/s)            2.14       9.44
  Max Chl Dpth (ft)           2.63    Hydr. Depth (ft)            0.32       2.33
  Conv. Total (cfs)        24868.3    Conv. (cfs)                244.6    24623.7
  Length Wtd. (ft)                    Wetted Per. (ft)           39.08     121.75
  Min Ch El (ft)           2727.00    Shear (lb/sq ft)            0.23       1.71
  Alpha                       1.06    Stream Power (lb/ft s)    308.76       0.00       0.00
  Frctn Loss (ft)             8.07    Cum Volume (acre-ft)
  C & E Loss (ft)             0.47    Cum SA (acres)


Warning: The velocity head has changed by more than 0.5 ft (0.15 m).  This may indicate the need
for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than
0.7 or greater than 1.4.
          This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross
section.  This may indicate the
         need for additional cross sections.

CROSS SECTION OUTPUT  Profile #50-yr FIS

  E.G. Elev (ft)           2729.81    Element                   Left OB    Channel   Right OB
  Vel Head (ft)               0.87    Wt. n-Val.                            0.030
  W.S. Elev (ft)           2728.95    Reach Len. (ft)
  Crit W.S. (ft)           2728.95    Flow Area (sq ft)                    200.88
  E.G. Slope (ft/ft)      0.011113    Area (sq ft)                         200.88
  Q Total (cfs)            1500.00    Flow (cfs)                          1500.00
```

Top Width (ft)	117.17	Top Width (ft)			117.17	
Vel Total (ft/s)	7.47	Avg. Vel. (ft/s)			7.47	
Max Chl Dpth (ft)	1.95	Hydr. Depth (ft)			1.71	
Conv. Total (cfs)	14229.3	Conv. (cfs)			14229.3	
Length Wtd. (ft)		Wetted Per. (ft)			117.46	
Min Ch El (ft)	2727.00	Shear (lb/sq ft)			1.19	
Alpha	1.00	Stream Power (lb/ft s)	308.76		0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)				
C & E Loss (ft)		Cum SA (acres)				

Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth).
Water surface set to critical depth.

CROSS SECTION OUTPUT Profile #10-yr FIS

E.G. Elev (ft)	2727.79	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.24	Wt. n-Val.		0.030	
W.S. Elev (ft)	2727.55	Reach Len. (ft)			
Crit W.S. (ft)	2727.53	Flow Area (sq ft)		50.80	
E.G. Slope (ft/ft)	0.015007	Area (sq ft)		50.80	
Q Total (cfs)	200.00	Flow (cfs)		200.00	
Top Width (ft)	97.13	Top Width (ft)		97.13	
Vel Total (ft/s)	3.94	Avg. Vel. (ft/s)		3.94	
Max Chl Dpth (ft)	0.54	Hydr. Depth (ft)		0.52	
Conv. Total (cfs)	1632.6	Conv. (cfs)		1632.6	
Length Wtd. (ft)		Wetted Per. (ft)		97.21	
Min Ch El (ft)	2727.00	Shear (lb/sq ft)		0.49	
Alpha	1.00	Stream Power (lb/ft s)	308.76	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Note: Hydraulic jump has occurred between this cross section and the previous upstream section.

CROSS SECTION OUTPUT Profile #10-yr SBCFCD

E.G. Elev (ft)	2729.98	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.92	Wt. n-Val.	0.035	0.030	
W.S. Elev (ft)	2729.06	Reach Len. (ft)			
Crit W.S. (ft)	2729.06	Flow Area (sq ft)	0.12	214.55	
E.G. Slope (ft/ft)	0.010935	Area (sq ft)	0.12	214.55	
Q Total (cfs)	1650.00	Flow (cfs)	0.05	1649.95	
Top Width (ft)	122.08	Top Width (ft)	3.79	118.29	
Vel Total (ft/s)	7.69	Avg. Vel. (ft/s)	0.44	7.69	
Max Chl Dpth (ft)	2.06	Hydr. Depth (ft)	0.03	1.81	
Conv. Total (cfs)	15778.9	Conv. (cfs)	0.5	15778.4	
Length Wtd. (ft)		Wetted Per. (ft)	3.79	118.59	
Min Ch El (ft)	2727.00	Shear (lb/sq ft)	0.02	1.24	
Alpha	1.00	Stream Power (lb/ft s)	308.76	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The conveyance ratio (upstream conveyance divided by downstream conveyance) is less than 0.7 or greater than 1.4.
This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the

need for additional cross sections.

CROSS SECTION OUTPUT Profile #5-yr SBCFCD

E.G. Elev (ft)	2729.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.74	Wt. n-Val.		0.030	
W.S. Elev (ft)	2728.61	Reach Len. (ft)			
Crit W.S. (ft)	2728.61	Flow Area (sq ft)		162.68	
E.G. Slope (ft/ft)	0.011835	Area (sq ft)		162.68	
Q Total (cfs)	1120.00	Flow (cfs)		1120.00	
Top Width (ft)	112.41	Top Width (ft)		112.41	
Vel Total (ft/s)	6.88	Avg. Vel. (ft/s)		6.88	
Max Chl Dpth (ft)	1.61	Hydr. Depth (ft)		1.45	
Conv. Total (cfs)	10295.1	Conv. (cfs)		10295.1	
Length Wtd. (ft)		Wetted Per. (ft)		112.65	
Min Ch El (ft)	2727.00	Shear (lb/sq ft)		1.07	
Alpha	1.00	Stream Power (lb/ft s)	308.76	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: Slope too steep for slope area to converge during supercritical flow calculations (normal depth is below critical depth).
Water surface set to critical depth.

CROSS SECTION OUTPUT Profile #2-yr SBCFCD

E.G. Elev (ft)	2728.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.54	Wt. n-Val.		0.030	
W.S. Elev (ft)	2728.18	Reach Len. (ft)			
Crit W.S. (ft)	2728.18	Flow Area (sq ft)		114.93	
E.G. Slope (ft/ft)	0.012866	Area (sq ft)		114.93	
Q Total (cfs)	680.00	Flow (cfs)		680.00	
Top Width (ft)	106.16	Top Width (ft)		106.16	
Vel Total (ft/s)	5.92	Avg. Vel. (ft/s)		5.92	
Max Chl Dpth (ft)	1.18	Hydr. Depth (ft)		1.08	
Conv. Total (cfs)	5995.1	Conv. (cfs)		5995.1	
Length Wtd. (ft)		Wetted Per. (ft)		106.33	
Min Ch El (ft)	2727.00	Shear (lb/sq ft)		0.87	
Alpha	1.00	Stream Power (lb/ft s)	308.76	0.00	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

Warning: The energy equation could not be balanced within the specified number of iterations. The program used critical depth
for the water surface and continued on with the calculations.
Warning: The velocity head has changed by more than 0.5 ft (0.15 m). This may indicate the need for additional cross sections.
Warning: The energy loss was greater than 1.0 ft (0.3 m). between the current and previous cross section. This may indicate the
need for additional cross sections.

SUMMARY OF MANNING'S N VALUES

River:Desert Knolls Wa

Reach	River Sta.	n1	n2	n3	n4	n5
Main	12028.1	.035	.013	.035		
Main	11915	.035	.035	.035		
Main	11864	.035	.035	.035		
Main	11841	.035	.035	.035		

Main	11792	.035	.035	.035
Main	11788	.035	.035	.035
Main	11785	.035	.035	.035
Main	11663.9	.035	.03	.035
Main	11313.9	.035	.03	.035
Main	11170.*	.04	.035	.04
Main	11168	.04	.035	.04
Main	11153	.035	.035	.035
Main	11151	.035	.035	.035
Main	11136	.04	.035	.04
Main	10963.9	.035	.03	.035
Main	10745	.035	.03	.035
Main	10720.4	.035	.03	.035
Main	10694.4	Culvert		
Main	10659.4	.035	.03	.035
Main	10613.9	.035	.03	.035
Main	10213.9	.035	.03	.035
Main	10170.*	.04	.035	.04
Main	10168	.035	.035	.035
Main	10153	.035	.035	.035
Main	10151	.035	.035	.035
Main	10136	.04	.035	.04
Main	9863.9	.035	.03	.035
Main	9736	.035	.03	.035
Main	9728	.035	.03	.035
Main	9536.1	.035	.013	.035
Main	9525.6	Culvert		
Main	9515.2	.035	.013	.035
Main	9313.9	.035	.03	.035
Main	9125	.035	.03	.035
Main	9116	.035	.03	.035
Main	9035.8	.035	.013	.035
Main	9020.4	Culvert		
Main	9005	.035	.013	.035
Main	8713.9	.035	.03	.035
Main	8470.*	.04	.035	.04
Main	8468	.04	.035	.04
Main	8453	.04	.035	.04
Main	8451	.04	.035	.04
Main	8436	.04	.035	.04
Main	8413.9	.035	.03	.035
Main	8113.9	.035	.03	.035
Main	7840	.035	.013	.035
Main	7761.1	.035	.013	.035
Main	7749.9	Culvert		
Main	7738.6	.035	.013	.035
Main	7456.8	.035	.03	.035
Main	7347	.035	.013	.035
Main	7267	.035	.013	.035
Main	7246.1	Culvert		
Main	7231.3	.035	.013	.035
Main	7010.2	.035	.03	.035
Main	6880	.035	.013	.035
Main	6801.6	.035	.013	.035
Main	6785.6	Culvert		
Main	6769.7	.035	.013	.035
Main	6690	.035	.013	.035
Main	6555.8	.035	.03	.035
Main	6400	.035	.03	.035
Main	6344.7	.035	.013	.035
Main	6328.7	Culvert		
Main	6312.5	.035	.013	.035
Main	6000	.035	.013	.035
Main	5778.8	.035	.03	.035
Main	5742	.035	.013	.035

Main	5679.8	Culvert				
Main	5609.6	.035	.013	.035		
Main	5581.3	.035	.013	.035		
Main	5515.3	.013	.013	.013		
Main	5135	.013	.013	.013		
Main	4875	.013	.013	.013		
Main	4635	.013	.013	.013		
Main	4385	.013	.013	.013		
Main	4135	.013	.013	.013		
Main	3969.6	.035	.013	.035		
Main	3835	.013	.013	.013		
Main	3600.*	.04	.035	.04		
Main	3598	.04	.035	.04		
Main	3583	.04	.016	.035	.016	.04
Main	3581	.04	.016	.035	.016	.04
Main	3566	.04	.035	.04		
Main	3520.3	.035	.03	.035		
Main	3450.*	.04	.035	.04		
Main	3448	.04	.016	.035	.016	.04
Main	3433	.035	.035	.035		
Main	3431	.035	.016	.035	.016	.035
Main	3416	.04	.016	.035	.016	.04
Main	3300	.04	.016	.035	.016	.04
Main	3298	.04	.016	.035	.016	.04
Main	3283	.04	.016	.035	.016	.035
Main	3281	.04	.016	.035	.016	.035
Main	3266	.04	.016	.035	.016	.04
Main	3000	.04	.016	.035	.04	
Main	2998	.04	.016	.035	.04	
Main	2983	.035	.016	.035	.016	.035
Main	2981	.035	.016	.035	.016	.035
Main	2966	.04	.035	.04		
Main	2942.6	.035	.03	.035		
Main	2730.8	.035	.03	.035		
Main	2700.*	.04	.016	.035	.016	.04
Main	2698	.04	.016	.035	.016	.04
Main	2683	.016	.035	.016	.04	
Main	2681	.016	.035	.016	.04	
Main	2666	.04	.016	.035	.016	.04
Main	2513.9	.035	.016	.03	.016	.035
Main	2400.*	.04	.016	.035	.016	.04
Main	2398	.04	.016	.035	.016	.04
Main	2383	.04	.016	.035	.016	.04
Main	2381	.04	.016	.035	.016	.04
Main	2366	.04	.016	.035	.016	.04
Main	2260.4	.04	.016	.03	.016	.035
Main	2200.*	.04	.016	.035	.016	.04
Main	2198	.04	.016	.035	.016	.04
Main	2183	.04	.016	.035	.016	.04
Main	2181	.04	.016	.035	.016	.04
Main	2166	.04	.016	.035	.016	.04
Main	1986.6	.035	.016	.03	.016	.035
Main	1900.*	.04	.016	.035	.016	.04
Main	1898	.04	.016	.035	.016	.04
Main	1883	.04	.016	.035	.016	.04
Main	1881	.04	.016	.035	.016	.04
Main	1866	.04	.016	.035	.016	.04
Main	1699.2	.035	.016	.03	.016	.035
Main	1600.*	.035	.035	.035		
Main	1598	.04	.016	.035	.016	.04
Main	1583	.04	.016	.035	.016	.04
Main	1581	.04	.016	.035	.016	.04
Main	1566	.04	.016	.035	.016	.04
Main	1439.8	.035	.03	.035		
Main	957.5	.035	.03	.035		

SUMMARY OF REACH LENGTHS

River: Desert Knolls Wa

Reach	River Sta.	Left	Channel	Right
Main	12028.1	113.1	113.1	113.1
Main	11915	51	51	51
Main	11864	23	23	23
Main	11841	49	49	49
Main	11792	4	4	4
Main	11788	3	3	3
Main	11785	121.1	121.1	121.1
Main	11663.9	350	350	350
Main	11313.9	143.9	143.9	143.9
Main	11170.*	2	2	2
Main	11168	15	15	15
Main	11153	2	2	2
Main	11151	15	15	15
Main	11136	172.1	172.1	172.1
Main	10963.9	243.5	243.5	243.5
Main	10745	24.6	24.6	24.6
Main	10720.4	61	61	61
Main	10694.4	Culvert		
Main	10659.4	45.5	45.5	45.5
Main	10613.9	400	400	400
Main	10213.9	43.9	43.9	43.9
Main	10170.*	2	2	2
Main	10168	15	15	15
Main	10153	2	2	2
Main	10151	15	15	15
Main	10136	272.1	272.1	272.1
Main	9863.9	127.9	127.9	127.9
Main	9736	8	8	8
Main	9728	191.1	191.1	191.1
Main	9536.1	20.9	20.9	20.9
Main	9525.6	Culvert		
Main	9515.2	201.3	201.3	201.3
Main	9313.9	188.9	188.9	188.9
Main	9125	9	9	9
Main	9116	80.2	80.2	80.2
Main	9035.8	30.7	30.7	30.7
Main	9020.4	Culvert		
Main	9005	291.2	291.2	291.2
Main	8713.9	243.9	243.9	243.9
Main	8470.*	2	2	2
Main	8468	15	15	15
Main	8453	2	2	2
Main	8451	15	15	15
Main	8436	22.1	22.1	22.1
Main	8413.9	300	300	300
Main	8113.9	273.9	273.9	273.9
Main	7840	78.9	78.9	78.9
Main	7761.1	22.5	22.5	22.5
Main	7749.9	Culvert		
Main	7738.6	281.8	281.8	281.8
Main	7456.8	109.8	109.8	109.8
Main	7347	80	80	80
Main	7267	35.7	35.7	35.7
Main	7246.1	Culvert		
Main	7231.3	221.1	221.1	221.1

Main	7010.2	130.2	130.2	130.2
Main	6880	78.4	78.4	78.4
Main	6801.6	31.8	31.8	31.8
Main	6785.6	Culvert		
Main	6769.7	79.7	79.7	79.7
Main	6690	134.2	134.2	134.2
Main	6555.8	155.8	155.8	155.8
Main	6400	55.3	55.3	55.3
Main	6344.7	32	32	32
Main	6328.7	Culvert		
Main	6312.5	312.5	312.5	312.5
Main	6000	239.9	239.9	239.9
Main	5778.8	36.8	36.8	36.8
Main	5742	132.4	132.4	132.4
Main	5679.8	Culvert		
Main	5609.6	28.3	28.3	28.3
Main	5581.3	66.1	66.1	66.1
Main	5515.3	50.3	50.3	50.3
Main	5135	260	260	260
Main	4875	240	240	240
Main	4635	250	250	250
Main	4385	250	250	250
Main	4135	300	300	300
Main	3969.6	134.6	134.6	134.6
Main	3835	235	235	235
Main	3600.*	2	2	2
Main	3598	15	15	15
Main	3583	2	2	2
Main	3581	15	15	15
Main	3566	45.7	45.7	45.7
Main	3520.3	70.3	70.3	70.3
Main	3450.*	2	2	2
Main	3448	15	15	15
Main	3433	2	2	2
Main	3431	15	15	15
Main	3416	116	116	116
Main	3300	2	2	2
Main	3298	15	15	15
Main	3283	2	2	2
Main	3281	15	15	15
Main	3266	266	266	266
Main	3000	2	2	2
Main	2998	15	15	15
Main	2983	2	2	2
Main	2981	15	15	15
Main	2966	23.4	23.4	23.4
Main	2942.6	211.8	211.8	211.8
Main	2730.8	30.8	30.8	30.8
Main	2700.*	2	2	2
Main	2698	15	15	15
Main	2683	2	2	2
Main	2681	15	15	15
Main	2666	152.1	152.1	152.1
Main	2513.9	113.9	113.9	113.9
Main	2400.*	2	2	2
Main	2398	15	15	15
Main	2383	2	2	2
Main	2381	15	15	15
Main	2366	105.6	105.6	105.6
Main	2260.4	60.4	60.4	60.4
Main	2200.*	2	2	2
Main	2198	15	15	15
Main	2183	2	2	2
Main	2181	15	15	15
Main	2166	179.4	179.4	179.4

Main	1986.6	86.6	86.6	86.6
Main	1900.*	2	2	2
Main	1898	15	15	15
Main	1883	2	2	2
Main	1881	15	15	15
Main	1866	166.8	166.8	166.8
Main	1699.2	99.2	99.2	99.2
Main	1600.*	2	2	2
Main	1598	15	15	15
Main	1583	2	2	2
Main	1581	15	15	15
Main	1566	126.2	126.2	126.2
Main	1439.8	482.3	482.3	482.3
Main	957.5	0	0	0

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS
River: Desert Knolls Wa

Reach	River Sta.	Contr.	Expan.
Main	12028.1	.1	.3
Main	11915	.1	.3
Main	11864	.1	.3
Main	11841	.1	.3
Main	11792	.1	.3
Main	11788	.1	.3
Main	11785	.1	.3
Main	11663.9	.1	.3
Main	11313.9	.1	.3
Main	11170.*	.1	.3
Main	11168	.1	.3
Main	11153	.1	.3
Main	11151	.1	.3
Main	11136	.1	.3
Main	10963.9	.1	.3
Main	10745	.1	.3
Main	10720.4	.3	.5
Main	10694.4	Culvert	
Main	10659.4	.3	.5
Main	10613.9	.1	.3
Main	10213.9	.1	.3
Main	10170.*	.1	.3
Main	10168	.1	.3
Main	10153	.1	.3
Main	10151	.1	.3
Main	10136	.1	.3
Main	9863.9	.1	.3
Main	9736	.3	.5
Main	9728	.3	.5
Main	9536.1	.3	.5
Main	9525.6	Culvert	
Main	9515.2	.3	.5
Main	9313.9	.1	.3
Main	9125	.3	.5
Main	9116	.3	.5
Main	9035.8	.3	.5
Main	9020.4	Culvert	
Main	9005	.3	.5
Main	8713.9	.1	.3
Main	8470.*	.1	.3
Main	8468	.1	.3

Main	8453		.1	.3
Main	8451		.1	.3
Main	8436		.1	.3
Main	8413.9		.1	.3
Main	8113.9		.1	.3
Main	7840		.3	.5
Main	7761.1		.3	.5
Main	7749.9	Culvert		
Main	7738.6		.3	.5
Main	7456.8		.1	.3
Main	7347		.3	.5
Main	7267		.3	.5
Main	7246.1	Culvert		
Main	7231.3		.3	.5
Main	7010.2		.1	.3
Main	6880		.3	.5
Main	6801.6		.3	.5
Main	6785.6	Culvert		
Main	6769.7		.3	.5
Main	6690		.3	.5
Main	6555.8		.1	.3
Main	6400		.3	.5
Main	6344.7		.3	.5
Main	6328.7	Culvert		
Main	6312.5		.3	.5
Main	6000		.1	.3
Main	5778.8		.1	.3
Main	5742		.3	.5
Main	5679.8	Culvert		
Main	5609.6		.3	.5
Main	5581.3		.1	.3
Main	5515.3		.1	.3
Main	5135		.1	.3
Main	4875		.1	.3
Main	4635		.1	.3
Main	4385		.1	.3
Main	4135		.1	.3
Main	3969.6		.1	.3
Main	3835		.1	.3
Main	3600.*		.1	.3
Main	3598		.1	.3
Main	3583		.1	.3
Main	3581		.1	.3
Main	3566		.1	.3
Main	3520.3		.1	.3
Main	3450.*		.1	.3
Main	3448		.1	.3
Main	3433		.1	.3
Main	3431		.1	.3
Main	3416		.1	.3
Main	3300		.1	.3
Main	3298		.1	.3
Main	3283		.1	.3
Main	3281		.1	.3
Main	3266		.1	.3
Main	3000		.1	.3
Main	2998		.1	.3
Main	2983		.1	.3
Main	2981		.1	.3
Main	2966		.1	.3
Main	2942.6		.1	.3
Main	2730.8		.1	.3
Main	2700.*		.1	.3
Main	2698		.1	.3
Main	2683		.1	.3

Main	2681	.1	.3
Main	2666	.1	.3
Main	2513.9	.1	.3
Main	2400.*	.1	.3
Main	2398	.1	.3
Main	2383	.1	.3
Main	2381	.1	.3
Main	2366	.1	.3
Main	2260.4	.1	.3
Main	2200.*	.1	.3
Main	2198	.1	.3
Main	2183	.1	.3
Main	2181	.1	.3
Main	2166	.1	.3
Main	1986.6	.1	.3
Main	1900.*	.1	.3
Main	1898	.1	.3
Main	1883	.1	.3
Main	1881	.1	.3
Main	1866	.1	.3
Main	1699.2	.1	.3
Main	1600.*	.1	.3
Main	1598	.1	.3
Main	1583	.1	.3
Main	1581	.1	.3
Main	1566	.1	.3
Main	1439.8	.1	.3
Main	957.5	.1	.3

Profile Output Table - Standard Table 1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Main	12028.1	100-yr SBCFCD	1730.00	2858.50	2865.53	2859.56	2865.54	0.000004	0.83	2076.14	300.00	0.06
Main	12028.1	100-yr FIS	700.00	2858.50	2862.67	2859.08	2862.67	0.000004	0.58	1216.13	300.00	0.05
Main	12028.1	50-yr FIS	500.00	2858.50	2861.89	2858.96	2861.90	0.000004	0.51	983.88	300.00	0.05
Main	12028.1	10-yr FIS	100.00	2858.50	2859.65	2858.66	2859.65	0.000006	0.31	321.78	285.82	0.05
Main	12028.1	10-yr SBCFCD	810.00	2858.50	2863.05	2859.13	2863.05	0.000004	0.61	1330.24	300.00	0.05
Main	12028.1	5-yr SBCFCD	550.00	2858.50	2862.10	2858.99	2862.10	0.000004	0.53	1045.40	300.00	0.05
Main	12028.1	2-yr SBCFCD	340.00	2858.50	2861.16	2858.86	2861.16	0.000004	0.45	763.51	298.77	0.05
Main	11915	100-yr SBCFCD	1730.00	2858.30	2863.42	2863.42	2865.35	0.012467	11.15	155.18	40.62	1.01
Main	11915	100-yr FIS	700.00	2858.30	2861.31	2861.31	2862.55	0.014185	8.91	78.53	32.14	1.00
Main	11915	50-yr FIS	500.00	2858.30	2860.75	2860.75	2861.79	0.015009	8.18	61.15	29.88	1.01
Main	11915	10-yr FIS	100.00	2858.30	2859.19	2859.19	2859.60	0.019750	5.17	19.35	23.58	1.01
Main	11915	10-yr SBCFCD	810.00	2858.30	2861.59	2861.59	2862.92	0.013916	9.26	87.46	33.24	1.01
Main	11915	5-yr SBCFCD	550.00	2858.30	2860.90	2860.90	2861.99	0.014707	8.37	65.72	30.49	1.00
Main	11915	2-yr SBCFCD	340.00	2858.30	2860.24	2860.24	2861.07	0.015873	7.35	46.25	27.80	1.00
Main	11864	100-yr SBCFCD	1730.00	2856.70	2860.79	2861.82	2864.27	0.028579	14.96	115.62	36.49	1.48
Main	11864	100-yr FIS	700.00	2856.70	2859.02	2859.71	2861.34	0.035787	12.23	57.21	29.34	1.54
Main	11864	50-yr FIS	500.00	2856.70	2858.57	2859.15	2860.54	0.038661	11.25	44.45	27.53	1.56
Main	11864	10-yr FIS	100.00	2856.70	2857.39	2857.59	2858.10	0.045705	6.75	14.82	22.79	1.47
Main	11864	10-yr SBCFCD	810.00	2856.70	2859.25	2859.98	2861.74	0.034499	12.66	63.98	30.26	1.53
Main	11864	5-yr SBCFCD	550.00	2856.70	2858.69	2859.30	2860.75	0.037831	11.53	47.72	28.01	1.56
Main	11864	2-yr SBCFCD	340.00	2856.70	2858.16	2858.63	2859.76	0.041933	10.15	33.51	25.88	1.57
Main	11841	100-yr SBCFCD	1730.00	2850.50	2859.42	2855.62	2859.82	0.001446	5.11	338.43	55.87	0.37
Main	11841	100-yr FIS	700.00	2850.50	2856.76	2853.51	2856.95	0.000949	3.43	204.31	45.23	0.28
Main	11841	50-yr FIS	500.00	2850.50	2856.03	2852.95	2856.16	0.000778	2.90	172.21	42.28	0.25
Main	11841	10-yr FIS	100.00	2850.50	2853.87	2851.39	2853.89	0.000193	1.11	90.32	33.58	0.12
Main	11841	10-yr SBCFCD	810.00	2850.50	2857.12	2853.78	2857.33	0.001028	3.67	220.51	46.65	0.30
Main	11841	5-yr SBCFCD	550.00	2850.50	2856.22	2853.10	2856.37	0.000826	3.05	180.49	43.06	0.26
Main	11841	2-yr SBCFCD	340.00	2850.50	2855.33	2852.43	2855.42	0.000597	2.36	143.77	39.48	0.22
Main	11792	100-yr SBCFCD	1730.00	2850.50	2859.33		2859.75	0.001504	5.18	333.71	55.58	0.37
Main	11792	100-yr FIS	700.00	2850.50	2856.71		2856.90	0.000979	3.47	201.97	45.03	0.29
Main	11792	50-yr FIS	500.00	2850.50	2855.99		2856.12	0.000801	2.93	170.45	42.11	0.26
Main	11792	10-yr FIS	100.00	2850.50	2853.86		2853.88	0.000195	1.11	89.99	33.54	0.12
Main	11792	10-yr SBCFCD	810.00	2850.50	2857.06		2857.27	0.001063	3.72	217.86	46.42	0.30
Main	11792	5-yr SBCFCD	550.00	2850.50	2856.18		2856.33	0.000851	3.08	178.58	42.88	0.27
Main	11792	2-yr SBCFCD	340.00	2850.50	2855.30		2855.39	0.000611	2.39	142.53	39.35	0.22
Main	11788	100-yr SBCFCD	1730.00	2852.50	2858.12	2857.63	2859.63	0.008816	9.86	175.49	42.47	0.85
Main	11788	100-yr FIS	700.00	2852.50	2855.90	2855.51	2856.82	0.009231	7.69	91.06	33.59	0.82
Main	11788	50-yr FIS	500.00	2852.50	2855.29	2854.96	2856.05	0.009576	7.02	71.26	31.15	0.82
Main	11788	10-yr FIS	100.00	2852.50	2853.59		2853.85	0.010009	4.16	24.06	24.34	0.74
Main	11788	10-yr SBCFCD	810.00	2852.50	2856.18	2855.79	2857.19	0.009246	8.04	100.77	34.73	0.83
Main	11788	5-yr SBCFCD	550.00	2852.50	2855.44	2855.10	2856.25	0.009530	7.22	76.21	31.78	0.82
Main	11788	2-yr SBCFCD	340.00	2852.50	2854.73	2854.43	2855.33	0.009684	6.23	54.58	28.92	0.80
Main	11785	100-yr SBCFCD	1730.00	2852.50	2857.62	2857.62	2859.55	0.012485	11.15	155.10	40.62	1.01
Main	11785	100-yr FIS	700.00	2852.50	2855.51	2855.51	2856.75	0.014197	8.92	78.50	32.13	1.01
Main	11785	50-yr FIS	500.00	2852.50	2854.96	2854.96	2855.99	0.014836	8.14	61.40	29.91	1.00
Main	11785	10-yr FIS	100.00	2852.50	2853.39	2853.39	2853.80	0.019750	5.17	19.35	23.58	1.01

Main	11785	10-yr SBCFCD	810.00	2852.50	2855.79	2855.79	2857.12	0.013813	9.24	87.68	33.26	1.00
Main	11785	5-yr SBCFCD	550.00	2852.50	2855.11	2855.11	2856.19	0.014649	8.36	65.81	30.50	1.00
Main	11785	2-yr SBCFCD	340.00	2852.50	2854.44	2854.44	2855.27	0.015817	7.34	46.30	27.80	1.00
Main	11663.9	100-yr SBCFCD	1730.00	2849.70	2853.06	2854.33	2857.13	0.028964	16.19	106.87	38.58	1.71
Main	11663.9	100-yr FIS	700.00	2849.70	2851.62	2852.38	2854.10	0.033482	12.64	55.40	32.75	1.71
Main	11663.9	50-yr FIS	500.00	2849.70	2851.27	2851.87	2853.26	0.034320	11.35	44.07	31.32	1.69
Main	11663.9	10-yr FIS	100.00	2849.70	2850.33	2850.47	2850.90	0.029435	6.02	16.61	27.55	1.37
Main	11663.9	10-yr SBCFCD	810.00	2849.70	2851.80	2852.63	2854.50	0.032869	13.19	61.39	33.48	1.72
Main	11663.9	5-yr SBCFCD	550.00	2849.70	2851.36	2852.01	2853.49	0.034109	11.70	46.99	31.70	1.69
Main	11663.9	2-yr SBCFCD	340.00	2849.70	2850.95	2851.40	2852.47	0.034369	9.91	34.32	30.04	1.63
Main	11313.9	100-yr SBCFCD	1960.00	2844.50	2849.48	2849.48	2851.45	0.009119	11.27	173.86	44.90	1.01
Main	11313.9	100-yr FIS	1700.00	2844.50	2849.09	2849.10	2850.91	0.009196	10.84	156.88	43.36	1.00
Main	11313.9	50-yr FIS	1000.00	2844.50	2847.83	2847.83	2849.23	0.010033	9.48	105.44	38.32	1.01
Main	11313.9	10-yr FIS	150.00	2844.50	2845.51	2845.51	2845.98	0.013886	5.52	27.16	29.02	1.01
Main	11313.9	10-yr SBCFCD	920.00	2844.50	2847.67	2847.67	2849.00	0.010128	9.27	99.28	37.67	1.01
Main	11313.9	5-yr SBCFCD	620.00	2844.50	2846.98	2846.98	2848.06	0.010815	8.34	74.35	34.93	1.01
Main	11313.9	2-yr SBCFCD	380.00	2844.50	2846.32	2846.33	2847.15	0.011749	7.27	52.26	32.30	1.01
Main	11170.*	100-yr SBCFCD	1960.00	2842.40	2848.40	2847.12	2849.30	0.004883	7.60	257.97	61.00	0.65
Main	11170.*	100-yr FIS	1700.00	2842.40	2847.96	2846.75	2848.79	0.004957	7.34	231.53	58.34	0.65
Main	11170.*	50-yr FIS	1000.00	2842.40	2846.55	2845.60	2847.19	0.005239	6.44	155.35	49.89	0.64
Main	11170.*	10-yr FIS	150.00	2842.40	2843.75	2843.40	2843.97	0.006670	3.84	39.06	33.07	0.62
Main	11170.*	10-yr SBCFCD	920.00	2842.40	2846.36	2845.45	2846.98	0.005287	6.30	145.97	48.75	0.64
Main	11170.*	5-yr SBCFCD	620.00	2842.40	2845.56	2844.81	2846.06	0.005549	5.70	108.78	43.94	0.64
Main	11170.*	2-yr SBCFCD	380.00	2842.40	2844.77	2844.19	2845.16	0.005884	5.00	76.02	39.21	0.63
Main	11168	100-yr SBCFCD	1960.00	2842.40	2848.39		2849.29	0.004918	7.62	257.31	60.93	0.65
Main	11168	100-yr FIS	1700.00	2842.40	2847.95		2848.79	0.004994	7.36	230.92	58.27	0.65
Main	11168	50-yr FIS	1000.00	2842.40	2846.53		2847.18	0.005308	6.47	154.63	49.81	0.65
Main	11168	10-yr FIS	150.00	2842.40	2843.73		2843.96	0.006989	3.90	38.46	32.96	0.64
Main	11168	10-yr SBCFCD	920.00	2842.40	2846.34		2846.97	0.005360	6.33	145.27	48.66	0.65
Main	11168	5-yr SBCFCD	620.00	2842.40	2845.54		2846.05	0.005647	5.73	108.12	43.84	0.64
Main	11168	2-yr SBCFCD	380.00	2842.40	2844.75		2845.15	0.006025	5.04	75.41	39.11	0.64
Main	11153	100-yr SBCFCD	1960.00	2837.40	2848.92		2849.04	0.000338	2.86	685.90	94.10	0.19
Main	11153	100-yr FIS	1700.00	2837.40	2848.45		2848.56	0.000304	2.65	642.22	91.28	0.18
Main	11153	50-yr FIS	1000.00	2837.40	2846.94		2847.00	0.000195	1.96	511.31	82.22	0.14
Main	11153	10-yr FIS	150.00	2837.40	2843.89		2843.89	0.000021	0.52	288.42	63.92	0.04
Main	11153	10-yr SBCFCD	920.00	2837.40	2846.73		2846.79	0.000181	1.86	494.60	80.99	0.13
Main	11153	5-yr SBCFCD	620.00	2837.40	2845.87		2845.90	0.000123	1.45	426.89	75.81	0.11
Main	11153	2-yr SBCFCD	380.00	2837.40	2845.01		2845.03	0.000071	1.04	364.03	70.66	0.08
Main	11151	100-yr SBCFCD	1960.00	2837.40	2848.92		2849.04	0.000338	2.86	685.83	94.10	0.19
Main	11151	100-yr FIS	1700.00	2837.40	2848.45		2848.56	0.000304	2.65	642.18	91.27	0.18
Main	11151	50-yr FIS	1000.00	2837.40	2846.94		2847.00	0.000195	1.96	511.27	82.22	0.14
Main	11151	10-yr FIS	150.00	2837.40	2843.89		2843.89	0.000021	0.52	288.42	63.92	0.04
Main	11151	10-yr SBCFCD	920.00	2837.40	2846.73		2846.79	0.000181	1.86	494.58	80.99	0.13
Main	11151	5-yr SBCFCD	620.00	2837.40	2845.87		2845.90	0.000123	1.45	426.88	75.81	0.11
Main	11151	2-yr SBCFCD	380.00	2837.40	2845.01		2845.03	0.000071	1.04	364.01	70.66	0.08
Main	11136	100-yr SBCFCD	1960.00	2842.40	2847.12	2847.12	2848.87	0.012403	10.62	184.55	53.29	1.01
Main	11136	100-yr FIS	1700.00	2842.40	2846.75	2846.75	2848.39	0.012674	10.27	165.47	51.09	1.01
Main	11136	50-yr FIS	1000.00	2842.40	2845.60	2845.60	2846.87	0.013665	9.02	110.88	44.22	1.00
Main	11136	10-yr FIS	150.00	2842.40	2843.40	2843.40	2843.85	0.018741	5.38	27.88	30.98	1.00
Main	11136	10-yr SBCFCD	920.00	2842.40	2845.45	2845.45	2846.66	0.013840	8.83	104.16	43.30	1.00

Main	11136	5-yr SBCFCD	620.00	2842.40	2844.81	2844.81	2845.80	0.014764	7.99	77.57	39.44	1.00
Main	11136	2-yr SBCFCD	380.00	2842.40	2844.19	2844.19	2844.95	0.015985	7.01	54.19	35.71	1.00
Main	10963.9	100-yr SBCFCD	1960.00	2839.30	2843.12	2843.98	2846.10	0.019603	13.84	141.67	49.09	1.44
Main	10963.9	100-yr FIS	1700.00	2839.30	2842.84	2843.62	2845.59	0.019784	13.31	127.72	47.27	1.43
Main	10963.9	50-yr FIS	1000.00	2839.30	2841.94	2842.48	2843.95	0.020086	11.40	87.74	41.60	1.38
Main	10963.9	10-yr FIS	150.00	2839.30	2840.23	2840.29	2840.75	0.017230	5.77	26.02	30.87	1.11
Main	10963.9	10-yr SBCFCD	920.00	2839.30	2841.82	2842.33	2843.73	0.020070	11.10	82.86	40.85	1.37
Main	10963.9	5-yr SBCFCD	620.00	2839.30	2841.32	2841.69	2842.81	0.019923	9.78	63.43	37.74	1.33
Main	10963.9	2-yr SBCFCD	380.00	2839.30	2840.85	2841.07	2841.90	0.019280	8.24	46.14	34.73	1.26
Main	10745	100-yr SBCFCD	1960.00	2836.00	2843.96	2841.10	2844.57	0.001706	6.26	313.32	54.71	0.46
Main	10745	100-yr FIS	1700.00	2836.00	2842.41	2840.69	2843.24	0.002922	7.29	233.11	48.73	0.59
Main	10745	50-yr FIS	1000.00	2836.00	2839.42	2839.42	2840.84	0.009982	9.57	104.48	37.18	1.01
Main	10745	10-yr FIS	150.00	2836.00	2837.03	2837.03	2837.52	0.013769	5.59	26.85	27.98	1.01
Main	10745	10-yr SBCFCD	920.00	2836.00	2839.25	2839.25	2840.61	0.010108	9.36	98.25	36.52	1.01
Main	10745	5-yr SBCFCD	620.00	2836.00	2838.55	2838.55	2839.65	0.010736	8.42	73.66	33.83	1.01
Main	10745	2-yr SBCFCD	380.00	2836.00	2837.87	2837.87	2838.71	0.011679	7.35	51.70	31.22	1.01
Main	10720.4	100-yr SBCFCD	1960.00	2831.60	2844.27	2836.68	2844.42	0.000260	3.13	626.59	74.94	0.19
Main	10720.4	100-yr FIS	1700.00	2831.60	2842.86	2836.29	2843.02	0.000317	3.24	524.98	69.27	0.21
Main	10720.4	50-yr FIS	1000.00	2831.60	2839.54	2835.00	2839.70	0.000436	3.15	317.37	55.94	0.23
Main	10720.4	10-yr FIS	150.00	2831.60	2833.93	2832.63	2834.00	0.000854	2.25	66.69	33.35	0.28
Main	10720.4	10-yr SBCFCD	920.00	2831.60	2838.97	2834.84	2839.13	0.000492	3.22	286.01	53.63	0.25
Main	10720.4	5-yr SBCFCD	620.00	2831.60	2837.31	2834.14	2837.45	0.000587	3.06	202.36	46.94	0.26
Main	10720.4	2-yr SBCFCD	380.00	2831.60	2835.77	2833.47	2835.89	0.000696	2.81	135.05	40.77	0.27
Main	10694.4		Culvert									
Main	10659.4	100-yr SBCFCD	1960.00	2831.60	2839.54		2840.13	0.001677	6.18	317.19	55.92	0.46
Main	10659.4	100-yr FIS	1700.00	2831.60	2839.99		2840.37	0.001017	4.96	342.99	57.75	0.36
Main	10659.4	50-yr FIS	1000.00	2831.60	2837.69		2838.01	0.001196	4.53	220.83	48.50	0.37
Main	10659.4	10-yr FIS	150.00	2831.60	2833.53		2833.65	0.001638	2.79	53.71	31.75	0.38
Main	10659.4	10-yr SBCFCD	920.00	2831.60	2836.93		2837.31	0.001666	4.97	184.95	45.43	0.43
Main	10659.4	5-yr SBCFCD	620.00	2831.60	2835.90		2836.20	0.001662	4.42	140.26	41.28	0.42
Main	10659.4	2-yr SBCFCD	380.00	2831.60	2834.87		2835.10	0.001656	3.80	100.06	37.16	0.41
Main	10613.9	100-yr SBCFCD	2590.00	2831.50	2839.39		2840.04	0.001674	6.47	400.52	66.55	0.46
Main	10613.9	100-yr FIS	2700.00	2831.50	2839.56		2840.23	0.001682	6.56	411.88	67.23	0.47
Main	10613.9	50-yr FIS	1500.00	2831.50	2837.46		2837.91	0.001560	5.36	279.74	58.85	0.43
Main	10613.9	10-yr FIS	200.00	2831.50	2833.47		2833.58	0.001315	2.61	76.67	42.88	0.34
Main	10613.9	10-yr SBCFCD	1220.00	2831.50	2836.85		2837.24	0.001521	4.99	244.56	56.40	0.42
Main	10613.9	5-yr SBCFCD	820.00	2831.50	2835.83		2836.13	0.001452	4.33	189.22	52.33	0.40
Main	10613.9	2-yr SBCFCD	500.00	2831.50	2834.82		2835.02	0.001376	3.62	137.99	48.26	0.38
Main	10213.9	100-yr SBCFCD	2590.00	2830.90	2838.66		2839.34	0.001786	6.62	390.99	65.75	0.48
Main	10213.9	100-yr FIS	2700.00	2830.90	2838.83		2839.53	0.001795	6.72	401.91	66.41	0.48
Main	10213.9	50-yr FIS	1500.00	2830.90	2836.82		2837.27	0.001610	5.43	276.38	58.44	0.44
Main	10213.9	10-yr FIS	200.00	2830.90	2833.02		2833.11	0.001030	2.41	82.94	43.38	0.31
Main	10213.9	10-yr SBCFCD	1220.00	2830.90	2836.23		2836.62	0.001545	5.02	242.96	56.13	0.43
Main	10213.9	5-yr SBCFCD	820.00	2830.90	2835.26		2835.55	0.001422	4.31	190.37	52.28	0.40
Main	10213.9	2-yr SBCFCD	500.00	2830.90	2834.29		2834.49	0.001272	3.53	141.57	48.44	0.36
Main	10170.*	100-yr SBCFCD	2590.00	2830.80	2838.73		2839.20	0.001774	5.55	466.66	82.76	0.41
Main	10170.*	100-yr FIS	2700.00	2830.80	2838.90		2839.39	0.001773	5.61	480.89	83.79	0.41
Main	10170.*	50-yr FIS	1500.00	2830.80	2836.82		2837.17	0.001703	4.68	320.22	71.31	0.39
Main	10170.*	10-yr FIS	200.00	2830.80	2832.98		2833.05	0.001190	2.21	90.50	48.12	0.28

Main	10170.*	10-yr SBCFCD	1220.00	2830.80	2836.23		2836.53	0.001667	4.38	278.73	67.71	0.38
Main	10170.*	5-yr SBCFCD	820.00	2830.80	2835.24		2835.47	0.001583	3.82	214.77	61.76	0.36
Main	10170.*	2-yr SBCFCD	500.00	2830.80	2834.26		2834.42	0.001453	3.18	157.10	55.85	0.33
Main	10168	100-yr SBCFCD	2590.00	2830.80	2838.72		2839.20	0.001784	5.57	465.29	82.51	0.41
Main	10168	100-yr FIS	2700.00	2830.80	2838.89		2839.38	0.001784	5.63	479.48	83.54	0.41
Main	10168	50-yr FIS	1500.00	2830.80	2836.82		2837.16	0.001713	4.70	319.37	71.12	0.39
Main	10168	10-yr FIS	200.00	2830.80	2832.98		2833.05	0.001196	2.21	90.31	48.05	0.28
Main	10168	10-yr SBCFCD	1220.00	2830.80	2836.22		2836.52	0.001675	4.39	278.06	67.54	0.38
Main	10168	5-yr SBCFCD	820.00	2830.80	2835.24		2835.46	0.001591	3.83	214.25	61.61	0.36
Main	10168	2-yr SBCFCD	500.00	2830.80	2834.26		2834.41	0.001460	3.19	156.77	55.73	0.34
Main	10153	100-yr SBCFCD	2590.00	2825.80	2838.97		2839.08	0.000230	2.64	980.98	113.95	0.16
Main	10153	100-yr FIS	2700.00	2825.80	2839.15		2839.26	0.000237	2.70	1001.02	115.00	0.16
Main	10153	50-yr FIS	1500.00	2825.80	2837.01		2837.07	0.000150	1.95	769.13	102.20	0.13
Main	10153	10-yr FIS	200.00	2825.80	2833.03		2833.03	0.000015	0.49	409.31	78.31	0.04
Main	10153	10-yr SBCFCD	1220.00	2825.80	2836.40		2836.44	0.000125	1.72	707.27	98.51	0.11
Main	10153	5-yr SBCFCD	820.00	2825.80	2835.37		2835.40	0.000085	1.35	609.57	92.37	0.09
Main	10153	2-yr SBCFCD	500.00	2825.80	2834.35		2834.37	0.000049	0.96	518.66	86.27	0.07
Main	10151	100-yr SBCFCD	2590.00	2825.80	2838.97		2839.08	0.000230	2.64	982.01	114.11	0.16
Main	10151	100-yr FIS	2700.00	2825.80	2839.15		2839.26	0.000236	2.69	1002.08	115.16	0.16
Main	10151	50-yr FIS	1500.00	2825.80	2837.01		2837.07	0.000150	1.95	769.90	102.34	0.13
Main	10151	10-yr FIS	200.00	2825.80	2833.03		2833.03	0.000015	0.49	409.63	78.39	0.04
Main	10151	10-yr SBCFCD	1220.00	2825.80	2836.40		2836.44	0.000125	1.72	707.93	98.63	0.11
Main	10151	5-yr SBCFCD	820.00	2825.80	2835.37		2835.40	0.000085	1.34	610.10	92.49	0.09
Main	10151	2-yr SBCFCD	500.00	2825.80	2834.35		2834.37	0.000049	0.96	519.10	86.37	0.07
Main	10136	100-yr SBCFCD	2590.00	2830.80	2838.52		2839.03	0.001971	5.77	449.10	81.43	0.43
Main	10136	100-yr FIS	2700.00	2830.80	2838.68		2839.21	0.001971	5.83	462.79	82.43	0.43
Main	10136	50-yr FIS	1500.00	2830.80	2836.67		2837.03	0.001881	4.85	309.04	70.32	0.41
Main	10136	10-yr FIS	200.00	2830.80	2832.94		2833.02	0.001262	2.25	88.75	47.89	0.29
Main	10136	10-yr SBCFCD	1220.00	2830.80	2836.09		2836.41	0.001835	4.53	269.41	66.84	0.40
Main	10136	5-yr SBCFCD	820.00	2830.80	2835.13		2835.38	0.001729	3.94	208.21	61.08	0.38
Main	10136	2-yr SBCFCD	500.00	2830.80	2834.19		2834.35	0.001571	3.27	152.94	55.37	0.35
Main	9863.9	100-yr SBCFCD	2590.00	2830.70	2837.28	2835.68	2838.30	0.003235	8.14	318.37	61.83	0.63
Main	9863.9	100-yr FIS	2700.00	2830.70	2837.43	2835.82	2838.48	0.003235	8.24	327.81	62.45	0.63
Main	9863.9	50-yr FIS	1500.00	2830.70	2835.68		2836.37	0.002961	6.68	224.66	55.30	0.58
Main	9863.9	10-yr FIS	200.00	2830.70	2832.46		2832.60	0.001909	2.94	68.06	42.20	0.41
Main	9863.9	10-yr SBCFCD	1220.00	2830.70	2835.17		2835.77	0.002854	6.18	197.44	53.26	0.57
Main	9863.9	5-yr SBCFCD	820.00	2830.70	2834.34		2834.78	0.002658	5.31	154.49	49.86	0.53
Main	9863.9	2-yr SBCFCD	500.00	2830.70	2833.52		2833.82	0.002387	4.34	115.08	46.52	0.49
Main	9736	100-yr SBCFCD	2590.00	2830.60	2835.59	2835.59	2837.57	0.008524	11.30	229.22	56.84	0.99
Main	9736	100-yr FIS	2700.00	2830.60	2835.69	2835.69	2837.74	0.008668	11.51	234.54	57.25	1.00
Main	9736	50-yr FIS	1500.00	2830.60	2834.17	2834.17	2835.67	0.009406	9.83	152.62	50.60	1.00
Main	9736	10-yr FIS	200.00	2830.60	2831.59	2831.59	2832.05	0.013368	5.44	36.78	39.33	0.99
Main	9736	10-yr SBCFCD	1220.00	2830.60	2833.74	2833.74	2835.08	0.009748	9.30	131.25	48.72	1.00
Main	9736	5-yr SBCFCD	820.00	2830.60	2833.05	2833.05	2834.12	0.010297	8.28	99.00	45.73	0.99
Main	9736	2-yr SBCFCD	500.00	2830.60	2832.38	2832.38	2833.19	0.011405	7.21	69.35	42.80	1.00
Main	9728	100-yr SBCFCD	2590.00	2825.30	2834.49	2830.53	2835.07	0.001228	6.13	422.52	56.99	0.40
Main	9728	100-yr FIS	2700.00	2825.30	2834.77	2830.66	2835.35	0.001201	6.16	438.49	57.65	0.39
Main	9728	50-yr FIS	1500.00	2825.30	2831.54	2828.99	2832.03	0.001589	5.67	264.74	49.92	0.43
Main	9728	10-yr FIS	200.00	2825.30	2825.62	2826.28	2830.42	0.585178	17.58	11.38	35.77	5.49
Main	9728	10-yr SBCFCD	1220.00	2825.30	2826.92	2828.54	2833.37	0.098974	20.37	59.88	38.88	2.89

Main	9728	5-yr SBCFCD	820.00	2825.30	2826.45	2827.81	2832.44	0.141673	19.65	41.74	37.75	3.29
Main	9728	2-yr SBCFCD	500.00	2825.30	2826.04	2827.11	2831.54	0.226894	18.82	26.57	36.77	3.90
Main	9536.1	100-yr SBCFCD	2590.00	2825.00	2834.52	2830.03	2834.91	0.000156	5.04	514.23	73.07	0.33
Main	9536.1	100-yr FIS	2700.00	2825.00	2834.80	2830.15	2835.19	0.000152	5.05	534.99	74.20	0.33
Main	9536.1	50-yr FIS	1500.00	2825.00	2831.52	2828.60	2831.88	0.000212	4.79	313.16	61.08	0.37
Main	9536.1	10-yr FIS	200.00	2825.00	2826.74	2825.98	2826.88	0.000376	2.99	66.95	41.96	0.42
Main	9536.1	10-yr SBCFCD	1220.00	2825.00	2830.65	2828.16	2830.99	0.000235	4.66	261.73	57.61	0.39
Main	9536.1	5-yr SBCFCD	820.00	2825.00	2829.31	2827.47	2829.60	0.000278	4.36	187.87	52.23	0.41
Main	9536.1	2-yr SBCFCD	500.00	2825.00	2828.11	2826.78	2828.34	0.000324	3.91	128.00	47.42	0.42
Main	9525.6		Culvert									
Main	9515.2	100-yr SBCFCD	2620.00	2825.00	2831.00		2832.34	0.000872	9.28	282.19	59.01	0.75
Main	9515.2	100-yr FIS	2700.00	2825.00	2831.09		2832.46	0.000880	9.40	287.19	59.35	0.75
Main	9515.2	50-yr FIS	1500.00	2825.00	2829.34		2830.31	0.000909	7.92	189.45	52.35	0.73
Main	9515.2	10-yr FIS	200.00	2825.00	2826.48		2826.68	0.000647	3.55	56.28	40.93	0.53
Main	9515.2	10-yr SBCFCD	1230.00	2825.00	2828.85		2829.72	0.000929	7.48	164.39	50.40	0.73
Main	9515.2	5-yr SBCFCD	830.00	2825.00	2828.09		2828.75	0.000907	6.52	127.29	47.36	0.70
Main	9515.2	2-yr SBCFCD	510.00	2825.00	2827.40		2827.84	0.000819	5.34	95.47	44.60	0.64
Main	9313.9	100-yr SBCFCD	2620.00	2824.70	2829.69	2829.69	2831.73	0.008748	11.45	228.75	56.65	1.00
Main	9313.9	100-yr FIS	2700.00	2824.70	2829.80	2829.80	2831.85	0.008624	11.50	234.70	57.10	1.00
Main	9313.9	50-yr FIS	1500.00	2824.70	2828.42	2828.25	2829.78	0.008146	9.37	160.08	51.12	0.93
Main	9313.9	10-yr FIS	200.00	2824.70	2826.25	2825.68	2826.43	0.002915	3.35	59.62	41.74	0.49
Main	9313.9	10-yr SBCFCD	1230.00	2824.70	2828.13	2827.84	2829.24	0.007279	8.46	145.44	49.87	0.87
Main	9313.9	5-yr SBCFCD	830.00	2824.70	2827.60	2827.16	2828.35	0.005941	6.94	119.64	47.57	0.77
Main	9313.9	2-yr SBCFCD	510.00	2824.70	2827.07	2826.50	2827.52	0.004477	5.36	95.20	45.29	0.65
Main	9125	100-yr SBCFCD	2620.00	2824.40	2829.59	2827.87	2830.35	0.002670	7.01	373.62	72.00	0.54
Main	9125	100-yr FIS	2700.00	2824.40	2829.80	2827.94	2830.55	0.002503	6.95	388.65	72.00	0.53
Main	9125	50-yr FIS	1500.00	2824.40	2826.78	2826.78	2827.97	0.010771	8.77	171.04	72.00	1.00
Main	9125	10-yr FIS	200.00	2824.40	2825.02	2825.02	2825.33	0.015700	4.47	44.75	72.00	1.00
Main	9125	10-yr SBCFCD	1230.00	2824.40	2826.47	2826.47	2827.53	0.011332	8.25	149.06	72.00	1.01
Main	9125	5-yr SBCFCD	830.00	2824.40	2826.01	2826.01	2826.81	0.011761	7.16	115.86	72.00	1.00
Main	9125	2-yr SBCFCD	510.00	2824.40	2825.55	2825.55	2826.14	0.013351	6.15	82.86	72.00	1.01
Main	9116	100-yr SBCFCD	2620.00	2820.10	2829.85	2823.56	2830.07	0.000375	3.73	702.30	72.00	0.21
Main	9116	100-yr FIS	2700.00	2820.10	2830.05	2823.64	2830.28	0.000375	3.77	716.70	72.16	0.21
Main	9116	50-yr FIS	1500.00	2820.10	2826.79	2822.49	2826.94	0.000394	3.11	481.68	72.00	0.21
Main	9116	10-yr FIS	200.00	2820.10	2821.78	2820.72	2821.82	0.000592	1.65	121.03	72.00	0.22
Main	9116	10-yr SBCFCD	1230.00	2820.10	2825.95	2822.20	2826.08	0.000404	2.92	421.03	72.00	0.21
Main	9116	5-yr SBCFCD	830.00	2820.10	2824.58	2821.69	2824.68	0.000429	2.58	322.22	72.00	0.21
Main	9116	2-yr SBCFCD	510.00	2820.10	2823.31	2821.26	2823.38	0.000471	2.21	230.99	72.00	0.22
Main	9035.8	100-yr SBCFCD	2620.00	2820.00	2829.94	2822.01	2829.98	0.000011	1.62	1615.76	162.56	0.09
Main	9035.8	100-yr FIS	2700.00	2820.00	2830.14	2822.06	2830.18	0.000011	1.64	1648.54	162.56	0.09
Main	9035.8	50-yr FIS	1500.00	2820.00	2826.85	2821.39	2826.88	0.000012	1.35	1113.31	162.56	0.09
Main	9035.8	10-yr FIS	200.00	2820.00	2821.79	2820.36	2821.80	0.000017	0.69	291.70	162.56	0.09
Main	9035.8	10-yr SBCFCD	1230.00	2820.00	2826.00	2821.21	2826.02	0.000012	1.26	975.16	162.56	0.09
Main	9035.8	5-yr SBCFCD	830.00	2820.00	2824.61	2820.93	2824.63	0.000013	1.11	750.09	162.56	0.09
Main	9035.8	2-yr SBCFCD	510.00	2820.00	2823.34	2820.68	2823.35	0.000014	0.94	542.29	162.56	0.09
Main	9020.4		Culvert									
Main	9005	100-yr SBCFCD	2620.00	2820.00	2824.08		2824.95	0.000835	7.47	350.96	102.15	0.71
Main	9005	100-yr FIS	2700.00	2820.00	2824.21		2825.06	0.000799	7.43	363.49	103.12	0.70

Main	9005	50-yr FIS	1500.00	2820.00	2822.31	2822.31	2823.36	0.001974	8.22	182.58	88.11	1.01
Main	9005	10-yr FIS	200.00	2820.00	2820.63	2820.63	2820.93	0.002937	4.42	45.20	74.72	1.00
Main	9005	10-yr SBCFCD	1230.00	2820.00	2822.04	2822.04	2822.97	0.002049	7.75	158.63	85.93	1.01
Main	9005	5-yr SBCFCD	830.00	2820.00	2821.58	2821.58	2822.32	0.002211	6.90	120.31	82.31	1.01
Main	9005	2-yr SBCFCD	510.00	2820.00	2821.15	2821.15	2821.70	0.002439	5.95	85.71	78.91	1.01
Main	8713.9	100-yr SBCFCD	2620.00	2817.35	2822.04	2822.04	2824.04	0.008815	11.34	231.08	58.45	1.00
Main	8713.9	100-yr FIS	2700.00	2817.35	2822.13	2822.13	2824.16	0.008780	11.43	236.16	58.79	1.01
Main	8713.9	50-yr FIS	1500.00	2817.35	2820.73	2820.67	2822.14	0.009059	9.52	157.56	53.28	0.98
Main	8713.9	10-yr FIS	200.00	2817.35	2818.06	2818.25	2818.79	0.032219	6.85	29.18	42.77	1.46
Main	8713.9	10-yr SBCFCD	1230.00	2817.35	2820.11	2820.27	2821.61	0.012208	9.82	125.31	50.84	1.10
Main	8713.9	5-yr SBCFCD	830.00	2817.35	2819.34	2819.63	2820.74	0.016783	9.48	87.58	47.84	1.23
Main	8713.9	2-yr SBCFCD	510.00	2817.35	2818.72	2819.02	2819.91	0.022834	8.76	58.24	45.36	1.36
Main	8470.*	100-yr SBCFCD	2620.00	2815.20	2821.20	2819.90	2822.13	0.004807	7.73	339.05	78.04	0.65
Main	8470.*	100-yr FIS	2700.00	2815.20	2821.30	2819.98	2822.24	0.004792	7.78	346.83	78.75	0.65
Main	8470.*	50-yr FIS	1500.00	2815.20	2819.60		2820.30	0.005094	6.71	223.50	66.57	0.65
Main	8470.*	10-yr FIS	200.00	2815.20	2816.52	2816.17	2816.74	0.006586	3.82	52.34	44.45	0.62
Main	8470.*	10-yr SBCFCD	1230.00	2815.20	2819.13	2818.21	2819.76	0.005207	6.37	192.96	63.19	0.64
Main	8470.*	5-yr SBCFCD	830.00	2815.20	2818.33	2817.57	2818.84	0.005450	5.74	144.57	57.44	0.64
Main	8470.*	2-yr SBCFCD	510.00	2815.20	2817.54	2816.96	2817.93	0.005794	5.02	101.57	51.79	0.63
Main	8468	100-yr SBCFCD	2620.00	2815.20	2821.19		2822.12	0.004840	7.75	338.24	77.96	0.66
Main	8468	100-yr FIS	2700.00	2815.20	2821.29		2822.23	0.004824	7.80	346.00	78.67	0.66
Main	8468	50-yr FIS	1500.00	2815.20	2819.59		2820.29	0.005141	6.73	222.77	66.49	0.65
Main	8468	10-yr FIS	200.00	2815.20	2816.50		2816.73	0.006906	3.88	51.54	44.32	0.63
Main	8468	10-yr SBCFCD	1230.00	2815.20	2819.12		2819.76	0.005261	6.40	192.27	63.12	0.65
Main	8468	5-yr SBCFCD	830.00	2815.20	2818.31		2818.83	0.005544	5.78	143.72	57.33	0.64
Main	8468	2-yr SBCFCD	510.00	2815.20	2817.53		2817.92	0.005933	5.06	100.76	51.68	0.64
Main	8453	100-yr SBCFCD	2620.00	2810.20	2821.71		2821.88	0.000407	3.26	804.05	104.71	0.21
Main	8453	100-yr FIS	2700.00	2810.20	2821.82		2821.99	0.000417	3.31	815.02	105.34	0.21
Main	8453	50-yr FIS	1500.00	2810.20	2820.01		2820.10	0.000255	2.36	634.82	94.42	0.16
Main	8453	10-yr FIS	200.00	2810.20	2816.66		2816.66	0.000023	0.57	352.21	74.10	0.05
Main	8453	10-yr SBCFCD	1230.00	2810.20	2819.51		2819.57	0.000212	2.09	587.92	91.36	0.15
Main	8453	5-yr SBCFCD	830.00	2810.20	2818.64		2818.68	0.000142	1.62	511.06	86.11	0.12
Main	8453	2-yr SBCFCD	510.00	2810.20	2817.78		2817.80	0.000081	1.16	439.47	80.92	0.09
Main	8451	100-yr SBCFCD	2620.00	2810.20	2821.71		2821.87	0.000407	3.26	803.97	104.71	0.21
Main	8451	100-yr FIS	2700.00	2810.20	2821.81		2821.98	0.000417	3.31	814.95	105.34	0.21
Main	8451	50-yr FIS	1500.00	2810.20	2820.01		2820.10	0.000255	2.36	634.78	94.41	0.16
Main	8451	10-yr FIS	200.00	2810.20	2816.66		2816.66	0.000023	0.57	352.21	74.10	0.05
Main	8451	10-yr SBCFCD	1230.00	2810.20	2819.51		2819.57	0.000212	2.09	587.88	91.36	0.15
Main	8451	5-yr SBCFCD	830.00	2810.20	2818.64		2818.68	0.000142	1.62	511.04	86.11	0.12
Main	8451	2-yr SBCFCD	510.00	2810.20	2817.78		2817.80	0.000081	1.16	439.45	80.92	0.09
Main	8436	100-yr SBCFCD	2620.00	2815.20	2819.90	2819.90	2821.69	0.012129	10.74	243.92	68.74	1.00
Main	8436	100-yr FIS	2700.00	2815.20	2819.99	2819.99	2821.80	0.012071	10.82	249.58	69.32	1.00
Main	8436	50-yr FIS	1500.00	2815.20	2818.59	2818.59	2819.96	0.013281	9.38	159.95	59.33	1.01
Main	8436	10-yr FIS	200.00	2815.20	2816.17	2816.17	2816.62	0.019124	5.39	37.11	41.92	1.01
Main	8436	10-yr SBCFCD	1230.00	2815.20	2818.21	2818.21	2819.45	0.013706	8.91	137.99	56.61	1.01
Main	8436	5-yr SBCFCD	830.00	2815.20	2817.57	2817.57	2818.58	0.014713	8.06	103.03	51.99	1.01
Main	8436	2-yr SBCFCD	510.00	2815.20	2816.96	2816.96	2817.72	0.015909	7.04	72.46	47.59	1.01
Main	8413.9	100-yr SBCFCD	2620.00	2814.70	2819.10	2819.38	2821.39	0.010954	12.16	215.52	57.98	1.11
Main	8413.9	100-yr FIS	2700.00	2814.70	2819.20	2819.47	2821.51	0.010715	12.18	221.60	58.40	1.10
Main	8413.9	50-yr FIS	1500.00	2814.70	2817.59	2818.01	2819.58	0.015414	11.31	132.59	51.80	1.25

Main	8413.9	10-yr FIS	200.00	2814.70	2815.84	2815.61	2816.11	0.006398	4.14	48.29	44.66	0.70
Main	8413.9	10-yr SBCFCD	1230.00	2814.70	2817.20	2817.62	2819.05	0.017016	10.91	112.73	50.21	1.28
Main	8413.9	5-yr SBCFCD	830.00	2814.70	2816.60	2816.97	2818.14	0.019869	9.98	83.14	47.74	1.33
Main	8413.9	2-yr SBCFCD	510.00	2814.70	2816.05	2816.36	2817.26	0.023399	8.81	57.88	45.53	1.38
Main	8113.9	100-yr SBCFCD	2620.00	2812.00	2816.69	2816.69	2818.68	0.008826	11.32	231.39	58.75	1.01
Main	8113.9	100-yr FIS	2700.00	2812.00	2816.77	2816.77	2818.80	0.008782	11.41	236.57	59.10	1.01
Main	8113.9	50-yr FIS	1500.00	2812.00	2815.31	2815.31	2816.78	0.009703	9.73	154.22	53.23	1.01
Main	8113.9	10-yr FIS	200.00	2812.00	2812.90	2812.90	2813.34	0.014213	5.32	37.62	43.60	1.01
Main	8113.9	10-yr SBCFCD	1230.00	2812.00	2814.92	2814.92	2816.23	0.010018	9.19	133.87	51.68	1.01
Main	8113.9	5-yr SBCFCD	830.00	2812.00	2814.28	2814.28	2815.32	0.010711	8.19	101.33	49.10	1.00
Main	8113.9	2-yr SBCFCD	510.00	2812.00	2813.66	2813.66	2814.44	0.011748	7.09	71.95	46.64	1.01
Main	7840	100-yr SBCFCD	2620.00	2809.65	2813.26	2814.33	2816.91	0.004108	15.34	170.79	54.69	1.53
Main	7840	100-yr FIS	2700.00	2809.65	2813.33	2814.42	2817.04	0.004079	15.46	174.66	54.98	1.53
Main	7840	50-yr FIS	1500.00	2809.65	2812.17	2812.96	2814.88	0.004642	13.21	113.57	50.25	1.55
Main	7840	10-yr FIS	200.00	2809.65	2810.38	2810.55	2811.06	0.005379	6.60	30.28	42.97	1.39
Main	7840	10-yr SBCFCD	1230.00	2809.65	2811.87	2812.57	2814.28	0.004817	12.47	98.64	49.02	1.55
Main	7840	5-yr SBCFCD	830.00	2809.65	2811.38	2811.92	2813.27	0.005114	11.05	75.14	47.03	1.54
Main	7840	2-yr SBCFCD	510.00	2809.65	2810.93	2811.31	2812.29	0.005346	9.37	54.40	45.20	1.51
Main	7761.1	100-yr SBCFCD	2620.00	2806.00	2814.87	2809.38	2815.04	0.000063	3.31	791.08	108.34	0.22
Main	7761.1	100-yr FIS	2700.00	2806.00	2814.69	2809.45	2814.88	0.000072	3.50	771.55	107.56	0.23
Main	7761.1	50-yr FIS	1500.00	2806.00	2811.92	2808.35	2812.06	0.000085	3.06	490.03	95.58	0.24
Main	7761.1	10-yr FIS	200.00	2806.00	2807.55	2806.63	2807.60	0.000142	1.76	113.86	76.71	0.25
Main	7761.1	10-yr SBCFCD	1230.00	2806.00	2811.39	2808.07	2811.51	0.000079	2.80	439.61	93.27	0.23
Main	7761.1	5-yr SBCFCD	830.00	2806.00	2810.14	2807.60	2810.24	0.000089	2.54	327.06	87.90	0.23
Main	7761.1	2-yr SBCFCD	510.00	2806.00	2809.00	2807.17	2809.08	0.000100	2.22	229.47	82.97	0.24
Main	7749.9		Culvert									
Main	7738.6	100-yr SBCFCD	2970.00	2806.00	2813.15		2813.41	0.000110	4.09	726.52	110.20	0.28
Main	7738.6	100-yr FIS	2700.00	2806.00	2812.76		2813.00	0.000110	3.95	683.07	109.25	0.28
Main	7738.6	50-yr FIS	1500.00	2806.00	2810.71		2810.87	0.000113	3.23	464.93	104.33	0.27
Main	7738.6	10-yr FIS	200.00	2806.00	2807.24		2807.29	0.000172	1.70	117.47	95.99	0.27
Main	7738.6	10-yr SBCFCD	1400.00	2806.00	2810.51		2810.67	0.000114	3.15	444.17	103.85	0.27
Main	7738.6	5-yr SBCFCD	930.00	2806.00	2809.48		2809.60	0.000120	2.75	338.00	101.36	0.27
Main	7738.6	2-yr SBCFCD	570.00	2806.00	2808.53		2808.61	0.000131	2.35	242.68	99.08	0.26
Main	7456.8	100-yr SBCFCD	2970.00	2805.60	2811.49	2810.67	2812.95	0.005054	9.72	305.43	63.80	0.78
Main	7456.8	100-yr FIS	2700.00	2805.60	2811.18	2810.38	2812.56	0.005063	9.45	285.86	62.55	0.78
Main	7456.8	50-yr FIS	1500.00	2805.60	2809.59	2808.92	2810.54	0.005046	7.81	191.99	56.15	0.74
Main	7456.8	10-yr FIS	200.00	2805.60	2806.91	2806.50	2807.11	0.004010	3.58	55.92	45.30	0.57
Main	7456.8	10-yr SBCFCD	1400.00	2805.60	2809.44	2808.77	2810.34	0.005040	7.63	183.39	55.53	0.74
Main	7456.8	5-yr SBCFCD	930.00	2805.60	2808.65	2808.04	2809.33	0.004943	6.61	140.64	52.32	0.71
Main	7456.8	2-yr SBCFCD	570.00	2805.60	2807.92	2807.38	2808.39	0.004725	5.50	103.63	49.38	0.67
Main	7347	100-yr SBCFCD	2970.00	2805.40	2810.51	2810.51	2812.60	0.001583	11.62	255.53	60.11	0.99
Main	7347	100-yr FIS	2700.00	2805.40	2810.21	2810.21	2812.21	0.001611	11.34	238.10	58.96	0.99
Main	7347	50-yr FIS	1500.00	2805.40	2808.74	2808.74	2810.18	0.001770	9.64	155.53	53.15	0.99
Main	7347	10-yr FIS	200.00	2805.40	2806.31	2806.31	2806.74	0.002560	5.25	38.09	43.59	0.99
Main	7347	10-yr SBCFCD	1400.00	2805.40	2808.60	2808.60	2809.99	0.001790	9.46	148.04	52.60	0.99
Main	7347	5-yr SBCFCD	930.00	2805.40	2807.87	2807.87	2808.96	0.001922	8.41	110.61	49.71	0.99
Main	7347	2-yr SBCFCD	570.00	2805.40	2807.20	2807.20	2808.02	0.002113	7.28	78.26	47.08	1.00
Main	7267	100-yr SBCFCD	2970.00	2802.00	2810.96	2806.28	2811.38	0.000146	5.16	575.34	70.38	0.32
Main	7267	100-yr FIS	2700.00	2802.00	2810.36	2806.02	2810.76	0.000152	5.06	533.37	69.55	0.32

Main	7267	50-yr FIS	1500.00	2802.00	2807.71	2804.73	2807.99	0.000164	4.24	353.72	65.89	0.32
Main	7267	10-yr FIS	200.00	2802.00	2802.24	2802.72	2805.33	0.100795	14.10	14.19	58.34	5.04
Main	7267	10-yr SBCFCD	1400.00	2802.00	2807.53	2804.61	2807.79	0.000160	4.10	341.55	65.63	0.32
Main	7267	5-yr SBCFCD	930.00	2802.00	2806.26	2803.97	2806.46	0.000166	3.58	259.57	63.88	0.31
Main	7267	2-yr SBCFCD	570.00	2802.00	2805.12	2803.43	2805.27	0.000173	3.03	187.81	62.31	0.31
Main	7246.1		Culvert									
Main	7231.3	100-yr SBCFCD	3150.00	2802.00	2808.90		2809.70	0.000378	7.16	439.73	69.44	0.50
Main	7231.3	100-yr FIS	2700.00	2802.00	2808.33		2809.04	0.000369	6.74	400.55	68.50	0.49
Main	7231.3	50-yr FIS	1500.00	2802.00	2806.51		2806.96	0.000350	5.39	278.51	65.48	0.46
Main	7231.3	10-yr FIS	200.00	2802.00	2803.32		2803.42	0.000367	2.57	77.94	60.19	0.40
Main	7231.3	10-yr SBCFCD	1480.00	2802.00	2806.47		2806.92	0.000350	5.36	276.08	65.42	0.46
Main	7231.3	5-yr SBCFCD	990.00	2802.00	2805.52		2805.85	0.000348	4.62	214.21	63.83	0.44
Main	7231.3	2-yr SBCFCD	610.00	2802.00	2804.62		2804.85	0.000349	3.87	157.81	62.35	0.43
Main	7010.2	100-yr SBCFCD	3150.00	2801.65	2807.85	2806.89	2809.30	0.004705	9.65	326.30	65.25	0.76
Main	7010.2	100-yr FIS	2700.00	2801.65	2807.35	2806.42	2808.66	0.004679	9.19	293.94	63.20	0.75
Main	7010.2	50-yr FIS	1500.00	2801.65	2805.75	2804.96	2806.64	0.004592	7.56	198.30	56.70	0.71
Main	7010.2	10-yr FIS	200.00	2801.65	2803.04	2802.56	2803.22	0.003286	3.36	59.56	45.66	0.52
Main	7010.2	10-yr SBCFCD	1480.00	2801.65	2805.72	2804.93	2806.60	0.004609	7.54	196.27	56.55	0.71
Main	7010.2	5-yr SBCFCD	990.00	2801.65	2804.90	2804.19	2805.56	0.004505	6.55	151.22	53.21	0.68
Main	7010.2	2-yr SBCFCD	610.00	2801.65	2804.14	2803.52	2804.60	0.004221	5.43	112.39	50.15	0.64
Main	6880	100-yr SBCFCD	3150.00	2801.45	2806.74	2806.74	2808.90	0.001566	11.79	267.26	61.02	0.99
Main	6880	100-yr FIS	2700.00	2801.45	2806.26	2806.26	2808.25	0.001605	11.32	238.59	59.13	0.99
Main	6880	50-yr FIS	1500.00	2801.45	2804.78	2804.78	2806.23	0.001787	9.67	155.14	53.23	1.00
Main	6880	10-yr FIS	200.00	2801.45	2802.33	2802.33	2802.79	0.002855	5.43	36.83	43.50	1.04
Main	6880	10-yr SBCFCD	1480.00	2801.45	2804.76	2804.76	2806.19	0.001773	9.60	154.17	53.15	0.99
Main	6880	5-yr SBCFCD	990.00	2801.45	2804.02	2804.02	2805.15	0.001901	8.56	115.68	50.19	0.99
Main	6880	2-yr SBCFCD	610.00	2801.45	2803.32	2803.32	2804.19	0.002102	7.45	81.90	47.44	1.00
Main	6801.6	100-yr SBCFCD	3150.00	2796.65	2805.97	2800.72	2806.36	0.000136	5.02	627.28	67.36	0.29
Main	6801.6	100-yr FIS	2700.00	2796.65	2805.13	2800.32	2805.48	0.000134	4.73	570.62	67.35	0.29
Main	6801.6	50-yr FIS	1500.00	2796.65	2802.55	2799.13	2802.77	0.000127	3.78	396.98	67.32	0.27
Main	6801.6	10-yr FIS	200.00	2796.65	2796.83	2797.30	2800.97	0.199036	16.33	12.25	67.26	6.74
Main	6801.6	10-yr SBCFCD	1480.00	2796.65	2802.50	2799.11	2802.72	0.000127	3.76	393.70	67.32	0.27
Main	6801.6	5-yr SBCFCD	990.00	2796.65	2801.21	2798.53	2801.37	0.000125	3.23	306.64	67.31	0.27
Main	6801.6	2-yr SBCFCD	610.00	2796.65	2800.02	2798.01	2800.13	0.000125	2.69	226.44	67.30	0.26
Main	6785.6		Culvert									
Main	6769.7	100-yr SBCFCD	3150.00	2796.55	2803.95		2804.57	0.000277	6.32	498.08	67.35	0.41
Main	6769.7	100-yr FIS	2700.00	2796.55	2803.41		2803.95	0.000257	5.84	461.97	67.34	0.39
Main	6769.7	50-yr FIS	1500.00	2796.55	2801.58		2801.89	0.000210	4.43	338.42	67.32	0.35
Main	6769.7	10-yr FIS	200.00	2796.55	2798.12		2798.17	0.000162	1.90	105.27	67.28	0.27
Main	6769.7	10-yr SBCFCD	1480.00	2796.55	2801.54		2801.84	0.000209	4.41	335.91	67.32	0.35
Main	6769.7	5-yr SBCFCD	990.00	2796.55	2800.54		2800.75	0.000191	3.69	268.48	67.31	0.33
Main	6769.7	2-yr SBCFCD	610.00	2796.55	2799.58		2799.72	0.000176	2.99	203.69	67.30	0.30
Main	6690	100-yr SBCFCD	3150.00	2796.45	2803.24		2804.38	0.000632	8.57	367.47	68.23	0.65
Main	6690	100-yr FIS	2700.00	2796.45	2802.77		2803.77	0.000603	8.05	335.48	66.25	0.63
Main	6690	50-yr FIS	1500.00	2796.45	2801.10		2801.75	0.000554	6.50	230.74	59.31	0.58
Main	6690	10-yr FIS	200.00	2796.45	2797.98	2797.35	2798.13	0.000442	3.02	66.25	46.38	0.45
Main	6690	10-yr SBCFCD	1480.00	2796.45	2801.06		2801.71	0.000554	6.47	228.72	59.17	0.58
Main	6690	5-yr SBCFCD	990.00	2796.45	2800.16		2800.65	0.000531	5.60	176.92	55.41	0.55
Main	6690	2-yr SBCFCD	610.00	2796.45	2799.30		2799.64	0.000502	4.67	130.72	51.83	0.52

Main	6555.8	100-yr SBCFCD	3150.00	2796.25	2803.05	2801.53	2804.21	0.003399	8.64	364.53	67.20	0.65
Main	6555.8	100-yr FIS	2700.00	2796.25	2802.60	2801.06	2803.61	0.003191	8.07	334.76	65.41	0.63
Main	6555.8	50-yr FIS	1500.00	2796.25	2800.96	2799.58	2801.60	0.002846	6.45	232.67	58.83	0.57
Main	6555.8	10-yr FIS	200.00	2796.25	2797.88	2797.13	2798.01	0.001910	2.83	70.69	46.54	0.40
Main	6555.8	10-yr SBCFCD	1480.00	2796.25	2800.92	2799.56	2801.56	0.002842	6.42	230.67	58.70	0.57
Main	6555.8	5-yr SBCFCD	990.00	2796.25	2800.03	2798.81	2800.50	0.002666	5.51	179.79	55.12	0.54
Main	6555.8	2-yr SBCFCD	610.00	2796.25	2799.18	2798.12	2799.50	0.002441	4.54	134.29	51.71	0.50
Main	6400	100-yr SBCFCD	3150.00	2796.00	2801.39	2801.39	2803.33	0.008778	11.18	281.86	73.31	1.00
Main	6400	100-yr FIS	2700.00	2796.00	2800.89	2800.89	2802.75	0.008920	10.93	247.01	67.13	1.00
Main	6400	50-yr FIS	1500.00	2796.00	2799.32	2799.32	2800.78	0.009639	9.70	154.56	53.26	1.00
Main	6400	10-yr FIS	200.00	2796.00	2796.90	2796.90	2797.34	0.014187	5.31	37.64	43.60	1.01
Main	6400	10-yr SBCFCD	1480.00	2796.00	2799.29	2799.29	2800.74	0.009643	9.66	153.17	53.15	1.00
Main	6400	5-yr SBCFCD	990.00	2796.00	2798.55	2798.55	2799.70	0.010386	8.63	114.77	50.18	1.01
Main	6400	2-yr SBCFCD	610.00	2796.00	2797.86	2797.86	2798.73	0.011369	7.48	81.52	47.46	1.01
Main	6344.7	100-yr SBCFCD	3150.00	2792.00	2801.47	2794.92	2801.61	0.000042	2.99	1055.03	111.78	0.17
Main	6344.7	100-yr FIS	2700.00	2792.00	2800.54	2794.63	2800.67	0.000043	2.84	951.39	111.70	0.17
Main	6344.7	50-yr FIS	1500.00	2792.00	2797.77	2793.78	2797.85	0.000046	2.34	641.76	111.48	0.17
Main	6344.7	10-yr FIS	200.00	2792.00	2793.52	2792.47	2793.54	0.000064	1.19	168.33	111.12	0.17
Main	6344.7	10-yr SBCFCD	1480.00	2792.00	2797.72	2793.76	2797.80	0.000046	2.33	635.99	111.47	0.17
Main	6344.7	5-yr SBCFCD	990.00	2792.00	2796.37	2793.35	2796.44	0.000049	2.04	486.09	111.36	0.17
Main	6344.7	2-yr SBCFCD	610.00	2792.00	2795.17	2792.98	2795.21	0.000053	1.73	351.95	111.26	0.17
Main	6328.7		Culvert									
Main	6312.5	100-yr SBCFCD	3150.00	2792.00	2797.10		2797.58	0.000302	5.55	567.15	111.53	0.43
Main	6312.5	100-yr FIS	2700.00	2792.00	2796.15		2796.68	0.000431	5.85	461.63	111.43	0.51
Main	6312.5	50-yr FIS	1500.00	2792.00	2793.78	2793.78	2794.67	0.002139	7.60	197.42	111.18	1.00
Main	6312.5	10-yr FIS	200.00	2792.00	2792.47	2792.47	2792.70	0.003194	3.86	51.77	111.05	1.00
Main	6312.5	10-yr SBCFCD	1480.00	2792.00	2793.76	2793.76	2794.65	0.002134	7.55	195.95	111.18	1.00
Main	6312.5	5-yr SBCFCD	990.00	2792.00	2793.35	2793.35	2794.03	0.002308	6.60	149.93	111.14	1.00
Main	6312.5	2-yr SBCFCD	610.00	2792.00	2792.98	2792.98	2793.47	0.002542	5.62	108.64	111.10	1.00
Main	6000	100-yr SBCFCD	3150.00	2788.00	2793.78	2793.78	2796.66	0.001917	13.61	231.38	40.00	1.00
Main	6000	100-yr FIS	2700.00	2788.00	2793.23	2793.23	2795.82	0.001918	12.91	209.08	40.00	1.00
Main	6000	50-yr FIS	1500.00	2788.00	2791.02	2791.55	2793.41	0.003249	12.40	120.94	40.00	1.26
Main	6000	10-yr FIS	200.00	2788.00	2788.48	2788.93	2790.16	0.022546	10.38	19.27	40.00	2.64
Main	6000	10-yr SBCFCD	1480.00	2788.00	2790.98	2791.51	2793.38	0.003318	12.42	119.12	40.00	1.27
Main	6000	5-yr SBCFCD	990.00	2788.00	2789.97	2790.67	2792.43	0.005567	12.58	78.70	40.00	1.58
Main	6000	2-yr SBCFCD	610.00	2788.00	2789.25	2789.93	2791.56	0.009167	12.20	50.01	40.00	1.92
Main	5778.8	100-yr SBCFCD	3150.00	2785.00	2791.52	2792.54	2795.55	0.015325	16.10	195.62	41.19	1.30
Main	5778.8	100-yr FIS	2700.00	2785.00	2791.00	2791.92	2794.71	0.015284	15.44	174.85	39.14	1.29
Main	5778.8	50-yr FIS	1500.00	2785.00	2789.33	2789.89	2791.96	0.014333	13.03	115.14	31.55	1.20
Main	5778.8	10-yr FIS	200.00	2785.00	2786.31	2786.31	2786.94	0.013034	6.37	31.41	25.07	1.00
Main	5778.8	10-yr SBCFCD	1480.00	2785.00	2789.29	2789.85	2791.91	0.014315	12.98	113.99	31.35	1.20
Main	5778.8	5-yr SBCFCD	990.00	2785.00	2788.53	2788.69	2790.35	0.011936	10.84	91.36	28.98	1.08
Main	5778.8	2-yr SBCFCD	610.00	2785.00	2787.71	2787.71	2788.95	0.011006	8.96	68.04	27.53	1.00
Main	5742	100-yr SBCFCD	3150.00	2785.00	2794.35	2790.18	2795.06	0.000291	6.76	465.82	58.88	0.42
Main	5742	100-yr FIS	2700.00	2785.00	2793.24	2789.70	2793.94	0.000325	6.71	402.14	56.11	0.44
Main	5742	50-yr FIS	1500.00	2785.00	2790.30	2788.16	2790.86	0.000398	6.02	249.05	47.83	0.47
Main	5742	10-yr FIS	200.00	2785.00	2786.24	2785.83	2786.42	0.000725	3.43	58.28	47.00	0.54
Main	5742	10-yr SBCFCD	1480.00	2785.00	2790.24	2788.13	2790.80	0.000400	6.01	246.40	47.68	0.47
Main	5742	5-yr SBCFCD	990.00	2785.00	2786.44	2787.41	2789.78	0.011001	14.67	67.49	47.00	2.16

Main	5742	2-yr SBCFCD	610.00	2785.00	2786.05	2786.73	2788.43	0.011649	12.37	49.31	47.00	2.13
Main	5679.8		Culvert									
Main	5609.6	100-yr SBCFCD	3150.00	2784.00	2793.55	2789.28	2794.35	0.000309	7.17	439.25	46.00	0.41
Main	5609.6	100-yr FIS	2700.00	2784.00	2792.75	2788.77	2793.45	0.000294	6.71	402.44	46.00	0.40
Main	5609.6	50-yr FIS	1500.00	2784.00	2790.03	2787.23	2790.48	0.000279	5.41	277.22	46.00	0.39
Main	5609.6	10-yr FIS	200.00	2784.00	2785.24	2784.84	2785.43	0.000767	3.52	56.81	46.00	0.56
Main	5609.6	10-yr SBCFCD	1480.00	2784.00	2789.97	2787.19	2790.43	0.000279	5.39	274.81	46.00	0.39
Main	5609.6	5-yr SBCFCD	990.00	2784.00	2786.43	2786.43	2787.65	0.002091	8.84	111.95	46.00	1.00
Main	5609.6	2-yr SBCFCD	610.00	2784.00	2785.77	2785.77	2786.64	0.002212	7.49	81.45	46.00	0.99
Main	5581.3	100-yr SBCFCD	3150.00	2783.60	2790.79	2790.79	2793.70	0.001835	13.69	230.16	39.35	1.00
Main	5581.3	100-yr FIS	2700.00	2783.60	2790.10	2790.10	2792.82	0.001873	13.25	203.84	36.99	0.99
Main	5581.3	50-yr FIS	1500.00	2783.60	2787.92	2787.92	2789.98	0.002045	11.52	130.17	31.06	0.99
Main	5581.3	10-yr FIS	200.00	2783.60	2784.69	2784.69	2785.27	0.002809	6.12	32.68	30.02	1.03
Main	5581.3	10-yr SBCFCD	1480.00	2783.60	2787.87	2787.87	2789.93	0.002062	11.50	128.66	31.00	1.00
Main	5581.3	5-yr SBCFCD	990.00	2783.60	2786.85	2786.85	2788.45	0.002130	10.15	97.50	30.03	0.99
Main	5581.3	2-yr SBCFCD	610.00	2783.60	2785.95	2785.95	2787.11	0.002223	8.65	70.55	30.02	0.99
Main	5515.3	100-yr SBCFCD	3150.00	2783.00	2787.05	2788.94	2793.17	0.006258	19.86	158.58	46.69	1.90
Main	5515.3	100-yr FIS	2700.00	2783.00	2786.68	2788.42	2792.32	0.006422	19.06	141.65	45.36	1.90
Main	5515.3	50-yr FIS	1500.00	2783.00	2785.57	2786.80	2789.56	0.006887	16.03	93.55	41.31	1.88
Main	5515.3	10-yr FIS	200.00	2783.00	2783.70	2784.06	2784.89	0.010169	8.76	22.84	34.15	1.89
Main	5515.3	10-yr SBCFCD	1480.00	2783.00	2785.55	2786.76	2789.51	0.006894	15.97	92.70	41.23	1.88
Main	5515.3	5-yr SBCFCD	990.00	2783.00	2784.99	2785.93	2788.07	0.007157	14.06	70.39	39.16	1.85
Main	5515.3	2-yr SBCFCD	610.00	2783.00	2784.47	2785.16	2786.74	0.007644	12.10	50.43	37.17	1.83
Main	5135	100-yr SBCFCD	3150.00	2782.21	2786.70	2788.63	2792.90	0.004476	20.80	164.79	43.46	1.73
Main	5135	100-yr FIS	2700.00	2782.21	2786.26	2788.03	2792.03	0.004750	20.00	145.88	42.13	1.75
Main	5135	50-yr FIS	1500.00	2782.21	2784.94	2786.24	2789.22	0.005815	17.02	93.06	38.19	1.82
Main	5135	10-yr FIS	200.00	2782.21	2782.89	2783.31	2784.31	0.011926	9.64	21.05	32.04	2.06
Main	5135	10-yr SBCFCD	1480.00	2782.21	2784.91	2786.21	2789.17	0.005850	16.97	92.08	38.11	1.82
Main	5135	5-yr SBCFCD	990.00	2782.21	2784.28	2785.31	2787.69	0.006642	15.11	68.36	36.20	1.85
Main	5135	2-yr SBCFCD	610.00	2782.21	2783.69	2784.48	2786.31	0.007866	13.18	47.75	34.45	1.91
Main	4875	100-yr SBCFCD	3150.00	2779.75	2783.87	2786.17	2791.42	0.006072	22.88	148.93	42.35	1.99
Main	4875	100-yr FIS	2700.00	2779.75	2783.46	2785.57	2790.48	0.006448	21.99	131.90	41.13	2.01
Main	4875	50-yr FIS	1500.00	2779.75	2782.26	2783.78	2787.40	0.007767	18.61	84.79	37.53	2.07
Main	4875	10-yr FIS	200.00	2779.75	2780.50	2780.84	2781.65	0.008395	8.67	23.45	32.26	1.76
Main	4875	10-yr SBCFCD	1480.00	2779.75	2782.24	2783.75	2787.34	0.007801	18.54	83.94	37.47	2.07
Main	4875	5-yr SBCFCD	990.00	2779.75	2781.67	2782.85	2785.67	0.008595	16.35	63.00	35.75	2.08
Main	4875	2-yr SBCFCD	610.00	2779.75	2781.16	2782.02	2784.06	0.009262	13.85	45.37	34.24	2.05
Main	4635	100-yr SBCFCD	3150.00	2777.45	2781.38	2783.87	2789.76	0.007137	24.06	141.20	41.80	2.14
Main	4635	100-yr FIS	2700.00	2777.45	2781.00	2783.27	2788.75	0.007522	23.07	125.41	40.65	2.16
Main	4635	50-yr FIS	1500.00	2777.45	2779.88	2781.48	2785.39	0.008699	19.27	81.76	37.29	2.18
Main	4635	10-yr FIS	200.00	2777.45	2778.17	2778.54	2779.44	0.009990	9.14	22.23	32.15	1.90
Main	4635	10-yr SBCFCD	1480.00	2777.45	2779.86	2781.45	2785.33	0.008727	19.19	80.98	37.23	2.18
Main	4635	5-yr SBCFCD	990.00	2777.45	2779.33	2780.55	2783.51	0.009220	16.70	61.61	35.63	2.15
Main	4635	2-yr SBCFCD	610.00	2777.45	2778.85	2779.72	2781.80	0.009523	13.97	44.98	34.20	2.08
Main	4385	100-yr SBCFCD	3150.00	2775.05	2778.87	2781.47	2787.82	0.007917	24.85	136.45	41.46	2.24
Main	4385	100-yr FIS	2700.00	2775.05	2778.51	2780.87	2786.74	0.008267	23.76	121.59	40.37	2.25
Main	4385	50-yr FIS	1500.00	2775.05	2777.45	2779.08	2783.14	0.009155	19.57	80.44	37.18	2.23
Main	4385	10-yr FIS	200.00	2775.05	2775.78	2776.14	2777.01	0.009393	8.97	22.65	32.19	1.85
Main	4385	10-yr SBCFCD	1480.00	2775.05	2777.43	2779.05	2783.07	0.009175	19.49	79.69	37.12	2.23

Main	4385	5-yr SBCFCD	990.00	2775.05	2776.91	2778.15	2781.17	0.009467	16.84	61.10	35.59	2.17
Main	4385	2-yr SBCFCD	610.00	2775.05	2776.45	2777.32	2779.41	0.009597	14.00	44.87	34.19	2.09
Main	4135	100-yr SBCFCD	3150.00	2772.65	2776.40	2779.07	2785.74	0.008459	25.37	133.51	41.24	2.31
Main	4135	100-yr FIS	2700.00	2772.65	2776.05	2778.47	2784.58	0.008741	24.17	119.40	40.20	2.31
Main	4135	50-yr FIS	1500.00	2772.65	2775.03	2776.68	2780.81	0.009388	19.73	79.79	37.13	2.25
Main	4135	10-yr FIS	200.00	2772.65	2773.37	2773.74	2774.63	0.009696	9.06	22.43	32.17	1.88
Main	4135	10-yr SBCFCD	1480.00	2772.65	2775.01	2776.65	2780.74	0.009400	19.63	79.08	37.07	2.25
Main	4135	5-yr SBCFCD	990.00	2772.65	2774.51	2775.75	2778.79	0.009570	16.89	60.89	35.57	2.18
Main	4135	2-yr SBCFCD	610.00	2772.65	2774.05	2774.92	2777.01	0.009603	14.00	44.86	34.19	2.09
Main	3969.6	100-yr SBCFCD	3380.00	2771.00	2775.17	2777.49	2782.85	0.007553	22.25	151.94	42.88	2.08
Main	3969.6	100-yr FIS	2700.00	2771.00	2774.57	2776.67	2781.59	0.008198	21.25	127.03	41.05	2.13
Main	3969.6	50-yr FIS	1500.00	2771.00	2773.65	2774.96	2777.93	0.007068	16.61	90.33	38.20	1.90
Main	3969.6	10-yr FIS	200.00	2771.00	2771.94	2772.08	2772.65	0.004139	6.77	29.56	32.94	1.26
Main	3969.6	10-yr SBCFCD	1600.00	2771.00	2773.84	2775.12	2778.00	0.006329	16.37	97.74	38.79	1.82
Main	3969.6	5-yr SBCFCD	1070.00	2771.00	2773.32	2774.20	2776.25	0.005646	13.73	77.93	37.19	1.67
Main	3969.6	2-yr SBCFCD	650.00	2771.00	2772.79	2773.33	2774.70	0.005015	11.08	58.65	35.56	1.52
Main	3835	100-yr SBCFCD	3380.00	2769.77	2774.08	2776.48	2781.93	0.005966	23.37	156.97	42.92	1.98
Main	3835	100-yr FIS	2700.00	2769.77	2773.45	2775.59	2780.59	0.006606	22.16	130.86	41.05	2.03
Main	3835	50-yr FIS	1500.00	2769.77	2772.42	2773.80	2777.00	0.006471	17.59	89.91	37.94	1.91
Main	3835	10-yr FIS	200.00	2769.77	2770.49	2770.87	2771.76	0.009990	9.14	22.23	32.15	1.90
Main	3835	10-yr SBCFCD	1600.00	2769.77	2772.59	2773.97	2777.13	0.005921	17.55	96.46	38.45	1.84
Main	3835	5-yr SBCFCD	1070.00	2769.77	2771.99	2773.03	2775.40	0.006051	15.13	73.99	36.66	1.79
Main	3835	2-yr SBCFCD	650.00	2769.77	2771.39	2772.13	2773.87	0.006634	12.82	52.42	34.85	1.78
Main	3600.*	100-yr SBCFCD	3380.00	2766.20	2768.60	2770.97	2778.00	0.124377	24.60	137.41	64.47	2.97
Main	3600.*	100-yr FIS	2700.00	2766.20	2768.30	2770.30	2776.38	0.125449	22.81	118.36	62.67	2.93
Main	3600.*	50-yr FIS	1500.00	2766.20	2767.70	2769.05	2772.91	0.121800	18.32	81.87	59.05	2.74
Main	3600.*	10-yr FIS	200.00	2766.20	2767.27	2766.98	2767.46	0.006811	3.51	56.97	56.45	0.62
Main	3600.*	10-yr SBCFCD	1600.00	2766.20	2767.75	2769.16	2773.28	0.124170	18.87	84.79	59.35	2.78
Main	3600.*	5-yr SBCFCD	1070.00	2766.20	2767.43	2768.50	2771.52	0.122920	16.24	65.88	57.40	2.67
Main	3600.*	2-yr SBCFCD	650.00	2766.20	2767.14	2767.87	2769.81	0.112368	13.12	49.54	55.65	2.45
Main	3598	100-yr SBCFCD	3380.00	2766.20	2768.65	2770.97	2777.63	0.116162	24.05	140.51	64.76	2.88
Main	3598	100-yr FIS	2700.00	2766.20	2768.35	2770.30	2776.02	0.115721	22.22	121.51	62.97	2.82
Main	3598	50-yr FIS	1500.00	2766.20	2767.76	2769.05	2772.57	0.107400	17.60	85.22	59.39	2.59
Main	3598	10-yr FIS	200.00	2766.20	2767.25		2767.45	0.007225	3.58	55.92	56.34	0.63
Main	3598	10-yr SBCFCD	1600.00	2766.20	2767.81	2769.17	2772.93	0.110138	18.16	88.10	59.69	2.63
Main	3598	5-yr SBCFCD	1070.00	2766.20	2767.49	2768.50	2771.18	0.104427	15.43	69.36	57.76	2.48
Main	3598	2-yr SBCFCD	650.00	2766.20	2767.21	2767.87	2769.51	0.088421	12.17	53.40	56.07	2.20
Main	3583	100-yr SBCFCD	3380.00	2761.20	2772.86	2765.93	2773.04	0.000402	3.41	992.15	120.15	0.21
Main	3583	100-yr FIS	2700.00	2761.20	2772.06	2765.32	2772.20	0.000338	3.01	898.09	115.35	0.19
Main	3583	50-yr FIS	1500.00	2761.20	2770.36	2764.07	2770.43	0.000201	2.11	710.34	105.10	0.14
Main	3583	10-yr FIS	200.00	2761.20	2767.39	2761.99	2767.39	0.000015	0.47	424.49	87.22	0.04
Main	3583	10-yr SBCFCD	1600.00	2761.20	2770.52	2764.19	2770.60	0.000214	2.20	727.56	106.08	0.15
Main	3583	5-yr SBCFCD	1070.00	2761.20	2769.60	2763.53	2769.64	0.000142	1.69	631.95	100.51	0.12
Main	3583	2-yr SBCFCD	650.00	2761.20	2768.70	2762.88	2768.73	0.000080	1.19	544.51	95.14	0.09
Main	3581	100-yr SBCFCD	3380.00	2761.20	2772.86	2765.93	2773.04	0.000402	3.41	992.06	120.15	0.21
Main	3581	100-yr FIS	2700.00	2761.20	2772.06	2765.32	2772.20	0.000338	3.01	898.00	115.34	0.19
Main	3581	50-yr FIS	1500.00	2761.20	2770.36	2764.07	2770.43	0.000201	2.11	710.29	105.10	0.14
Main	3581	10-yr FIS	200.00	2761.20	2767.39	2761.99	2767.39	0.000015	0.47	424.49	87.22	0.04
Main	3581	10-yr SBCFCD	1600.00	2761.20	2770.52	2764.19	2770.60	0.000214	2.20	727.51	106.08	0.15
Main	3581	5-yr SBCFCD	1070.00	2761.20	2769.60	2763.53	2769.64	0.000142	1.69	631.93	100.51	0.12

Main	3581	2-yr SBCFCD	650.00	2761.20	2768.70	2762.88	2768.73	0.000080	1.19	544.49	95.14	0.09
Main	3566	100-yr SBCFCD	3380.00	2766.20	2770.93	2770.93	2772.85	0.011591	11.12	303.87	78.51	1.00
Main	3566	100-yr FIS	2700.00	2766.20	2770.33	2770.33	2772.03	0.011975	10.47	257.89	74.90	0.99
Main	3566	50-yr FIS	1500.00	2766.20	2769.08	2769.08	2770.30	0.013117	8.89	168.75	67.34	0.99
Main	3566	10-yr FIS	200.00	2766.20	2766.98	2766.98	2767.35	0.019732	4.89	40.86	54.71	1.00
Main	3566	10-yr SBCFCD	1600.00	2766.20	2769.19	2769.19	2770.47	0.013103	9.08	176.19	68.00	0.99
Main	3566	5-yr SBCFCD	1070.00	2766.20	2768.52	2768.52	2769.54	0.014110	8.11	131.95	63.96	0.99
Main	3566	2-yr SBCFCD	650.00	2766.20	2767.88	2767.88	2768.65	0.015719	7.04	92.30	60.11	1.00
Main	3520.3	100-yr SBCFCD	3380.00	2765.00	2768.11	2769.26	2771.90	0.026260	15.62	216.36	78.36	1.66
Main	3520.3	100-yr FIS	2700.00	2765.00	2767.68	2768.72	2771.06	0.028381	14.75	183.02	76.75	1.68
Main	3520.3	50-yr FIS	1500.00	2765.00	2766.84	2767.59	2769.27	0.033584	12.52	119.77	73.21	1.73
Main	3520.3	10-yr FIS	200.00	2765.00	2765.57	2765.74	2766.15	0.035393	6.10	32.77	61.61	1.47
Main	3520.3	10-yr SBCFCD	1600.00	2765.00	2766.92	2767.68	2769.44	0.033010	12.75	125.49	73.69	1.72
Main	3520.3	5-yr SBCFCD	1070.00	2765.00	2766.50	2767.11	2768.46	0.035428	11.26	95.05	71.10	1.72
Main	3520.3	2-yr SBCFCD	650.00	2765.00	2766.11	2766.55	2767.52	0.037591	9.52	68.25	68.73	1.68
Main	3450.*	100-yr SBCFCD	3380.00	2762.50	2768.60	2767.23	2769.62	0.004639	8.12	416.47	86.59	0.65
Main	3450.*	100-yr FIS	2700.00	2762.50	2767.85	2766.64	2768.76	0.004748	7.64	353.60	82.12	0.65
Main	3450.*	50-yr FIS	1500.00	2762.50	2766.27	2765.37	2766.92	0.005111	6.49	231.02	72.61	0.64
Main	3450.*	10-yr FIS	200.00	2762.50	2763.57	2763.28	2763.76	0.006802	3.51	56.98	56.42	0.62
Main	3450.*	10-yr SBCFCD	1600.00	2762.50	2766.42	2765.49	2767.10	0.005054	6.61	242.20	73.53	0.64
Main	3450.*	5-yr SBCFCD	1070.00	2762.50	2765.57	2764.79	2766.11	0.005311	5.88	181.95	68.44	0.64
Main	3450.*	2-yr SBCFCD	650.00	2762.50	2764.76	2764.17	2765.16	0.005684	5.07	128.18	63.55	0.63
Main	3448	100-yr SBCFCD	3380.00	2762.50	2768.59	2767.23	2769.62	0.004667	8.13	415.58	86.53	0.65
Main	3448	100-yr FIS	2700.00	2762.50	2767.84	2766.64	2768.75	0.004781	7.65	352.75	82.06	0.65
Main	3448	50-yr FIS	1500.00	2762.50	2766.26	2765.37	2766.92	0.005163	6.52	230.24	72.55	0.64
Main	3448	10-yr FIS	200.00	2762.50	2763.55	2763.28	2763.75	0.007221	3.58	55.92	56.31	0.63
Main	3448	10-yr SBCFCD	1600.00	2762.50	2766.41	2765.49	2767.09	0.005104	6.63	241.41	73.46	0.64
Main	3448	5-yr SBCFCD	1070.00	2762.50	2765.56	2764.82	2766.10	0.005399	5.91	180.96	68.35	0.64
Main	3448	2-yr SBCFCD	650.00	2762.50	2764.74	2764.18	2765.15	0.005819	5.11	127.21	63.45	0.64
Main	3433	100-yr SBCFCD	3380.00	2757.50	2769.17	2762.23	2769.35	0.000402	3.41	991.56	119.99	0.21
Main	3433	100-yr FIS	2700.00	2757.50	2768.37	2761.63	2768.51	0.000338	3.01	897.73	115.21	0.19
Main	3433	50-yr FIS	1500.00	2757.50	2766.66	2760.37	2766.73	0.000201	2.11	709.91	104.97	0.14
Main	3433	10-yr FIS	200.00	2757.50	2763.69	2758.28	2763.69	0.000015	0.47	424.21	87.12	0.04
Main	3433	10-yr SBCFCD	1600.00	2757.50	2766.82	2760.49	2766.90	0.000214	2.20	727.06	105.95	0.15
Main	3433	5-yr SBCFCD	1070.00	2757.50	2765.90	2759.81	2765.94	0.000142	1.69	631.65	100.40	0.12
Main	3433	2-yr SBCFCD	650.00	2757.50	2765.00	2759.19	2765.03	0.000080	1.19	544.14	95.02	0.09
Main	3431	100-yr SBCFCD	3380.00	2757.50	2769.17	2762.23	2769.35	0.000402	3.41	991.47	119.99	0.21
Main	3431	100-yr FIS	2700.00	2757.50	2768.37	2761.63	2768.51	0.000338	3.01	897.65	115.20	0.19
Main	3431	50-yr FIS	1500.00	2757.50	2766.66	2760.37	2766.73	0.000201	2.11	709.86	104.97	0.14
Main	3431	10-yr FIS	200.00	2757.50	2763.69	2758.28	2763.69	0.000015	0.47	424.21	87.12	0.04
Main	3431	10-yr SBCFCD	1600.00	2757.50	2766.82	2760.49	2766.90	0.000214	2.20	727.01	105.94	0.15
Main	3431	5-yr SBCFCD	1070.00	2757.50	2765.90	2759.81	2765.94	0.000142	1.69	631.60	100.40	0.12
Main	3431	2-yr SBCFCD	650.00	2757.50	2765.00	2759.19	2765.03	0.000080	1.19	544.12	95.02	0.09
Main	3416	100-yr SBCFCD	3380.00	2762.50	2767.23	2767.23	2769.15	0.011564	11.12	303.92	78.40	1.00
Main	3416	100-yr FIS	2700.00	2762.50	2766.62	2766.62	2768.34	0.012118	10.52	256.71	74.70	1.00
Main	3416	50-yr FIS	1500.00	2762.50	2765.37	2765.37	2766.61	0.013194	8.91	168.35	67.23	0.99
Main	3416	10-yr FIS	200.00	2762.50	2763.28	2763.28	2763.65	0.019924	4.91	40.73	54.67	1.00
Main	3416	10-yr SBCFCD	1600.00	2762.50	2765.49	2765.49	2766.77	0.013073	9.08	176.24	67.93	0.99
Main	3416	5-yr SBCFCD	1070.00	2762.50	2764.81	2764.81	2765.84	0.014331	8.15	131.23	63.83	1.00
Main	3416	2-yr SBCFCD	650.00	2762.50	2764.18	2764.18	2764.95	0.015656	7.04	92.39	60.07	1.00

Main	3300	100-yr SBCFCD	3380.00	2757.20	2760.13	2761.92	2766.14	0.062076	19.67	171.84	66.74	2.16
Main	3300	100-yr FIS	2700.00	2757.20	2759.70	2761.31	2765.18	0.068252	18.78	143.79	64.40	2.21
Main	3300	50-yr FIS	1500.00	2757.20	2758.84	2760.04	2763.11	0.088847	16.58	90.45	59.74	2.37
Main	3300	10-yr FIS	200.00	2757.20	2757.65	2757.97	2758.82	0.127819	8.69	23.01	52.93	2.32
Main	3300	10-yr SBCFCD	1600.00	2757.20	2758.92	2760.17	2763.32	0.086404	16.82	95.11	60.18	2.36
Main	3300	5-yr SBCFCD	1070.00	2757.20	2758.50	2759.49	2762.09	0.099553	15.20	70.40	57.80	2.43
Main	3300	2-yr SBCFCD	650.00	2757.20	2758.13	2758.86	2760.85	0.116360	13.26	49.03	55.65	2.49
Main	3298	100-yr SBCFCD	3380.00	2757.20	2760.18	2761.92	2765.94	0.058225	19.26	175.53	67.07	2.10
Main	3298	100-yr FIS	2700.00	2757.20	2759.76	2761.31	2764.97	0.063202	18.31	147.43	64.70	2.14
Main	3298	50-yr FIS	1500.00	2757.20	2758.90	2760.04	2762.85	0.078563	15.94	94.08	60.08	2.25
Main	3298	10-yr FIS	200.00	2757.20	2757.74	2757.97	2758.53	0.065994	7.10	28.18	53.48	1.72
Main	3298	10-yr SBCFCD	1600.00	2757.20	2758.98	2760.16	2763.06	0.076883	16.21	98.73	60.52	2.24
Main	3298	5-yr SBCFCD	1070.00	2757.20	2758.57	2759.49	2761.81	0.084738	14.44	74.08	58.16	2.26
Main	3298	2-yr SBCFCD	650.00	2757.20	2758.19	2758.87	2760.54	0.091363	12.29	52.87	56.05	2.23
Main	3283	100-yr SBCFCD	3380.00	2752.20	2763.88	2756.91	2764.06	0.000397	3.39	996.85	120.31	0.21
Main	3283	100-yr FIS	2700.00	2752.20	2763.08	2756.31	2763.22	0.000334	2.99	902.41	115.51	0.19
Main	3283	50-yr FIS	1500.00	2752.20	2761.37	2755.05	2761.44	0.000198	2.10	713.51	105.27	0.14
Main	3283	10-yr FIS	200.00	2752.20	2758.38	2752.97	2758.39	0.000015	0.47	425.96	87.40	0.04
Main	3283	10-yr SBCFCD	1600.00	2752.20	2761.53	2755.17	2761.61	0.000211	2.19	731.01	106.26	0.15
Main	3283	5-yr SBCFCD	1070.00	2752.20	2760.60	2754.50	2760.64	0.000140	1.69	634.44	100.67	0.12
Main	3283	2-yr SBCFCD	650.00	2752.20	2759.70	2753.88	2759.72	0.000079	1.19	546.34	95.29	0.09
Main	3281	100-yr SBCFCD	3380.00	2752.20	2763.88	2756.91	2764.06	0.000397	3.39	996.76	120.30	0.21
Main	3281	100-yr FIS	2700.00	2752.20	2763.08	2756.31	2763.22	0.000334	2.99	902.29	115.51	0.19
Main	3281	50-yr FIS	1500.00	2752.20	2761.37	2755.05	2761.44	0.000198	2.10	713.46	105.27	0.14
Main	3281	10-yr FIS	200.00	2752.20	2758.38	2752.97	2758.39	0.000015	0.47	425.96	87.40	0.04
Main	3281	10-yr SBCFCD	1600.00	2752.20	2761.53	2755.17	2761.61	0.000211	2.19	730.96	106.26	0.15
Main	3281	5-yr SBCFCD	1070.00	2752.20	2760.60	2754.50	2760.64	0.000141	1.69	634.42	100.67	0.12
Main	3281	2-yr SBCFCD	650.00	2752.20	2759.70	2753.88	2759.72	0.000079	1.19	546.32	95.29	0.09
Main	3266	100-yr SBCFCD	3380.00	2757.20	2761.95	2761.95	2763.87	0.011555	11.12	303.88	78.29	0.99
Main	3266	100-yr FIS	2700.00	2757.20	2761.34	2761.34	2763.05	0.011963	10.48	257.54	74.54	0.99
Main	3266	50-yr FIS	1500.00	2757.20	2760.07	2760.07	2761.31	0.013236	8.95	167.67	66.66	0.99
Main	3266	10-yr FIS	200.00	2757.20	2758.01	2757.98	2758.35	0.017206	4.69	42.67	54.99	0.94
Main	3266	10-yr SBCFCD	1600.00	2757.20	2760.17	2760.17	2761.47	0.013385	9.18	174.38	67.28	1.00
Main	3266	5-yr SBCFCD	1070.00	2757.20	2759.51	2759.51	2760.54	0.014197	8.15	131.34	63.47	1.00
Main	3266	2-yr SBCFCD	650.00	2757.20	2758.89	2758.89	2759.64	0.015212	6.98	93.14	59.96	0.99
Main	3000	100-yr SBCFCD	3380.00	2754.40	2760.00	2758.70	2760.97	0.004692	7.89	428.31	93.99	0.65
Main	3000	100-yr FIS	2700.00	2754.40	2759.31	2758.13	2760.16	0.004785	7.40	364.88	89.62	0.65
Main	3000	50-yr FIS	1500.00	2754.40	2757.84	2756.97	2758.44	0.005143	6.25	239.83	80.30	0.64
Main	3000	10-yr FIS	200.00	2754.40	2755.36		2755.53	0.006940	3.33	60.04	65.35	0.61
Main	3000	10-yr SBCFCD	1600.00	2754.40	2757.97	2757.09	2758.60	0.005117	6.38	250.79	81.16	0.64
Main	3000	5-yr SBCFCD	1070.00	2754.40	2757.19	2756.47	2757.68	0.005384	5.66	189.00	76.19	0.63
Main	3000	2-yr SBCFCD	650.00	2754.40	2756.43	2755.90	2756.80	0.005808	4.87	133.36	71.41	0.63
Main	2998	100-yr SBCFCD	3380.00	2754.40	2759.99		2760.96	0.004723	7.91	427.35	93.93	0.65
Main	2998	100-yr FIS	2700.00	2754.40	2759.30		2760.15	0.004821	7.42	363.96	89.55	0.65
Main	2998	50-yr FIS	1500.00	2754.40	2757.82		2758.44	0.005217	6.28	238.69	80.21	0.64
Main	2998	10-yr FIS	200.00	2754.40	2755.34		2755.52	0.007418	3.40	58.82	65.25	0.63
Main	2998	10-yr SBCFCD	1600.00	2754.40	2757.96		2758.60	0.005170	6.40	249.92	81.09	0.64
Main	2998	5-yr SBCFCD	1070.00	2754.40	2757.17		2757.68	0.005482	5.69	187.89	76.09	0.64
Main	2998	2-yr SBCFCD	650.00	2754.40	2756.42		2756.79	0.005964	4.92	132.23	71.31	0.64

Main	2983	100-yr SBCFCD	3380.00	2749.40	2760.54	2753.69	2760.70	0.000366	3.24	1042.75	127.20	0.20
Main	2983	100-yr FIS	2700.00	2749.40	2759.80	2753.14	2759.92	0.000304	2.84	949.70	122.71	0.18
Main	2983	50-yr FIS	1500.00	2749.40	2758.20	2751.98	2758.26	0.000175	1.97	761.66	113.09	0.13
Main	2983	10-yr FIS	200.00	2749.40	2755.46	2750.09	2755.46	0.000012	0.42	474.50	96.56	0.03
Main	2983	10-yr SBCFCD	1600.00	2749.40	2758.35	2752.06	2758.42	0.000187	2.05	778.88	114.00	0.14
Main	2983	5-yr SBCFCD	1070.00	2749.40	2757.49	2751.47	2757.53	0.000121	1.57	682.84	108.80	0.11
Main	2983	2-yr SBCFCD	650.00	2749.40	2756.66	2750.91	2756.68	0.000067	1.09	594.86	103.81	0.08
Main	2981	100-yr SBCFCD	3380.00	2749.40	2760.54	2753.69	2760.70	0.000366	3.24	1042.65	127.19	0.20
Main	2981	100-yr FIS	2700.00	2749.40	2759.80	2753.14	2759.92	0.000304	2.84	949.61	122.70	0.18
Main	2981	50-yr FIS	1500.00	2749.40	2758.20	2751.98	2758.26	0.000175	1.97	761.64	113.08	0.13
Main	2981	10-yr FIS	200.00	2749.40	2755.46	2750.09	2755.46	0.000012	0.42	474.50	96.56	0.03
Main	2981	10-yr SBCFCD	1600.00	2749.40	2758.35	2752.06	2758.42	0.000187	2.05	778.82	114.00	0.14
Main	2981	5-yr SBCFCD	1070.00	2749.40	2757.49	2751.47	2757.53	0.000121	1.57	682.82	108.80	0.11
Main	2981	2-yr SBCFCD	650.00	2749.40	2756.66	2750.91	2756.68	0.000067	1.09	594.84	103.81	0.08
Main	2966	100-yr SBCFCD	3380.00	2754.40	2758.80	2758.70	2760.53	0.011067	10.57	319.77	86.37	0.97
Main	2966	100-yr FIS	2700.00	2754.40	2758.14	2758.14	2759.76	0.012457	10.22	264.25	82.20	1.00
Main	2966	50-yr FIS	1500.00	2754.40	2756.98	2756.98	2758.14	0.013829	8.66	173.14	74.86	1.00
Main	2966	10-yr FIS	200.00	2754.40	2755.09	2755.09	2755.43	0.020537	4.66	42.94	63.87	1.00
Main	2966	10-yr SBCFCD	1600.00	2754.40	2757.09	2757.09	2758.29	0.013648	8.82	181.39	75.55	1.00
Main	2966	5-yr SBCFCD	1070.00	2754.40	2756.47	2756.47	2757.43	0.014706	7.85	136.32	71.67	1.00
Main	2966	2-yr SBCFCD	650.00	2754.40	2755.90	2755.90	2756.61	0.016262	6.77	96.03	68.14	1.00
Main	2942.6	100-yr SBCFCD	3380.00	2754.00	2758.33	2758.33	2760.29	0.008728	11.24	300.67	77.16	1.00
Main	2942.6	100-yr FIS	2700.00	2754.00	2757.62	2757.74	2759.47	0.010188	10.93	247.09	74.60	1.06
Main	2942.6	50-yr FIS	1500.00	2754.00	2756.36	2756.56	2757.80	0.013436	9.64	155.60	70.35	1.14
Main	2942.6	10-yr FIS	200.00	2754.00	2754.82	2754.69	2755.05	0.008476	3.89	51.40	64.88	0.77
Main	2942.6	10-yr SBCFCD	1600.00	2754.00	2756.46	2756.67	2757.96	0.013180	9.81	163.06	70.71	1.14
Main	2942.6	5-yr SBCFCD	1070.00	2754.00	2755.88	2756.06	2757.07	0.014671	8.74	122.44	68.75	1.15
Main	2942.6	2-yr SBCFCD	650.00	2754.00	2755.37	2755.49	2756.22	0.015844	7.41	87.68	67.02	1.14
Main	2730.8	100-yr SBCFCD	3380.00	2752.00	2756.22	2756.34	2758.38	0.009195	11.78	288.84	76.01	1.04
Main	2730.8	100-yr FIS	2700.00	2752.00	2755.68	2755.77	2757.53	0.009551	10.90	248.36	74.15	1.03
Main	2730.8	50-yr FIS	1500.00	2752.00	2754.59	2754.59	2755.81	0.010102	8.85	169.54	70.31	1.00
Main	2730.8	10-yr FIS	200.00	2752.00	2752.77		2753.05	0.010604	4.20	47.62	63.39	0.85
Main	2730.8	10-yr SBCFCD	1600.00	2752.00	2754.70	2754.70	2755.97	0.010037	9.04	177.01	70.70	1.01
Main	2730.8	5-yr SBCFCD	1070.00	2752.00	2754.16	2754.08	2755.08	0.009504	7.67	139.56	68.73	0.95
Main	2730.8	2-yr SBCFCD	650.00	2752.00	2753.61	2753.51	2754.24	0.009526	6.37	102.01	66.67	0.91
Main	2700.*	100-yr SBCFCD	3380.00	2751.70	2756.86	2755.64	2757.77	0.004675	7.67	440.91	101.07	0.65
Main	2700.*	100-yr FIS	2700.00	2751.70	2756.20	2755.13	2757.00	0.004807	7.18	375.81	97.11	0.64
Main	2700.*	50-yr FIS	1500.00	2751.70	2754.83	2754.05	2755.40	0.005190	6.03	248.79	88.88	0.64
Main	2700.*	10-yr FIS	200.00	2751.70	2752.65	2752.32	2752.78	0.005273	2.89	69.12	75.72	0.53
Main	2700.*	10-yr SBCFCD	1600.00	2751.70	2754.96	2754.16	2755.54	0.005170	6.16	259.81	89.62	0.64
Main	2700.*	5-yr SBCFCD	1070.00	2751.70	2754.28	2753.59	2754.72	0.005121	5.33	200.75	85.56	0.61
Main	2700.*	2-yr SBCFCD	650.00	2751.70	2753.62	2753.04	2753.93	0.005164	4.47	145.56	81.58	0.59
Main	2698	100-yr SBCFCD	3380.00	2751.70	2756.84	2755.64	2757.76	0.004708	7.68	439.88	101.01	0.65
Main	2698	100-yr FIS	2700.00	2751.70	2756.19	2755.13	2756.99	0.004846	7.20	374.82	97.05	0.65
Main	2698	50-yr FIS	1500.00	2751.70	2754.82	2754.05	2755.39	0.005271	6.06	247.53	88.79	0.64
Main	2698	10-yr FIS	200.00	2751.70	2752.64	2752.32	2752.77	0.005532	2.94	68.11	75.64	0.55
Main	2698	10-yr SBCFCD	1600.00	2751.70	2754.94	2754.16	2755.54	0.005248	6.19	258.54	89.54	0.64
Main	2698	5-yr SBCFCD	1070.00	2751.70	2754.27	2753.59	2754.71	0.005215	5.36	199.58	85.47	0.62
Main	2698	2-yr SBCFCD	650.00	2751.70	2753.61	2753.04	2753.92	0.005285	4.50	144.49	81.50	0.60
Main	2683	100-yr SBCFCD	3380.00	2746.70	2757.37	2750.63	2757.52	0.000339	3.10	1089.20	134.19	0.19

Main	2683	100-yr FIS	2700.00	2746.70	2756.66	2750.10	2756.77	0.000279	2.71	995.57	129.92	0.17
Main	2683	50-yr FIS	1500.00	2746.70	2755.17	2749.05	2755.23	0.000156	1.85	808.91	120.97	0.13
Main	2683	10-yr FIS	200.00	2746.70	2752.73	2747.34	2752.73	0.000009	0.38	531.12	106.26	0.03
Main	2683	10-yr SBCFCD	1600.00	2746.70	2755.31	2749.14	2755.37	0.000167	1.94	825.56	121.79	0.13
Main	2683	5-yr SBCFCD	1070.00	2746.70	2754.55	2748.59	2754.58	0.000105	1.46	734.91	117.23	0.10
Main	2683	2-yr SBCFCD	650.00	2746.70	2753.81	2748.07	2753.83	0.000055	1.00	649.92	112.78	0.07
Main	2681	100-yr SBCFCD	3380.00	2746.70	2757.37	2750.63	2757.52	0.000339	3.10	1089.07	134.18	0.19
Main	2681	100-yr FIS	2700.00	2746.70	2756.66	2750.10	2756.77	0.000279	2.71	995.51	129.92	0.17
Main	2681	50-yr FIS	1500.00	2746.70	2755.17	2749.05	2755.23	0.000156	1.85	808.88	120.97	0.13
Main	2681	10-yr FIS	200.00	2746.70	2752.73	2747.34	2752.73	0.000009	0.38	531.12	106.26	0.03
Main	2681	10-yr SBCFCD	1600.00	2746.70	2755.31	2749.14	2755.37	0.000167	1.94	825.53	121.79	0.13
Main	2681	5-yr SBCFCD	1070.00	2746.70	2754.55	2748.59	2754.58	0.000105	1.46	734.88	117.23	0.10
Main	2681	2-yr SBCFCD	650.00	2746.70	2753.81	2748.07	2753.83	0.000055	1.00	649.92	112.78	0.07
Main	2666	100-yr SBCFCD	3380.00	2751.70	2755.62	2755.62	2757.34	0.012200	10.55	320.30	93.62	1.01
Main	2666	100-yr FIS	2700.00	2751.70	2755.10	2755.10	2756.62	0.012655	9.89	273.01	90.52	1.00
Main	2666	50-yr FIS	1500.00	2751.70	2754.20	2754.03	2755.13	0.011232	7.74	193.79	85.07	0.90
Main	2666	10-yr FIS	200.00	2751.70	2752.55		2752.71	0.007681	3.25	61.54	75.12	0.63
Main	2666	10-yr SBCFCD	1600.00	2751.70	2754.27	2754.13	2755.27	0.011674	8.02	199.51	85.48	0.93
Main	2666	5-yr SBCFCD	1070.00	2751.70	2753.88		2754.52	0.009124	6.41	166.81	83.14	0.80
Main	2666	2-yr SBCFCD	650.00	2751.70	2753.36		2753.78	0.008461	5.22	124.50	80.01	0.74
Main	2513.9	100-yr SBCFCD	3380.00	2750.00	2754.74	2754.06	2755.82	0.004895	8.36	404.49	106.83	0.76
Main	2513.9	100-yr FIS	2700.00	2750.00	2754.05	2753.54	2755.07	0.005681	8.12	332.63	102.80	0.80
Main	2513.9	50-yr FIS	1500.00	2750.00	2752.67	2752.56	2753.58	0.009188	7.68	195.41	94.57	0.94
Main	2513.9	10-yr FIS	200.00	2750.00	2750.76	2750.76	2751.11	0.015093	4.74	42.17	61.18	1.01
Main	2513.9	10-yr SBCFCD	1600.00	2750.00	2752.79	2752.68	2753.72	0.008696	7.71	207.46	95.63	0.92
Main	2513.9	5-yr SBCFCD	1070.00	2750.00	2752.14	2752.14	2752.96	0.011273	7.27	147.17	90.17	1.00
Main	2513.9	2-yr SBCFCD	650.00	2750.00	2751.62	2751.62	2752.25	0.011913	6.37	102.12	79.67	0.99
Main	2400.*	100-yr SBCFCD	3380.00	2748.70	2754.27	2753.00	2755.24	0.004675	7.90	428.03	93.59	0.65
Main	2400.*	100-yr FIS	2700.00	2748.70	2753.58	2752.43	2754.43	0.004796	7.41	364.21	89.39	0.65
Main	2400.*	50-yr FIS	1500.00	2748.70	2752.11	2751.27	2752.72	0.005161	6.25	239.83	80.57	0.64
Main	2400.*	10-yr FIS	200.00	2748.70	2749.66	2749.38	2749.83	0.006970	3.33	60.10	65.76	0.61
Main	2400.*	10-yr SBCFCD	1600.00	2748.70	2752.25	2751.39	2752.88	0.005108	6.37	251.16	81.41	0.64
Main	2400.*	5-yr SBCFCD	1070.00	2748.70	2751.47	2750.78	2751.97	0.005398	5.65	189.29	76.69	0.63
Main	2400.*	2-yr SBCFCD	650.00	2748.70	2750.72	2750.21	2751.09	0.005827	4.86	133.76	72.20	0.63
Main	2398	100-yr SBCFCD	3380.00	2748.70	2754.26	2753.00	2755.24	0.004706	7.91	427.07	93.53	0.65
Main	2398	100-yr FIS	2700.00	2748.70	2753.57	2752.43	2754.42	0.004832	7.43	363.29	89.33	0.65
Main	2398	50-yr FIS	1500.00	2748.70	2752.10	2751.27	2752.71	0.005236	6.28	238.69	80.48	0.64
Main	2398	10-yr FIS	200.00	2748.70	2749.64	2749.38	2749.82	0.007465	3.40	58.83	65.64	0.63
Main	2398	10-yr SBCFCD	1600.00	2748.70	2752.24	2751.39	2752.87	0.005179	6.40	250.01	81.33	0.64
Main	2398	5-yr SBCFCD	1070.00	2748.70	2751.46	2750.78	2751.96	0.005496	5.69	188.18	76.61	0.64
Main	2398	2-yr SBCFCD	650.00	2748.70	2750.71	2750.21	2751.08	0.005985	4.90	132.62	72.10	0.64
Main	2383	100-yr SBCFCD	3380.00	2743.70	2754.82	2748.01	2754.98	0.000369	3.25	1039.46	126.93	0.20
Main	2383	100-yr FIS	2700.00	2743.70	2754.07	2747.43	2754.19	0.000307	2.85	945.95	122.45	0.18
Main	2383	50-yr FIS	1500.00	2743.70	2752.48	2746.28	2752.54	0.000177	1.98	759.01	112.95	0.13
Main	2383	10-yr FIS	200.00	2743.70	2749.76	2744.37	2749.76	0.000012	0.42	474.24	96.55	0.03
Main	2383	10-yr SBCFCD	1600.00	2743.70	2752.63	2746.39	2752.70	0.000189	2.06	776.23	113.87	0.14
Main	2383	5-yr SBCFCD	1070.00	2743.70	2751.77	2745.77	2751.81	0.000122	1.57	680.92	108.70	0.11
Main	2383	2-yr SBCFCD	650.00	2743.70	2750.95	2745.21	2750.97	0.000067	1.09	593.83	103.75	0.08
Main	2381	100-yr SBCFCD	3380.00	2743.70	2754.81	2748.01	2754.98	0.000369	3.25	1039.34	126.92	0.20
Main	2381	100-yr FIS	2700.00	2743.70	2754.06	2747.43	2754.19	0.000307	2.85	945.86	122.45	0.18

Main	2381	50-yr FIS	1500.00	2743.70	2752.48	2746.28	2752.54	0.000177	1.98	758.98	112.95	0.13
Main	2381	10-yr FIS	200.00	2743.70	2749.76	2744.37	2749.76	0.000012	0.42	474.24	96.55	0.03
Main	2381	10-yr SBCFCD	1600.00	2743.70	2752.63	2746.39	2752.69	0.000189	2.06	776.17	113.86	0.14
Main	2381	5-yr SBCFCD	1070.00	2743.70	2751.77	2745.77	2751.81	0.000122	1.57	680.89	108.70	0.11
Main	2381	2-yr SBCFCD	650.00	2743.70	2750.95	2745.21	2750.97	0.000067	1.09	593.81	103.75	0.08
Main	2366	100-yr SBCFCD	3380.00	2748.70	2753.00	2753.00	2754.80	0.011661	10.76	314.22	86.04	0.99
Main	2366	100-yr FIS	2700.00	2748.70	2752.44	2752.44	2754.03	0.012143	10.12	266.79	82.65	0.99
Main	2366	50-yr FIS	1500.00	2748.70	2751.29	2751.29	2752.42	0.013396	8.55	175.50	75.67	0.99
Main	2366	10-yr FIS	200.00	2748.70	2749.42	2749.39	2749.73	0.018053	4.47	44.77	64.36	0.94
Main	2366	10-yr SBCFCD	1600.00	2748.70	2751.38	2751.38	2752.57	0.013484	8.76	182.64	76.24	1.00
Main	2366	5-yr SBCFCD	1070.00	2748.70	2750.78	2750.78	2751.72	0.014331	7.75	138.03	72.61	0.99
Main	2366	2-yr SBCFCD	650.00	2748.70	2750.21	2750.21	2750.90	0.015912	6.69	97.17	69.12	0.99
Main	2260.4	100-yr SBCFCD	3380.00	2747.00	2752.01	2751.28	2753.24	0.004947	8.89	380.24	91.56	0.77
Main	2260.4	100-yr FIS	2700.00	2747.00	2750.13	2750.71	2752.48	0.016171	12.30	219.54	79.30	1.30
Main	2260.4	50-yr FIS	1500.00	2747.00	2749.19	2749.56	2750.79	0.016733	10.15	147.73	73.16	1.26
Main	2260.4	10-yr FIS	200.00	2747.00	2747.68	2747.68	2748.01	0.014843	4.59	43.55	65.30	0.99
Main	2260.4	10-yr SBCFCD	1600.00	2747.00	2749.29	2749.66	2750.95	0.016521	10.34	154.69	73.78	1.26
Main	2260.4	5-yr SBCFCD	1070.00	2747.00	2748.79	2749.01	2750.05	0.016764	8.99	118.96	70.87	1.22
Main	2260.4	2-yr SBCFCD	650.00	2747.00	2748.35	2748.49	2749.20	0.016187	7.39	87.93	68.64	1.15
Main	2200.*	100-yr SBCFCD	3380.00	2746.10	2752.05	2750.36	2752.86	0.003680	7.25	466.27	96.87	0.58
Main	2200.*	100-yr FIS	2700.00	2746.10	2751.27	2749.82	2752.00	0.003877	6.87	392.77	92.05	0.59
Main	2200.*	50-yr FIS	1500.00	2746.10	2749.66	2748.67	2750.21	0.004443	5.94	252.71	82.07	0.60
Main	2200.*	10-yr FIS	200.00	2746.10	2747.07	2746.80	2747.24	0.006665	3.28	61.00	66.01	0.60
Main	2200.*	10-yr SBCFCD	1600.00	2746.10	2749.81	2748.78	2750.37	0.004381	6.04	265.02	82.99	0.60
Main	2200.*	5-yr SBCFCD	1070.00	2746.10	2748.97	2748.18	2749.42	0.004780	5.42	197.41	77.77	0.60
Main	2200.*	2-yr SBCFCD	650.00	2746.10	2748.18	2747.61	2748.52	0.005287	4.70	138.26	72.90	0.60
Main	2198	100-yr SBCFCD	3380.00	2746.10	2752.04	2750.36	2752.86	0.003698	7.26	465.51	96.82	0.58
Main	2198	100-yr FIS	2700.00	2746.10	2751.26	2749.82	2752.00	0.003900	6.89	392.01	91.99	0.59
Main	2198	50-yr FIS	1500.00	2746.10	2749.65	2748.67	2750.20	0.004483	5.95	251.95	82.01	0.60
Main	2198	10-yr FIS	200.00	2746.10	2747.05	2746.80	2747.22	0.007107	3.34	59.80	65.89	0.62
Main	2198	10-yr SBCFCD	1600.00	2746.10	2749.80	2748.78	2750.37	0.004419	6.05	264.27	82.94	0.60
Main	2198	5-yr SBCFCD	1070.00	2746.10	2748.96	2748.18	2749.42	0.004838	5.44	196.63	77.71	0.60
Main	2198	2-yr SBCFCD	650.00	2746.10	2748.17	2747.61	2748.52	0.005409	4.74	137.24	72.82	0.61
Main	2183	100-yr SBCFCD	3380.00	2741.10	2752.49	2745.40	2752.64	0.000336	3.14	1075.67	128.87	0.19
Main	2183	100-yr FIS	2700.00	2741.10	2751.68	2744.84	2751.80	0.000284	2.77	973.13	123.97	0.17
Main	2183	50-yr FIS	1500.00	2741.10	2749.99	2743.68	2750.04	0.000169	1.94	771.80	113.73	0.13
Main	2183	10-yr FIS	200.00	2741.10	2747.17	2741.79	2747.17	0.000012	0.42	475.41	96.69	0.03
Main	2183	10-yr SBCFCD	1600.00	2741.10	2750.14	2743.77	2750.21	0.000180	2.03	789.92	114.68	0.14
Main	2183	5-yr SBCFCD	1070.00	2741.10	2749.25	2743.18	2749.28	0.000118	1.55	689.30	109.25	0.11
Main	2183	2-yr SBCFCD	650.00	2741.10	2748.39	2742.61	2748.41	0.000066	1.09	598.30	104.09	0.08
Main	2181	100-yr SBCFCD	3380.00	2741.10	2752.49	2745.40	2752.64	0.000336	3.14	1075.57	128.87	0.19
Main	2181	100-yr FIS	2700.00	2741.10	2751.68	2744.84	2751.80	0.000284	2.77	973.07	123.97	0.17
Main	2181	50-yr FIS	1500.00	2741.10	2749.99	2743.68	2750.04	0.000169	1.94	771.77	113.72	0.13
Main	2181	10-yr FIS	200.00	2741.10	2747.17	2741.79	2747.17	0.000012	0.42	475.41	96.69	0.03
Main	2181	10-yr SBCFCD	1600.00	2741.10	2750.14	2743.77	2750.21	0.000180	2.03	789.89	114.68	0.14
Main	2181	5-yr SBCFCD	1070.00	2741.10	2749.25	2743.18	2749.28	0.000118	1.55	689.27	109.25	0.11
Main	2181	2-yr SBCFCD	650.00	2741.10	2748.39	2742.61	2748.41	0.000066	1.09	598.28	104.09	0.08
Main	2166	100-yr SBCFCD	3380.00	2746.10	2750.51	2750.51	2752.45	0.011632	11.18	302.39	77.15	0.99
Main	2166	100-yr FIS	2700.00	2746.10	2749.91	2749.91	2751.63	0.012226	10.51	256.87	74.82	1.00
Main	2166	50-yr FIS	1500.00	2746.10	2748.72	2748.72	2749.92	0.013496	8.80	170.38	70.18	1.00

Main	2166	10-yr FIS	200.00	2746.10	2746.80	2746.80	2747.14	0.020053	4.65	42.97	62.72	0.99
Main	2166	10-yr SBCFCD	1600.00	2746.10	2748.83	2748.83	2750.08	0.013266	8.96	178.53	70.63	0.99
Main	2166	5-yr SBCFCD	1070.00	2746.10	2748.20	2748.20	2749.18	0.014522	7.96	134.35	68.15	1.00
Main	2166	2-yr SBCFCD	650.00	2746.10	2747.61	2747.61	2748.34	0.016044	6.82	95.24	65.88	1.00
Main	1986.6	100-yr SBCFCD	3480.00	2743.00	2745.35	2746.43	2748.95	0.033717	15.22	228.58	104.81	1.82
Main	1986.6	100-yr FIS	2700.00	2743.00	2745.00	2745.92	2748.04	0.034634	13.99	193.05	102.67	1.80
Main	1986.6	50-yr FIS	1500.00	2743.00	2744.45	2745.00	2746.30	0.031674	10.92	137.38	99.21	1.64
Main	1986.6	10-yr FIS	200.00	2743.00	2743.52	2743.53	2743.79	0.017202	4.16	48.02	93.38	1.02
Main	1986.6	10-yr SBCFCD	1650.00	2743.00	2744.55	2745.12	2746.51	0.030862	11.23	146.98	99.81	1.63
Main	1986.6	5-yr SBCFCD	1120.00	2743.00	2744.27	2744.65	2745.63	0.027436	9.35	119.80	98.09	1.49
Main	1986.6	2-yr SBCFCD	680.00	2743.00	2743.99	2744.19	2744.84	0.023774	7.39	91.99	96.29	1.33
Main	1900.*	100-yr SBCFCD	3480.00	2741.50	2747.15	2745.86	2748.15	0.004714	8.00	435.17	93.93	0.65
Main	1900.*	100-yr FIS	2700.00	2741.50	2746.36	2745.24	2747.22	0.004849	7.44	362.66	89.17	0.65
Main	1900.*	50-yr FIS	1500.00	2741.50	2744.91	2744.09	2745.52	0.005185	6.27	239.36	80.45	0.64
Main	1900.*	10-yr FIS	200.00	2741.50	2742.46	2742.19	2742.63	0.006978	3.33	60.07	65.73	0.61
Main	1900.*	10-yr SBCFCD	1650.00	2741.50	2745.11	2744.20	2745.76	0.005129	6.45	255.88	81.67	0.64
Main	1900.*	5-yr SBCFCD	1120.00	2741.50	2744.34	2743.63	2744.86	0.005405	5.75	194.87	77.06	0.64
Main	1900.*	2-yr SBCFCD	680.00	2741.50	2743.58	2743.05	2743.96	0.005817	4.94	137.73	72.48	0.63
Main	1898	100-yr SBCFCD	3480.00	2741.50	2747.14	2745.86	2748.14	0.004744	8.01	434.21	93.86	0.66
Main	1898	100-yr FIS	2700.00	2741.50	2746.35	2745.24	2747.22	0.004886	7.46	361.73	89.11	0.65
Main	1898	50-yr FIS	1500.00	2741.50	2744.89	2744.09	2745.51	0.005261	6.30	238.22	80.37	0.64
Main	1898	10-yr FIS	200.00	2741.50	2742.44	2742.19	2742.62	0.007473	3.40	58.81	65.62	0.63
Main	1898	10-yr SBCFCD	1650.00	2741.50	2745.10	2744.20	2745.75	0.005199	6.48	254.73	81.59	0.65
Main	1898	5-yr SBCFCD	1120.00	2741.50	2744.33	2743.63	2744.85	0.005500	5.78	193.76	76.97	0.64
Main	1898	2-yr SBCFCD	680.00	2741.50	2743.56	2743.05	2743.95	0.005971	4.98	136.58	72.38	0.64
Main	1883	100-yr SBCFCD	3480.00	2736.50	2747.71	2740.86	2747.88	0.000377	3.30	1054.55	128.15	0.20
Main	1883	100-yr FIS	2700.00	2736.50	2746.86	2740.22	2746.98	0.000307	2.85	947.50	122.97	0.18
Main	1883	50-yr FIS	1500.00	2736.50	2745.28	2739.07	2745.34	0.000176	1.97	760.60	113.35	0.13
Main	1883	10-yr FIS	200.00	2736.50	2742.56	2737.20	2742.56	0.000012	0.42	475.08	96.83	0.03
Main	1883	10-yr SBCFCD	1650.00	2736.50	2745.50	2739.24	2745.57	0.000194	2.10	785.99	114.71	0.14
Main	1883	5-yr SBCFCD	1120.00	2736.50	2744.66	2738.63	2744.70	0.000129	1.62	691.64	109.59	0.11
Main	1883	2-yr SBCFCD	680.00	2736.50	2743.82	2738.05	2743.84	0.000071	1.13	601.64	104.48	0.08
Main	1881	100-yr SBCFCD	3480.00	2736.50	2747.71	2740.86	2747.88	0.000377	3.30	1054.46	128.15	0.20
Main	1881	100-yr FIS	2700.00	2736.50	2746.86	2740.22	2746.98	0.000307	2.85	947.38	122.96	0.18
Main	1881	50-yr FIS	1500.00	2736.50	2745.28	2739.07	2745.34	0.000176	1.97	760.57	113.35	0.13
Main	1881	10-yr FIS	200.00	2736.50	2742.56	2737.20	2742.56	0.000012	0.42	475.08	96.83	0.03
Main	1881	10-yr SBCFCD	1650.00	2736.50	2745.50	2739.24	2745.57	0.000194	2.10	785.93	114.70	0.14
Main	1881	5-yr SBCFCD	1120.00	2736.50	2744.66	2738.63	2744.70	0.000129	1.62	691.61	109.59	0.11
Main	1881	2-yr SBCFCD	680.00	2736.50	2743.82	2738.05	2743.84	0.000071	1.13	601.61	104.48	0.08
Main	1866	100-yr SBCFCD	3480.00	2741.50	2745.86	2745.86	2747.70	0.011730	10.86	320.38	86.85	1.00
Main	1866	100-yr FIS	2700.00	2741.50	2745.24	2745.24	2746.82	0.012148	10.11	267.17	83.00	0.99
Main	1866	50-yr FIS	1500.00	2741.50	2744.06	2744.06	2745.22	0.013870	8.63	173.73	75.75	1.00
Main	1866	10-yr FIS	200.00	2741.50	2742.20	2742.20	2742.53	0.019650	4.58	43.63	64.32	0.98
Main	1866	10-yr SBCFCD	1650.00	2741.50	2744.24	2744.24	2745.44	0.013371	8.82	187.09	76.83	1.00
Main	1866	5-yr SBCFCD	1120.00	2741.50	2743.65	2743.65	2744.60	0.014123	7.83	142.97	73.21	0.99
Main	1866	2-yr SBCFCD	680.00	2741.50	2743.05	2743.05	2743.76	0.015670	6.76	100.55	69.55	0.99
Main	1699.2	100-yr SBCFCD	3480.00	2738.00	2741.29	2742.35	2744.85	0.023176	15.14	229.88	79.74	1.57
Main	1699.2	100-yr FIS	2700.00	2738.00	2740.80	2741.74	2743.89	0.024348	14.10	191.49	76.80	1.57
Main	1699.2	50-yr FIS	1500.00	2738.00	2739.96	2740.58	2742.06	0.025584	11.64	128.88	71.74	1.53
Main	1699.2	10-yr FIS	200.00	2738.00	2738.62	2738.70	2739.04	0.022210	5.24	38.19	63.70	1.19

Main	1699.2	10-yr SBCFCD	1650.00	2738.00	2740.07	2740.75	2742.33	0.025702	12.06	136.79	72.40	1.55
Main	1699.2	5-yr SBCFCD	1120.00	2738.00	2739.63	2740.13	2741.37	0.026548	10.59	105.73	69.78	1.52
Main	1699.2	2-yr SBCFCD	680.00	2738.00	2739.22	2739.54	2740.41	0.025785	8.73	77.89	67.34	1.43
Main	1600.*	100-yr SBCFCD	3480.00	2736.50	2742.16	2740.86	2743.15	0.004696	7.99	435.72	93.96	0.65
Main	1600.*	100-yr FIS	2700.00	2736.50	2741.36	2740.24	2742.22	0.004844	7.44	362.79	89.18	0.65
Main	1600.*	50-yr FIS	1500.00	2736.50	2739.90	2739.09	2740.51	0.005255	6.29	238.30	80.37	0.64
Main	1600.*	10-yr FIS	200.00	2736.50	2737.44	2737.19	2737.62	0.007414	3.39	58.95	65.63	0.63
Main	1600.*	10-yr SBCFCD	1650.00	2736.50	2740.10	2739.20	2740.75	0.005180	6.47	255.05	81.61	0.64
Main	1600.*	5-yr SBCFCD	1120.00	2736.50	2739.33	2738.63	2739.85	0.005477	5.77	194.02	77.00	0.64
Main	1600.*	2-yr SBCFCD	680.00	2736.50	2738.56	2738.05	2738.95	0.005963	4.98	136.64	72.39	0.64
Main	1598	100-yr SBCFCD	3480.00	2731.50	2742.73	2735.87	2742.90	0.000377	3.31	1052.45	127.39	0.20
Main	1598	100-yr FIS	2700.00	2731.50	2741.88	2735.24	2742.00	0.000307	2.86	945.39	122.25	0.18
Main	1598	50-yr FIS	1500.00	2731.50	2740.28	2734.08	2740.34	0.000177	1.98	758.29	112.69	0.13
Main	1598	10-yr FIS	200.00	2731.50	2737.56	2732.19	2737.56	0.000012	0.42	473.85	96.36	0.03
Main	1598	10-yr SBCFCD	1650.00	2731.50	2740.51	2734.24	2740.58	0.000195	2.10	783.86	114.05	0.14
Main	1598	5-yr SBCFCD	1120.00	2731.50	2739.66	2733.63	2739.71	0.000129	1.62	689.77	108.98	0.11
Main	1598	2-yr SBCFCD	680.00	2731.50	2738.82	2733.06	2738.84	0.000071	1.13	599.83	103.91	0.08
Main	1583	100-yr SBCFCD	3480.00	2731.50	2742.73	2735.87	2742.90	0.000378	3.31	1051.70	127.36	0.20
Main	1583	100-yr FIS	2700.00	2731.50	2741.87	2735.24	2742.00	0.000307	2.86	944.83	122.22	0.18
Main	1583	50-yr FIS	1500.00	2731.50	2740.28	2734.08	2740.34	0.000177	1.98	757.99	112.68	0.13
Main	1583	10-yr FIS	200.00	2731.50	2737.56	2732.19	2737.56	0.000012	0.42	473.82	96.36	0.03
Main	1583	10-yr SBCFCD	1650.00	2731.50	2740.51	2734.24	2740.57	0.000195	2.11	783.53	114.03	0.14
Main	1583	5-yr SBCFCD	1120.00	2731.50	2739.66	2733.63	2739.70	0.000129	1.62	689.56	108.97	0.11
Main	1583	2-yr SBCFCD	680.00	2731.50	2738.82	2733.06	2738.84	0.000071	1.13	599.73	103.91	0.08
Main	1581	100-yr SBCFCD	3480.00	2731.50	2742.73	2735.87	2742.90	0.000378	3.31	1051.58	127.35	0.20
Main	1581	100-yr FIS	2700.00	2731.50	2741.87	2735.24	2742.00	0.000307	2.86	944.71	122.21	0.18
Main	1581	50-yr FIS	1500.00	2731.50	2740.28	2734.08	2740.34	0.000177	1.98	757.96	112.67	0.13
Main	1581	10-yr FIS	200.00	2731.50	2737.56	2732.19	2737.56	0.000012	0.42	473.82	96.36	0.03
Main	1581	10-yr SBCFCD	1650.00	2731.50	2740.50	2734.24	2740.57	0.000195	2.11	783.47	114.02	0.14
Main	1581	5-yr SBCFCD	1120.00	2731.50	2739.66	2733.63	2739.70	0.000129	1.62	689.53	108.97	0.11
Main	1581	2-yr SBCFCD	680.00	2731.50	2738.82	2733.06	2738.84	0.000071	1.13	599.70	103.91	0.08
Main	1566	100-yr SBCFCD	3480.00	2736.50	2740.87	2740.87	2742.71	0.011719	10.89	319.61	86.23	1.00
Main	1566	100-yr FIS	2700.00	2736.50	2740.24	2740.24	2741.84	0.012184	10.14	266.26	82.43	0.99
Main	1566	50-yr FIS	1500.00	2736.50	2739.09	2739.09	2740.22	0.013390	8.55	175.40	75.53	0.99
Main	1566	10-yr FIS	200.00	2736.50	2737.19	2737.19	2737.53	0.021132	4.69	42.64	64.12	1.01
Main	1566	10-yr SBCFCD	1650.00	2736.50	2739.24	2739.24	2740.45	0.013261	8.81	187.22	76.46	0.99
Main	1566	5-yr SBCFCD	1120.00	2736.50	2738.64	2738.64	2739.60	0.014292	7.88	142.18	72.84	0.99
Main	1566	2-yr SBCFCD	680.00	2736.50	2738.06	2738.06	2738.77	0.015492	6.75	100.79	69.35	0.99
Main	1439.8	100-yr SBCFCD	3480.00	2734.00	2737.04	2738.11	2740.49	0.024466	14.90	233.49	85.97	1.59
Main	1439.8	100-yr FIS	2700.00	2734.00	2736.59	2737.49	2739.55	0.025606	13.79	195.76	83.99	1.59
Main	1439.8	50-yr FIS	1500.00	2734.00	2735.83	2736.40	2737.81	0.027114	11.30	132.80	80.61	1.55
Main	1439.8	10-yr FIS	200.00	2734.00	2734.64	2734.68	2735.00	0.019036	4.81	41.61	70.27	1.10
Main	1439.8	10-yr SBCFCD	1650.00	2734.00	2735.93	2736.56	2738.05	0.026912	11.67	141.37	81.20	1.56
Main	1439.8	5-yr SBCFCD	1120.00	2734.00	2735.55	2736.00	2737.14	0.026800	10.10	110.92	79.10	1.50
Main	1439.8	2-yr SBCFCD	680.00	2734.00	2735.19	2735.48	2736.25	0.025708	8.26	82.33	77.08	1.41
Main	957.5	100-yr SBCFCD	3480.00	2727.00	2729.94	2730.35	2731.65	0.012792	10.59	348.43	181.21	1.16
Main	957.5	100-yr FIS	2700.00	2727.00	2729.63	2729.88	2731.01	0.011788	9.44	295.58	160.47	1.09
Main	957.5	50-yr FIS	1500.00	2727.00	2728.95	2728.95	2729.81	0.011113	7.47	200.88	117.17	1.00
Main	957.5	10-yr FIS	200.00	2727.00	2727.55	2727.53	2727.79	0.015007	3.94	50.80	97.13	0.96
Main	957.5	10-yr SBCFCD	1650.00	2727.00	2729.06	2729.06	2729.98	0.010935	7.69	214.67	122.08	1.01

Main	957.5	5-yr SBCFCD	1120.00	2727.00	2728.61	2728.61	2729.35	0.011835	6.88	162.68	112.41	1.01
Main	957.5	2-yr SBCFCD	680.00	2727.00	2728.18	2728.18	2728.72	0.012866	5.92	114.93	106.16	1.00

Profile Output Table - Standard Table 2

Reach	River Sta	Profile	E.G. Elev (ft)	W.S. Elev (ft)	Vel Head (ft)	Frctn Loss (ft)	C & E Loss (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Top Width (ft)
Main	12028.1	100-yr SBCFCD	2865.54	2865.53	0.01	0.00	0.19		1730.00		300.00
Main	12028.1	100-yr FIS	2862.67	2862.67	0.01	0.00	0.12		700.00		300.00
Main	12028.1	50-yr FIS	2861.90	2861.89	0.00	0.00	0.10		500.00		300.00
Main	12028.1	10-yr FIS	2859.65	2859.65	0.00	0.00	0.04		100.00		285.82
Main	12028.1	10-yr SBCFCD	2863.05	2863.05	0.01	0.00	0.13		810.00		300.00
Main	12028.1	5-yr SBCFCD	2862.10	2862.10	0.00	0.00	0.11		550.00		300.00
Main	12028.1	2-yr SBCFCD	2861.16	2861.16	0.00	0.00	0.08		340.00		298.77
Main	11915	100-yr SBCFCD	2865.35	2863.42	1.93	0.64	0.00		1730.00		40.62
Main	11915	100-yr FIS	2862.55	2861.31	1.23	0.72	0.00		700.00		32.14
Main	11915	50-yr FIS	2861.79	2860.75	1.04	0.77	0.00		500.00		29.88
Main	11915	10-yr FIS	2859.60	2859.19	0.41	1.01	0.00		100.00		23.58
Main	11915	10-yr SBCFCD	2862.92	2861.59	1.33	0.71	0.00		810.00		33.24
Main	11915	5-yr SBCFCD	2861.99	2860.90	1.09	0.75	0.00		550.00		30.49
Main	11915	2-yr SBCFCD	2861.07	2860.24	0.84	0.81	0.00		340.00		27.80
Main	11864	100-yr SBCFCD	2864.27	2860.79	3.48	0.92	0.15		1730.00		36.49
Main	11864	100-yr FIS	2861.34	2859.02	2.32	1.09	0.11		700.00		29.34
Main	11864	50-yr FIS	2860.54	2858.57	1.97	1.16	0.09		500.00		27.53
Main	11864	10-yr FIS	2858.10	2857.39	0.71	1.47	0.03		100.00		22.79
Main	11864	10-yr SBCFCD	2861.74	2859.25	2.49	1.06	0.12		810.00		30.26
Main	11864	5-yr SBCFCD	2860.75	2858.69	2.06	1.14	0.10		550.00		28.01
Main	11864	2-yr SBCFCD	2859.76	2858.16	1.60	1.24	0.08		340.00		25.88
Main	11841	100-yr SBCFCD	2859.82	2859.42	0.41	0.07	0.00		1730.00		55.87
Main	11841	100-yr FIS	2856.95	2856.76	0.18	0.05	0.00		700.00		45.23
Main	11841	50-yr FIS	2856.16	2856.03	0.13	0.04	0.00		500.00		42.28
Main	11841	10-yr FIS	2853.89	2853.87	0.02	0.01	0.00		100.00		33.58
Main	11841	10-yr SBCFCD	2857.33	2857.12	0.21	0.05	0.00		810.00		46.65
Main	11841	5-yr SBCFCD	2856.37	2856.22	0.14	0.04	0.00		550.00		43.06
Main	11841	2-yr SBCFCD	2855.42	2855.33	0.09	0.03	0.00		340.00		39.48
Main	11792	100-yr SBCFCD	2859.75	2859.33	0.42	0.01	0.11		1730.00		55.58
Main	11792	100-yr FIS	2856.90	2856.71	0.19	0.01	0.07		700.00		45.03
Main	11792	50-yr FIS	2856.12	2855.99	0.13	0.01	0.06		500.00		42.11
Main	11792	10-yr FIS	2853.88	2853.86	0.02	0.00	0.02		100.00		33.54
Main	11792	10-yr SBCFCD	2857.27	2857.06	0.21	0.01	0.08		810.00		46.42
Main	11792	5-yr SBCFCD	2856.33	2856.18	0.15	0.01	0.07		550.00		42.88
Main	11792	2-yr SBCFCD	2855.39	2855.30	0.09	0.01	0.05		340.00		39.35
Main	11788	100-yr SBCFCD	2859.63	2858.12	1.51	0.03	0.04		1730.00		42.47
Main	11788	100-yr FIS	2856.82	2855.90	0.92	0.03	0.03		700.00		33.59
Main	11788	50-yr FIS	2856.05	2855.29	0.76	0.04	0.03		500.00		31.15
Main	11788	10-yr FIS	2853.85	2853.59	0.27	0.04	0.01		100.00		24.34

Main	11788	10-yr SBCFCD	2857.19	2856.18	1.00	0.03	0.03	810.00	34.73
Main	11788	5-yr SBCFCD	2856.25	2855.44	0.81	0.04	0.03	550.00	31.78
Main	11788	2-yr SBCFCD	2855.33	2854.73	0.60	0.04	0.02	340.00	28.92
Main	11785	100-yr SBCFCD	2859.55	2857.62	1.93	1.29	0.03	1730.00	40.62
Main	11785	100-yr FIS	2856.75	2855.51	1.23	0.97	0.16	700.00	32.13
Main	11785	50-yr FIS	2855.99	2854.96	1.03	1.49	0.04	500.00	29.91
Main	11785	10-yr FIS	2853.80	2853.39	0.41	1.98	0.02	100.00	23.58
Main	11785	10-yr SBCFCD	2857.12	2855.79	1.33	1.44	0.02	810.00	33.26
Main	11785	5-yr SBCFCD	2856.19	2855.11	1.08	1.53	0.02	550.00	30.50
Main	11785	2-yr SBCFCD	2855.27	2854.44	0.84	1.65	0.02	340.00	27.80
Main	11663.9	100-yr SBCFCD	2857.13	2853.06	4.07	2.20	0.21	1730.00	38.58
Main	11663.9	100-yr FIS	2854.10	2851.62	2.48	2.52	0.12	700.00	32.75
Main	11663.9	50-yr FIS	2853.26	2851.27	2.00	2.63	0.10	500.00	31.32
Main	11663.9	10-yr FIS	2850.90	2850.33	0.56	2.89	0.01	100.00	27.55
Main	11663.9	10-yr SBCFCD	2854.50	2851.80	2.70	2.48	0.14	810.00	33.48
Main	11663.9	5-yr SBCFCD	2853.49	2851.36	2.13	2.60	0.10	550.00	31.70
Main	11663.9	2-yr SBCFCD	2852.47	2850.95	1.52	2.73	0.07	340.00	30.04
Main	11313.9	100-yr SBCFCD	2851.45	2849.48	1.97	5.06	0.63	1960.00	44.90
Main	11313.9	100-yr FIS	2850.91	2849.09	1.82	0.95	0.30	1700.00	43.36
Main	11313.9	50-yr FIS	2849.23	2847.83	1.40			1000.00	38.32
Main	11313.9	10-yr FIS	2845.98	2845.51	0.47	1.34	0.07	150.00	29.02
Main	11313.9	10-yr SBCFCD	2849.00	2847.67	1.33	1.03	0.21	920.00	37.67
Main	11313.9	5-yr SBCFCD	2848.06	2846.98	1.08	1.08	0.17	620.00	34.93
Main	11313.9	2-yr SBCFCD	2847.15	2846.32	0.82	1.16	0.13	380.00	32.30
Main	11170.*	100-yr SBCFCD	2849.30	2848.40	0.90	0.01	0.00	1960.00	61.00
Main	11170.*	100-yr FIS	2848.79	2847.96	0.84	0.01	0.00	1700.00	58.34
Main	11170.*	50-yr FIS	2847.19	2846.55	0.64	0.01	0.00	1000.00	49.89
Main	11170.*	10-yr FIS	2843.97	2843.75	0.23	0.01	0.00	150.00	33.07
Main	11170.*	10-yr SBCFCD	2846.98	2846.36	0.62	0.01	0.00	920.00	48.75
Main	11170.*	5-yr SBCFCD	2846.06	2845.56	0.50	0.01	0.00	620.00	43.94
Main	11170.*	2-yr SBCFCD	2845.16	2844.77	0.39	0.01	0.00	380.00	39.21
Main	11168	100-yr SBCFCD	2849.29	2848.39	0.90	0.01	0.23	1960.00	60.93
Main	11168	100-yr FIS	2848.79	2847.95	0.84	0.01	0.22	1700.00	58.27
Main	11168	50-yr FIS	2847.18	2846.53	0.65	0.01	0.18	1000.00	49.81
Main	11168	10-yr FIS	2843.96	2843.73	0.24	0.00	0.07	150.00	32.96
Main	11168	10-yr SBCFCD	2846.97	2846.34	0.62	0.01	0.17	920.00	48.66
Main	11168	5-yr SBCFCD	2846.05	2845.54	0.51	0.01	0.14	620.00	43.84
Main	11168	2-yr SBCFCD	2845.15	2844.75	0.39	0.00	0.11	380.00	39.11
Main	11153	100-yr SBCFCD	2849.04	2848.92	0.13	0.00	0.00	1960.00	94.10
Main	11153	100-yr FIS	2848.56	2848.45	0.11	0.00	0.00	1700.00	91.28
Main	11153	50-yr FIS	2847.00	2846.94	0.06	0.00	0.00	1000.00	82.22
Main	11153	10-yr FIS	2843.89	2843.89	0.00	0.00	0.00	150.00	63.92
Main	11153	10-yr SBCFCD	2846.79	2846.73	0.05	0.00	0.00	920.00	80.99
Main	11153	5-yr SBCFCD	2845.90	2845.87	0.03	0.00	0.00	620.00	75.81
Main	11153	2-yr SBCFCD	2845.03	2845.01	0.02	0.00	0.00	380.00	70.66
Main	11151	100-yr SBCFCD	2849.04	2848.92	0.13	0.01	0.16	1960.00	94.10

Main	11151	100-yr FIS	2848.56	2848.45	0.11	0.01	0.15	1700.00	91.27
Main	11151	50-yr FIS	2847.00	2846.94	0.06	0.01	0.12	1000.00	82.22
Main	11151	10-yr FIS	2843.89	2843.89	0.00	0.00	0.04	150.00	63.92
Main	11151	10-yr SBCFCD	2846.79	2846.73	0.05	0.01	0.12	920.00	80.99
Main	11151	5-yr SBCFCD	2845.90	2845.87	0.03	0.01	0.10	620.00	75.81
Main	11151	2-yr SBCFCD	2845.03	2845.01	0.02	0.00	0.07	380.00	70.66
Main	11136	100-yr SBCFCD	2848.87	2847.12	1.75	1.80	0.01	1960.00	53.29
Main	11136	100-yr FIS	2848.39	2846.75	1.64	1.86	0.01	1700.00	51.09
Main	11136	50-yr FIS	2846.87	2845.60	1.26	2.01	0.00	1000.00	44.22
Main	11136	10-yr FIS	2843.85	2843.40	0.45	2.64	0.01	150.00	30.98
Main	11136	10-yr SBCFCD	2846.66	2845.45	1.21	2.04	0.00	920.00	43.30
Main	11136	5-yr SBCFCD	2845.80	2844.81	0.99	2.17	0.00	620.00	39.44
Main	11136	2-yr SBCFCD	2844.95	2844.19	0.76	2.36	0.00	380.00	35.71
Main	10963.9	100-yr SBCFCD	2846.10	2843.12	2.97	2.65	0.12	1960.00	49.09
Main	10963.9	100-yr FIS	2845.59	2842.84	2.75	2.69	0.11	1700.00	47.27
Main	10963.9	50-yr FIS	2843.95	2841.94	2.02	2.83	0.08	1000.00	41.60
Main	10963.9	10-yr FIS	2840.75	2840.23	0.52	3.09	0.01	150.00	30.87
Main	10963.9	10-yr SBCFCD	2843.73	2841.82	1.91	2.85	0.07	920.00	40.85
Main	10963.9	5-yr SBCFCD	2842.81	2841.32	1.48	2.94	0.05	620.00	37.74
Main	10963.9	2-yr SBCFCD	2841.90	2840.85	1.05	3.01	0.03	380.00	34.73
Main	10745	100-yr SBCFCD	2844.57	2843.96	0.61	0.01	0.14	1960.00	54.71
Main	10745	100-yr FIS	2843.24	2842.41	0.83	0.02	0.20	1700.00	48.73
Main	10745	50-yr FIS	2840.84	2839.42	1.42			1000.00	37.18
Main	10745	10-yr FIS	2837.52	2837.03	0.48	0.05	0.12	150.00	27.98
Main	10745	10-yr SBCFCD	2840.61	2839.25	1.36			920.00	36.52
Main	10745	5-yr SBCFCD	2839.65	2838.55	1.10	0.04	0.29	620.00	33.83
Main	10745	2-yr SBCFCD	2838.71	2837.87	0.84	0.04	0.21	380.00	31.22
Main	10720.4	100-yr SBCFCD	2844.42	2844.27	0.15			1960.00	74.94
Main	10720.4	100-yr FIS	2843.02	2842.86	0.16			1700.00	69.27
Main	10720.4	50-yr FIS	2839.70	2839.54	0.15			1000.00	55.94
Main	10720.4	10-yr FIS	2834.00	2833.93	0.08			150.00	33.35
Main	10720.4	10-yr SBCFCD	2839.13	2838.97	0.16			920.00	53.63
Main	10720.4	5-yr SBCFCD	2837.45	2837.31	0.15			620.00	46.94
Main	10720.4	2-yr SBCFCD	2835.89	2835.77	0.12			380.00	40.77
Main	10694.4		Culvert						
Main	10659.4	100-yr SBCFCD	2840.13	2839.54	0.59	0.08	0.02	1960.00	55.92
Main	10659.4	100-yr FIS	2840.37	2839.99	0.38	0.06	0.09	1700.00	57.75
Main	10659.4	50-yr FIS	2838.01	2837.69	0.32	0.06	0.04	1000.00	48.50
Main	10659.4	10-yr FIS	2833.65	2833.53	0.12	0.07	0.01	150.00	31.75
Main	10659.4	10-yr SBCFCD	2837.31	2836.93	0.38	0.07	0.00	920.00	45.43
Main	10659.4	5-yr SBCFCD	2836.20	2835.90	0.30	0.07	0.01	620.00	41.28
Main	10659.4	2-yr SBCFCD	2835.10	2834.87	0.22	0.07	0.01	380.00	37.16
Main	10613.9	100-yr SBCFCD	2840.04	2839.39	0.65	0.69	0.00	2590.00	66.55
Main	10613.9	100-yr FIS	2840.23	2839.56	0.67	0.69	0.00	2700.00	67.23
Main	10613.9	50-yr FIS	2837.91	2837.46	0.45	0.63	0.00	1500.00	58.85
Main	10613.9	10-yr FIS	2833.58	2833.47	0.11	0.46	0.00	200.00	42.88

Main	10613.9	10-yr SBCFCD	2837.24	2836.85	0.39	0.61	0.00	1220.00	56.40
Main	10613.9	5-yr SBCFCD	2836.13	2835.83	0.29	0.57	0.00	820.00	52.33
Main	10613.9	2-yr SBCFCD	2835.02	2834.82	0.20	0.53	0.00	500.00	48.26
Main	10213.9	100-yr SBCFCD	2839.34	2838.66	0.68	0.08	0.06	2590.00	65.75
Main	10213.9	100-yr FIS	2839.53	2838.83	0.70	0.08	0.06	2700.00	66.41
Main	10213.9	50-yr FIS	2837.27	2836.82	0.46	0.07	0.03	1500.00	58.44
Main	10213.9	10-yr FIS	2833.11	2833.02	0.09	0.05	0.00	200.00	43.38
Main	10213.9	10-yr SBCFCD	2836.62	2836.23	0.39	0.07	0.03	1220.00	56.13
Main	10213.9	5-yr SBCFCD	2835.55	2835.26	0.29	0.07	0.02	820.00	52.28
Main	10213.9	2-yr SBCFCD	2834.49	2834.29	0.19	0.06	0.01	500.00	48.44
Main	10170.*	100-yr SBCFCD	2839.20	2838.73	0.48	0.00	0.00	2590.00	82.76
Main	10170.*	100-yr FIS	2839.39	2838.90	0.49	0.00	0.00	2700.00	83.79
Main	10170.*	50-yr FIS	2837.17	2836.82	0.34	0.00	0.00	1500.00	71.31
Main	10170.*	10-yr FIS	2833.05	2832.98	0.08	0.00	0.00	200.00	48.12
Main	10170.*	10-yr SBCFCD	2836.53	2836.23	0.30	0.00	0.00	1220.00	67.71
Main	10170.*	5-yr SBCFCD	2835.47	2835.24	0.23	0.00	0.00	820.00	61.76
Main	10170.*	2-yr SBCFCD	2834.42	2834.26	0.16	0.00	0.00	500.00	55.85
Main	10168	100-yr SBCFCD	2839.20	2838.72	0.48	0.01	0.11	2590.00	82.51
Main	10168	100-yr FIS	2839.38	2838.89	0.49	0.01	0.11	2700.00	83.54
Main	10168	50-yr FIS	2837.16	2836.82	0.34	0.01	0.09	1500.00	71.12
Main	10168	10-yr FIS	2833.05	2832.98	0.08	0.00	0.02	200.00	48.05
Main	10168	10-yr SBCFCD	2836.52	2836.22	0.30	0.00	0.08	1220.00	67.54
Main	10168	5-yr SBCFCD	2835.46	2835.24	0.23	0.00	0.06	820.00	61.61
Main	10168	2-yr SBCFCD	2834.41	2834.26	0.16	0.00	0.04	500.00	55.73
Main	10153	100-yr SBCFCD	2839.08	2838.97	0.11	0.00	0.00	2590.00	113.95
Main	10153	100-yr FIS	2839.26	2839.15	0.11	0.00	0.00	2700.00	115.00
Main	10153	50-yr FIS	2837.07	2837.01	0.06	0.00	0.00	1500.00	102.20
Main	10153	10-yr FIS	2833.03	2833.03	0.00	0.00	0.00	200.00	78.31
Main	10153	10-yr SBCFCD	2836.44	2836.40	0.05	0.00	0.00	1220.00	98.51
Main	10153	5-yr SBCFCD	2835.40	2835.37	0.03	0.00	0.00	820.00	92.37
Main	10153	2-yr SBCFCD	2834.37	2834.35	0.01	0.00	0.00	500.00	86.27
Main	10151	100-yr SBCFCD	2839.08	2838.97	0.11	0.01	0.04	2590.00	114.11
Main	10151	100-yr FIS	2839.26	2839.15	0.11	0.01	0.04	2700.00	115.16
Main	10151	50-yr FIS	2837.07	2837.01	0.06	0.01	0.03	1500.00	102.34
Main	10151	10-yr FIS	2833.03	2833.03	0.00	0.00	0.01	200.00	78.39
Main	10151	10-yr SBCFCD	2836.44	2836.40	0.05	0.00	0.03	1220.00	98.63
Main	10151	5-yr SBCFCD	2835.40	2835.37	0.03	0.00	0.02	820.00	92.49
Main	10151	2-yr SBCFCD	2834.37	2834.35	0.01	0.00	0.02	500.00	86.37
Main	10136	100-yr SBCFCD	2839.03	2838.52	0.52	0.68	0.05	2590.00	81.43
Main	10136	100-yr FIS	2839.21	2838.68	0.53	0.68	0.05	2700.00	82.43
Main	10136	50-yr FIS	2837.03	2836.67	0.37	0.63	0.03	1500.00	70.32
Main	10136	10-yr FIS	2833.02	2832.94	0.08	0.42	0.01	200.00	47.89
Main	10136	10-yr SBCFCD	2836.41	2836.09	0.32	0.62	0.03	1220.00	66.84
Main	10136	5-yr SBCFCD	2835.38	2835.13	0.24	0.58	0.02	820.00	61.08
Main	10136	2-yr SBCFCD	2834.35	2834.19	0.17	0.52	0.01	500.00	55.37
Main	9863.9	100-yr SBCFCD	2838.30	2837.28	1.03	0.63	0.10	2590.00	61.83

Main	9863.9	100-yr FIS	2838.48	2837.43	1.05	0.64	0.10	2700.00	62.45
Main	9863.9	50-yr FIS	2836.37	2835.68	0.69	0.62	0.08	1500.00	55.30
Main	9863.9	10-yr FIS	2832.60	2832.46	0.13	0.51	0.03	200.00	42.20
Main	9863.9	10-yr SBCFCD	2835.77	2835.17	0.59	0.61	0.07	1220.00	53.26
Main	9863.9	5-yr SBCFCD	2834.78	2834.34	0.44	0.60	0.06	820.00	49.86
Main	9863.9	2-yr SBCFCD	2833.82	2833.52	0.29	0.57	0.05	500.00	46.52
Main	9736	100-yr SBCFCD	2837.57	2835.59	1.98	0.02	0.70	2590.00	56.84
Main	9736	100-yr FIS	2837.74	2835.69	2.06	0.02	0.73	2700.00	57.25
Main	9736	50-yr FIS	2835.67	2834.17	1.50	0.03	0.50	1500.00	50.60
Main	9736	10-yr FIS	2832.05	2831.59	0.46	0.04	0.14	200.00	39.33
Main	9736	10-yr SBCFCD	2835.08	2833.74	1.34	0.03	0.44	1220.00	48.72
Main	9736	5-yr SBCFCD	2834.12	2833.05	1.07	0.03	0.33	820.00	45.73
Main	9736	2-yr SBCFCD	2833.19	2832.38	0.81	0.04	0.25	500.00	42.80
Main	9728	100-yr SBCFCD	2835.07	2834.49	0.58	0.06	0.09	2590.00	56.99
Main	9728	100-yr FIS	2835.35	2834.77	0.59	0.06	0.10	2700.00	57.65
Main	9728	50-yr FIS	2832.03	2831.54	0.50	0.09	0.07	1500.00	49.92
Main	9728	10-yr FIS	2830.42	2825.62	4.80	0.32	1.30	200.00	35.77
Main	9728	10-yr SBCFCD	2833.37	2826.92	6.45	0.18	1.53	1220.00	38.88
Main	9728	5-yr SBCFCD	2832.44	2826.45	5.99	0.20	1.48	820.00	37.75
Main	9728	2-yr SBCFCD	2831.54	2826.04	5.50	0.24	1.41	500.00	36.77
Main	9536.1	100-yr SBCFCD	2834.91	2834.52	0.39			2590.00	73.07
Main	9536.1	100-yr FIS	2835.19	2834.80	0.40			2700.00	74.20
Main	9536.1	50-yr FIS	2831.88	2831.52	0.36			1500.00	61.08
Main	9536.1	10-yr FIS	2826.88	2826.74	0.14			200.00	41.96
Main	9536.1	10-yr SBCFCD	2830.99	2830.65	0.34			1220.00	57.61
Main	9536.1	5-yr SBCFCD	2829.60	2829.31	0.30			820.00	52.23
Main	9536.1	2-yr SBCFCD	2828.34	2828.11	0.24			500.00	47.42
Main	9525.6		Culvert						
Main	9515.2	100-yr SBCFCD	2832.34	2831.00	1.34	0.41	0.21	2620.00	59.01
Main	9515.2	100-yr FIS	2832.46	2831.09	1.37	0.41	0.20	2700.00	59.35
Main	9515.2	50-yr FIS	2830.31	2829.34	0.97	0.41	0.12	1500.00	52.35
Main	9515.2	10-yr FIS	2826.68	2826.48	0.20	0.24	0.01	200.00	40.93
Main	9515.2	10-yr SBCFCD	2829.72	2828.85	0.87	0.41	0.07	1230.00	50.40
Main	9515.2	5-yr SBCFCD	2828.75	2828.09	0.66	0.38	0.03	830.00	47.36
Main	9515.2	2-yr SBCFCD	2827.84	2827.40	0.44	0.32	0.00	510.00	44.60
Main	9313.9	100-yr SBCFCD	2831.73	2829.69	2.04	0.84	0.38	2620.00	56.65
Main	9313.9	100-yr FIS	2831.85	2829.80	2.05	0.80	0.39	2700.00	57.10
Main	9313.9	50-yr FIS	2829.78	2828.42	1.36	1.76	0.05	1500.00	51.12
Main	9313.9	10-yr FIS	2826.43	2826.25	0.17	1.08	0.01	200.00	41.74
Main	9313.9	10-yr SBCFCD	2829.24	2828.13	1.11	1.69	0.02	1230.00	49.87
Main	9313.9	5-yr SBCFCD	2828.35	2827.60	0.75	1.53	0.00	830.00	47.57
Main	9313.9	2-yr SBCFCD	2827.52	2827.07	0.45	1.36	0.01	510.00	45.29
Main	9125	100-yr SBCFCD	2830.35	2829.59	0.76	0.01	0.27	2620.00	72.00
Main	9125	100-yr FIS	2830.55	2829.80	0.75	0.01	0.26	2700.00	72.00
Main	9125	50-yr FIS	2827.97	2826.78	1.19	0.01	0.52	1500.00	72.00
Main	9125	10-yr FIS	2825.33	2825.02	0.31	0.01	0.13	200.00	72.00

Main	9125	10-yr SBCFCD	2827.53	2826.47	1.06	0.01	0.46	1230.00	72.00
Main	9125	5-yr SBCFCD	2826.81	2826.01	0.80	0.01	0.35	830.00	72.00
Main	9125	2-yr SBCFCD	2826.14	2825.55	0.59	0.01	0.26	510.00	72.00
Main	9116	100-yr SBCFCD	2830.07	2829.85	0.22	0.00	0.09	2620.00	72.00
Main	9116	100-yr FIS	2830.28	2830.05	0.22	0.00	0.09	2700.00	72.16
Main	9116	50-yr FIS	2826.94	2826.79	0.15	0.00	0.06	1500.00	72.00
Main	9116	10-yr FIS	2821.82	2821.78	0.04	0.00	0.02	200.00	72.00
Main	9116	10-yr SBCFCD	2826.08	2825.95	0.13	0.00	0.05	1230.00	72.00
Main	9116	5-yr SBCFCD	2824.68	2824.58	0.10	0.00	0.04	830.00	72.00
Main	9116	2-yr SBCFCD	2823.38	2823.31	0.08	0.00	0.03	510.00	72.00
Main	9035.8	100-yr SBCFCD	2829.98	2829.94	0.04			2620.00	162.56
Main	9035.8	100-yr FIS	2830.18	2830.14	0.04			2700.00	162.56
Main	9035.8	50-yr FIS	2826.88	2826.85	0.03			1500.00	162.56
Main	9035.8	10-yr FIS	2821.80	2821.79	0.01			200.00	162.56
Main	9035.8	10-yr SBCFCD	2826.02	2826.00	0.02			1230.00	162.56
Main	9035.8	5-yr SBCFCD	2824.63	2824.61	0.02			830.00	162.56
Main	9035.8	2-yr SBCFCD	2823.35	2823.34	0.01			510.00	162.56
Main	9020.4		Culvert						
Main	9005	100-yr SBCFCD	2824.95	2824.08	0.87	0.57	0.34	2620.00	102.15
Main	9005	100-yr FIS	2825.06	2824.21	0.86	0.55	0.35	2700.00	103.12
Main	9005	50-yr FIS	2823.36	2822.31	1.05	1.07	0.11	1500.00	88.11
Main	9005	10-yr FIS	2820.93	2820.63	0.30	1.42	0.01	200.00	74.72
Main	9005	10-yr SBCFCD	2822.97	2822.04	0.93	1.10	0.09	1230.00	85.93
Main	9005	5-yr SBCFCD	2822.32	2821.58	0.74	1.16	0.06	830.00	82.31
Main	9005	2-yr SBCFCD	2821.70	2821.15	0.55	1.25	0.04	510.00	78.91
Main	8713.9	100-yr SBCFCD	2824.04	2822.04	2.00	1.55	0.32	2620.00	58.45
Main	8713.9	100-yr FIS	2824.16	2822.13	2.03	1.55	0.33	2700.00	58.79
Main	8713.9	50-yr FIS	2822.14	2820.73	1.41	1.62	0.21	1500.00	53.28
Main	8713.9	10-yr FIS	2818.79	2818.06	0.73	2.02	0.13	200.00	42.77
Main	8713.9	10-yr SBCFCD	2821.61	2820.11	1.50	1.20	0.17	1230.00	50.84
Main	8713.9	5-yr SBCFCD	2820.74	2819.34	1.39	1.39	0.20	830.00	47.84
Main	8713.9	2-yr SBCFCD	2819.91	2818.72	1.19	1.61	0.19	510.00	45.36
Main	8470.*	100-yr SBCFCD	2822.13	2821.20	0.93	0.01	0.00	2620.00	78.04
Main	8470.*	100-yr FIS	2822.24	2821.30	0.94	0.01	0.00	2700.00	78.75
Main	8470.*	50-yr FIS	2820.30	2819.60	0.70	0.01	0.00	1500.00	66.57
Main	8470.*	10-yr FIS	2816.74	2816.52	0.23	0.01	0.00	200.00	44.45
Main	8470.*	10-yr SBCFCD	2819.76	2819.13	0.63	0.01	0.00	1230.00	63.19
Main	8470.*	5-yr SBCFCD	2818.84	2818.33	0.51	0.01	0.00	830.00	57.44
Main	8470.*	2-yr SBCFCD	2817.93	2817.54	0.39	0.01	0.00	510.00	51.79
Main	8468	100-yr SBCFCD	2822.12	2821.19	0.93	0.01	0.23	2620.00	77.96
Main	8468	100-yr FIS	2822.23	2821.29	0.95	0.01	0.23	2700.00	78.67
Main	8468	50-yr FIS	2820.29	2819.59	0.70	0.01	0.19	1500.00	66.49
Main	8468	10-yr FIS	2816.73	2816.50	0.23	0.00	0.07	200.00	44.32
Main	8468	10-yr SBCFCD	2819.76	2819.12	0.64	0.01	0.17	1230.00	63.12
Main	8468	5-yr SBCFCD	2818.83	2818.31	0.52	0.01	0.14	830.00	57.33
Main	8468	2-yr SBCFCD	2817.92	2817.53	0.40	0.00	0.11	510.00	51.68

Main	8453	100-yr SBCFCD	2821.88	2821.71	0.16	0.00	0.00	2620.00	104.71
Main	8453	100-yr FIS	2821.99	2821.82	0.17	0.00	0.00	2700.00	105.34
Main	8453	50-yr FIS	2820.10	2820.01	0.09	0.00	0.00	1500.00	94.42
Main	8453	10-yr FIS	2816.66	2816.66	0.01	0.00	0.00	200.00	74.10
Main	8453	10-yr SBCFCD	2819.57	2819.51	0.07	0.00	0.00	1230.00	91.36
Main	8453	5-yr SBCFCD	2818.68	2818.64	0.04	0.00	0.00	830.00	86.11
Main	8453	2-yr SBCFCD	2817.80	2817.78	0.02	0.00	0.00	510.00	80.92
Main	8451	100-yr SBCFCD	2821.87	2821.71	0.16	0.02	0.16	2620.00	104.71
Main	8451	100-yr FIS	2821.98	2821.81	0.17	0.02	0.16	2700.00	105.34
Main	8451	50-yr FIS	2820.10	2820.01	0.09	0.01	0.13	1500.00	94.41
Main	8451	10-yr FIS	2816.66	2816.66	0.01	0.00	0.04	200.00	74.10
Main	8451	10-yr SBCFCD	2819.57	2819.51	0.07	0.01	0.12	1230.00	91.36
Main	8451	5-yr SBCFCD	2818.68	2818.64	0.04	0.01	0.10	830.00	86.11
Main	8451	2-yr SBCFCD	2817.80	2817.78	0.02	0.00	0.07	510.00	80.92
Main	8436	100-yr SBCFCD	2821.69	2819.90	1.79	0.23	0.02	2620.00	68.74
Main	8436	100-yr FIS	2821.80	2819.99	1.82	0.23	0.02	2700.00	69.32
Main	8436	50-yr FIS	2819.96	2818.59	1.37	0.23	0.01	1500.00	59.33
Main	8436	10-yr FIS	2816.62	2816.17	0.45	0.23	0.06	200.00	41.92
Main	8436	10-yr SBCFCD	2819.45	2818.21	1.23	0.23	0.03	1230.00	56.61
Main	8436	5-yr SBCFCD	2818.58	2817.57	1.01	0.23	0.05	830.00	51.99
Main	8436	2-yr SBCFCD	2817.72	2816.96	0.77	0.23	0.06	510.00	47.59
Main	8413.9	100-yr SBCFCD	2821.39	2819.10	2.29	0.25	0.05	2620.00	57.98
Main	8413.9	100-yr FIS	2821.51	2819.20	2.31	0.25	0.05	2700.00	58.40
Main	8413.9	50-yr FIS	2819.58	2817.59	1.99	0.32	0.06	1500.00	51.80
Main	8413.9	10-yr FIS	2816.11	2815.84	0.27	2.75	0.02	200.00	44.66
Main	8413.9	10-yr SBCFCD	2819.05	2817.20	1.85	0.34	0.06	1230.00	50.21
Main	8413.9	5-yr SBCFCD	2818.14	2816.60	1.55	0.37	0.05	830.00	47.74
Main	8413.9	2-yr SBCFCD	2817.26	2816.05	1.21	0.42	0.04	510.00	45.53
Main	8113.9	100-yr SBCFCD	2818.68	2816.69	1.99	0.88	0.00	2620.00	58.75
Main	8113.9	100-yr FIS	2818.80	2816.77	2.02			2700.00	59.10
Main	8113.9	50-yr FIS	2816.78	2815.31	1.47	0.96	0.00	1500.00	53.23
Main	8113.9	10-yr FIS	2813.34	2812.90	0.44	1.42	0.00	200.00	43.60
Main	8113.9	10-yr SBCFCD	2816.23	2814.92	1.31	1.00	0.00	1230.00	51.68
Main	8113.9	5-yr SBCFCD	2815.32	2814.28	1.04			830.00	49.10
Main	8113.9	2-yr SBCFCD	2814.44	2813.66	0.78	1.17	0.00	510.00	46.64
Main	7840	100-yr SBCFCD	2816.91	2813.26	3.65	1.59	0.17	2620.00	54.69
Main	7840	100-yr FIS	2817.04	2813.33	3.71	1.58	0.17	2700.00	54.98
Main	7840	50-yr FIS	2814.88	2812.17	2.71	1.77	0.12	1500.00	50.25
Main	7840	10-yr FIS	2811.06	2810.38	0.68	2.26	0.02	200.00	42.97
Main	7840	10-yr SBCFCD	2814.28	2811.87	2.41	1.84	0.11	1230.00	49.02
Main	7840	5-yr SBCFCD	2813.27	2811.38	1.89	1.96	0.09	830.00	47.03
Main	7840	2-yr SBCFCD	2812.29	2810.93	1.36	2.09	0.06	510.00	45.20
Main	7761.1	100-yr SBCFCD	2815.04	2814.87	0.17			2620.00	108.34
Main	7761.1	100-yr FIS	2814.88	2814.69	0.19			2700.00	107.56
Main	7761.1	50-yr FIS	2812.06	2811.92	0.15			1500.00	95.58
Main	7761.1	10-yr FIS	2807.60	2807.55	0.05			200.00	76.71

Main	7761.1	10-yr SBCFCD	2811.51	2811.39	0.12			1230.00	93.27
Main	7761.1	5-yr SBCFCD	2810.24	2810.14	0.10			830.00	87.90
Main	7761.1	2-yr SBCFCD	2809.08	2809.00	0.08			510.00	82.97
Main	7749.9		Culvert						
Main	7738.6	100-yr SBCFCD	2813.41	2813.15	0.26	0.09	0.36	2970.00	110.20
Main	7738.6	100-yr FIS	2813.00	2812.76	0.24	0.09	0.34	2700.00	109.25
Main	7738.6	50-yr FIS	2810.87	2810.71	0.16	0.10	0.24	1500.00	104.33
Main	7738.6	10-yr FIS	2807.29	2807.24	0.05	0.13	0.05	200.00	95.99
Main	7738.6	10-yr SBCFCD	2810.67	2810.51	0.15	0.10	0.23	1400.00	103.85
Main	7738.6	5-yr SBCFCD	2809.60	2809.48	0.12	0.10	0.17	930.00	101.36
Main	7738.6	2-yr SBCFCD	2808.61	2808.53	0.09	0.11	0.12	570.00	99.08
Main	7456.8	100-yr SBCFCD	2812.95	2811.49	1.47	0.29	0.06	2970.00	63.80
Main	7456.8	100-yr FIS	2812.56	2811.18	1.39	0.29	0.06	2700.00	62.55
Main	7456.8	50-yr FIS	2810.54	2809.59	0.95	0.31	0.05	1500.00	56.15
Main	7456.8	10-yr FIS	2807.11	2806.91	0.20	0.35	0.02	200.00	45.30
Main	7456.8	10-yr SBCFCD	2810.34	2809.44	0.90	0.31	0.05	1400.00	55.53
Main	7456.8	5-yr SBCFCD	2809.33	2808.65	0.68	0.32	0.04	930.00	52.32
Main	7456.8	2-yr SBCFCD	2808.39	2807.92	0.47	0.33	0.04	570.00	49.38
Main	7347	100-yr SBCFCD	2812.60	2810.51	2.10	0.03	0.84	2970.00	60.11
Main	7347	100-yr FIS	2812.21	2810.21	2.00	0.03	0.80	2700.00	58.96
Main	7347	50-yr FIS	2810.18	2808.74	1.44	0.03	0.58	1500.00	53.15
Main	7347	10-yr FIS	2806.74	2806.31	0.43	0.04	0.18	200.00	43.59
Main	7347	10-yr SBCFCD	2809.99	2808.60	1.39	0.03	0.56	1400.00	52.60
Main	7347	5-yr SBCFCD	2808.96	2807.87	1.10	0.03	0.45	930.00	49.71
Main	7347	2-yr SBCFCD	2808.02	2807.20	0.82	0.03	0.34	570.00	47.08
Main	7267	100-yr SBCFCD	2811.38	2810.96	0.41			2970.00	70.38
Main	7267	100-yr FIS	2810.76	2810.36	0.40			2700.00	69.55
Main	7267	50-yr FIS	2807.99	2807.71	0.28			1500.00	65.89
Main	7267	10-yr FIS	2805.33	2802.24	3.09	0.61	0.80	200.00	58.34
Main	7267	10-yr SBCFCD	2807.79	2807.53	0.26			1400.00	65.63
Main	7267	5-yr SBCFCD	2806.46	2806.26	0.20			930.00	63.88
Main	7267	2-yr SBCFCD	2805.27	2805.12	0.14			570.00	62.31
Main	7246.1		Culvert						
Main	7231.3	100-yr SBCFCD	2809.70	2808.90	0.80	0.20	0.20	3150.00	69.44
Main	7231.3	100-yr FIS	2809.04	2808.33	0.71	0.20	0.18	2700.00	68.50
Main	7231.3	50-yr FIS	2806.96	2806.51	0.45	0.19	0.13	1500.00	65.48
Main	7231.3	10-yr FIS	2803.42	2803.32	0.10	0.18	0.02	200.00	60.19
Main	7231.3	10-yr SBCFCD	2806.92	2806.47	0.45	0.19	0.13	1480.00	65.42
Main	7231.3	5-yr SBCFCD	2805.85	2805.52	0.33	0.19	0.10	990.00	63.83
Main	7231.3	2-yr SBCFCD	2804.85	2804.62	0.23	0.19	0.07	610.00	62.35
Main	7010.2	100-yr SBCFCD	2809.30	2807.85	1.45	0.33	0.07	3150.00	65.25
Main	7010.2	100-yr FIS	2808.66	2807.35	1.31	0.33	0.07	2700.00	63.20
Main	7010.2	50-yr FIS	2806.64	2805.75	0.89	0.35	0.06	1500.00	56.70
Main	7010.2	10-yr FIS	2803.22	2803.04	0.18	0.40	0.03	200.00	45.66
Main	7010.2	10-yr SBCFCD	2806.60	2805.72	0.88	0.35	0.05	1480.00	56.55

Main	7010.2	5-yr SBCFCD	2805.56	2804.90	0.67	0.36	0.05	990.00	53.21
Main	7010.2	2-yr SBCFCD	2804.60	2804.14	0.46	0.38	0.04	610.00	50.15
Main	6880	100-yr SBCFCD	2808.90	2806.74	2.16	0.03	0.88	3150.00	61.02
Main	6880	100-yr FIS	2808.25	2806.26	1.99	0.03	0.82	2700.00	59.13
Main	6880	50-yr FIS	2806.23	2804.78	1.45	0.02	0.61	1500.00	53.23
Main	6880	10-yr FIS	2802.79	2802.33	0.46	0.03	0.20	200.00	43.50
Main	6880	10-yr SBCFCD	2806.19	2804.76	1.43	0.02	0.61	1480.00	53.15
Main	6880	5-yr SBCFCD	2805.15	2804.02	1.14	0.02	0.49	990.00	50.19
Main	6880	2-yr SBCFCD	2804.19	2803.32	0.86	0.03	0.37	610.00	47.44
Main	6801.6	100-yr SBCFCD	2806.36	2805.97	0.39			3150.00	67.36
Main	6801.6	100-yr FIS	2805.48	2805.13	0.35			2700.00	67.35
Main	6801.6	50-yr FIS	2802.77	2802.55	0.22			1500.00	67.32
Main	6801.6	10-yr FIS	2800.97	2796.83	4.14	0.71	1.10	200.00	67.26
Main	6801.6	10-yr SBCFCD	2802.72	2802.50	0.22			1480.00	67.32
Main	6801.6	5-yr SBCFCD	2801.37	2801.21	0.16			990.00	67.31
Main	6801.6	2-yr SBCFCD	2800.13	2800.02	0.11			610.00	67.30
Main	6785.6		Culvert						
Main	6769.7	100-yr SBCFCD	2804.57	2803.95	0.62	0.03	0.16	3150.00	67.35
Main	6769.7	100-yr FIS	2803.95	2803.41	0.53	0.03	0.14	2700.00	67.34
Main	6769.7	50-yr FIS	2801.89	2801.58	0.31	0.03	0.11	1500.00	67.32
Main	6769.7	10-yr FIS	2798.17	2798.12	0.06	0.02	0.03	200.00	67.28
Main	6769.7	10-yr SBCFCD	2801.84	2801.54	0.30	0.03	0.10	1480.00	67.32
Main	6769.7	5-yr SBCFCD	2800.75	2800.54	0.21	0.02	0.08	990.00	67.31
Main	6769.7	2-yr SBCFCD	2799.72	2799.58	0.14	0.02	0.06	610.00	67.30
Main	6690	100-yr SBCFCD	2804.38	2803.24	1.14	0.17	0.01	3150.00	68.23
Main	6690	100-yr FIS	2803.77	2802.77	1.01	0.16	0.00	2700.00	66.25
Main	6690	50-yr FIS	2801.75	2801.10	0.66	0.14	0.01	1500.00	59.31
Main	6690	10-yr FIS	2798.13	2797.98	0.14	0.11	0.01	200.00	46.38
Main	6690	10-yr SBCFCD	2801.71	2801.06	0.65	0.14	0.01	1480.00	59.17
Main	6690	5-yr SBCFCD	2800.65	2800.16	0.49	0.14	0.01	990.00	55.41
Main	6690	2-yr SBCFCD	2799.64	2799.30	0.34	0.13	0.01	610.00	51.83
Main	6555.8	100-yr SBCFCD	2804.21	2803.05	1.16	0.80	0.08	3150.00	67.20
Main	6555.8	100-yr FIS	2803.61	2802.60	1.01	0.78	0.08	2700.00	65.41
Main	6555.8	50-yr FIS	2801.60	2800.96	0.65	0.74	0.08	1500.00	58.83
Main	6555.8	10-yr FIS	2798.01	2797.88	0.12	0.64	0.03	200.00	46.54
Main	6555.8	10-yr SBCFCD	2801.56	2800.92	0.64	0.74	0.08	1480.00	58.70
Main	6555.8	5-yr SBCFCD	2800.50	2800.03	0.47	0.73	0.07	990.00	55.12
Main	6555.8	2-yr SBCFCD	2799.50	2799.18	0.32	0.71	0.05	610.00	51.71
Main	6400	100-yr SBCFCD	2803.33	2801.39	1.94	0.01	0.90	3150.00	73.31
Main	6400	100-yr FIS	2802.75	2800.89	1.86	0.01	0.87	2700.00	67.13
Main	6400	50-yr FIS	2800.78	2799.32	1.46	0.01	0.69	1500.00	53.26
Main	6400	10-yr FIS	2797.34	2796.90	0.44	0.01	0.21	200.00	43.60
Main	6400	10-yr SBCFCD	2800.74	2799.29	1.45	0.01	0.68	1480.00	53.15
Main	6400	5-yr SBCFCD	2799.70	2798.55	1.16	0.01	0.55	990.00	50.18
Main	6400	2-yr SBCFCD	2798.73	2797.86	0.87	0.01	0.41	610.00	47.46

Main	6344.7	100-yr SBCFCD	2801.61	2801.47	0.14			3150.00	111.78
Main	6344.7	100-yr FIS	2800.67	2800.54	0.13			2700.00	111.70
Main	6344.7	50-yr FIS	2797.85	2797.77	0.08			1500.00	111.48
Main	6344.7	10-yr FIS	2793.54	2793.52	0.02			200.00	111.12
Main	6344.7	10-yr SBCFCD	2797.80	2797.72	0.08			1480.00	111.47
Main	6344.7	5-yr SBCFCD	2796.44	2796.37	0.06			990.00	111.36
Main	6344.7	2-yr SBCFCD	2795.21	2795.17	0.05			610.00	111.26
Main	6328.7		Culvert						
Main	6312.5	100-yr SBCFCD	2797.58	2797.10	0.48	0.19	0.72	3150.00	111.53
Main	6312.5	100-yr FIS	2796.68	2796.15	0.53	0.25	0.62	2700.00	111.43
Main	6312.5	50-yr FIS	2794.67	2793.78	0.90	0.64	0.25	1500.00	111.18
Main	6312.5	10-yr FIS	2792.70	2792.47	0.23	0.90	0.07	200.00	111.05
Main	6312.5	10-yr SBCFCD	2794.65	2793.76	0.89	0.64	0.25	1480.00	111.18
Main	6312.5	5-yr SBCFCD	2794.03	2793.35	0.68	0.69	0.20	990.00	111.14
Main	6312.5	2-yr SBCFCD	2793.47	2792.98	0.49	0.75	0.14	610.00	111.10
Main	6000	100-yr SBCFCD	2796.66	2793.78	2.88	0.72	0.31	3150.00	40.00
Main	6000	100-yr FIS	2795.82	2793.23	2.59	0.82	0.10	2700.00	40.00
Main	6000	50-yr FIS	2793.41	2791.02	2.39	0.81	0.45	1500.00	40.00
Main	6000	10-yr FIS	2790.16	2788.48	1.67	2.11	0.43	200.00	40.00
Main	6000	10-yr SBCFCD	2793.38	2790.98	2.40	0.82	0.45	1480.00	40.00
Main	6000	5-yr SBCFCD	2792.43	2789.97	2.46	1.07	0.53	990.00	40.00
Main	6000	2-yr SBCFCD	2791.56	2789.25	2.31	1.36	0.55	610.00	40.00
Main	5778.8	100-yr SBCFCD	2795.55	2791.52	4.03	1.00	0.11	3150.00	41.19
Main	5778.8	100-yr FIS	2794.71	2791.00	3.70	1.00	0.11	2700.00	39.14
Main	5778.8	50-yr FIS	2791.96	2789.33	2.64	1.43	0.02	1500.00	31.55
Main	5778.8	10-yr FIS	2786.94	2786.31	0.63	0.07	0.13	200.00	25.07
Main	5778.8	10-yr SBCFCD	2791.91	2789.29	2.62	1.45	0.02	1480.00	31.35
Main	5778.8	5-yr SBCFCD	2790.35	2788.53	1.82	1.89	0.19	990.00	28.98
Main	5778.8	2-yr SBCFCD	2788.95	2787.71	1.25	0.06	0.26	610.00	27.53
Main	5742	100-yr SBCFCD	2795.06	2794.35	0.71			3150.00	58.88
Main	5742	100-yr FIS	2793.94	2793.24	0.70			2700.00	56.11
Main	5742	50-yr FIS	2790.86	2790.30	0.56			1500.00	47.83
Main	5742	10-yr FIS	2786.42	2786.24	0.18			200.00	47.00
Main	5742	10-yr SBCFCD	2790.80	2790.24	0.56			1480.00	47.68
Main	5742	5-yr SBCFCD	2789.78	2786.44	3.34	0.42	0.15	990.00	47.00
Main	5742	2-yr SBCFCD	2788.43	2786.05	2.38	0.42	0.11	610.00	47.00
Main	5679.8		Culvert						
Main	5609.6	100-yr SBCFCD	2794.35	2793.55	0.80	0.02	0.63	3150.00	46.00
Main	5609.6	100-yr FIS	2793.45	2792.75	0.70	0.02	0.61	2700.00	46.00
Main	5609.6	50-yr FIS	2790.48	2790.03	0.45	0.02	0.48	1500.00	46.00
Main	5609.6	10-yr FIS	2785.43	2785.24	0.19	0.04	0.12	200.00	46.00
Main	5609.6	10-yr SBCFCD	2790.43	2789.97	0.45	0.02	0.48	1480.00	46.00
Main	5609.6	5-yr SBCFCD	2787.65	2786.43	1.21			990.00	46.00
Main	5609.6	2-yr SBCFCD	2786.64	2785.77	0.87			610.00	46.00
Main	5581.3	100-yr SBCFCD	2793.70	2790.79	2.91	0.09	0.32	3150.00	39.35

Main	5581.3	100-yr FIS	2792.82	2790.10	2.72	0.11	0.16		2700.00		36.99
Main	5581.3	50-yr FIS	2789.98	2787.92	2.06	0.13	0.13		1500.00		31.06
Main	5581.3	10-yr FIS	2785.27	2784.69	0.58	0.18	0.02		200.00		30.02
Main	5581.3	10-yr SBCFCD	2789.93	2787.87	2.05	0.13	0.13		1480.00		31.00
Main	5581.3	5-yr SBCFCD	2788.45	2786.85	1.60	0.13	0.09		990.00		30.03
Main	5581.3	2-yr SBCFCD	2787.11	2785.95	1.16	0.14	0.05		610.00		30.02
Main	5515.3	100-yr SBCFCD	2793.17	2787.05	6.13	0.20	0.32		3150.00		46.69
Main	5515.3	100-yr FIS	2792.32	2786.68	5.64	0.21	0.29		2700.00		45.36
Main	5515.3	50-yr FIS	2789.56	2785.57	3.99	0.23	0.19		1500.00		41.31
Main	5515.3	10-yr FIS	2784.89	2783.70	1.19	0.32	0.06		200.00		34.15
Main	5515.3	10-yr SBCFCD	2789.51	2785.55	3.96	0.23	0.19		1480.00		41.23
Main	5515.3	5-yr SBCFCD	2788.07	2784.99	3.07	0.24	0.15		990.00		39.16
Main	5515.3	2-yr SBCFCD	2786.74	2784.47	2.27	0.25	0.11		610.00		37.17
Main	5135	100-yr SBCFCD	2792.90	2786.70	6.20	0.26	0.01	175.02	2799.96	175.02	43.46
Main	5135	100-yr FIS	2792.03	2786.26	5.78	0.28	0.01	136.74	2426.52	136.74	42.13
Main	5135	50-yr FIS	2789.22	2784.94	4.28	0.32	0.03	53.01	1393.98	53.01	38.19
Main	5135	10-yr FIS	2784.31	2782.89	1.42	0.55	0.02	1.86	196.29	1.86	32.04
Main	5135	10-yr SBCFCD	2789.17	2784.91	4.25	0.32	0.03	51.85	1376.31	51.85	38.11
Main	5135	5-yr SBCFCD	2787.69	2784.28	3.41	0.35	0.03	26.94	936.12	26.94	36.20
Main	5135	2-yr SBCFCD	2786.31	2783.69	2.62	0.39	0.04	12.09	585.81	12.09	34.45
Main	4875	100-yr SBCFCD	2791.42	2783.87	7.55	1.35	0.13	162.08	2825.83	162.08	42.35
Main	4875	100-yr FIS	2790.48	2783.46	7.03	1.43	0.12	126.45	2447.10	126.45	41.13
Main	4875	50-yr FIS	2787.40	2782.26	5.14	1.74	0.09	49.04	1401.91	49.04	37.53
Main	4875	10-yr FIS	2781.65	2780.50	1.15	2.58	0.08	2.06	195.89	2.06	32.26
Main	4875	10-yr SBCFCD	2787.34	2782.24	5.10	1.75	0.08	47.99	1384.03	47.99	37.47
Main	4875	5-yr SBCFCD	2785.67	2781.67	4.00	1.96	0.06	25.09	939.82	25.09	35.75
Main	4875	2-yr SBCFCD	2784.06	2781.16	2.90	2.22	0.03	11.55	586.90	11.55	34.24
Main	4635	100-yr SBCFCD	2789.76	2781.38	8.38	1.58	0.08	155.56	2838.88	155.56	41.80
Main	4635	100-yr FIS	2788.75	2781.00	7.75	1.67	0.07	121.52	2456.96	121.52	40.65
Main	4635	50-yr FIS	2785.39	2779.88	5.51	1.97	0.04	47.57	1404.87	47.57	37.29
Main	4635	10-yr FIS	2779.44	2778.17	1.28	2.19	0.01	1.95	196.09	1.95	32.15
Main	4635	10-yr SBCFCD	2785.33	2779.86	5.47	1.98	0.04	46.55	1386.90	46.55	37.23
Main	4635	5-yr SBCFCD	2783.51	2779.33	4.18	2.14	0.02	24.61	940.78	24.61	35.63
Main	4635	2-yr SBCFCD	2781.80	2778.85	2.95	2.25	0.01	11.46	587.08	11.46	34.20
Main	4385	100-yr SBCFCD	2787.82	2778.87	8.95	1.88	0.06	151.49	2847.03	151.49	41.46
Main	4385	100-yr FIS	2786.74	2778.51	8.23	1.97	0.05	118.58	2462.84	118.58	40.37
Main	4385	50-yr FIS	2783.14	2777.45	5.69	2.23	0.02	46.91	1406.18	46.91	37.18
Main	4385	10-yr FIS	2777.01	2775.78	1.23	2.42	0.01	1.99	196.02	1.99	32.19
Main	4385	10-yr SBCFCD	2783.07	2777.43	5.64	2.24	0.02	45.92	1388.15	45.92	37.12
Main	4385	5-yr SBCFCD	2781.17	2776.91	4.25	2.34	0.01	24.43	941.14	24.43	35.59
Main	4385	2-yr SBCFCD	2779.41	2776.45	2.96	2.39	0.00	11.44	587.13	11.44	34.19
Main	4135	100-yr SBCFCD	2785.74	2776.40	9.34	2.05	0.04	148.93	2852.13	148.93	41.24
Main	4135	100-yr FIS	2784.58	2776.05	8.53	2.12	0.03	116.87	2466.26	116.87	40.20
Main	4135	50-yr FIS	2780.81	2775.03	5.78	2.32	0.01	46.59	1406.81	46.59	37.13
Main	4135	10-yr FIS	2774.63	2773.37	1.26	2.39	0.00	1.97	196.06	1.97	32.17
Main	4135	10-yr SBCFCD	2780.74	2775.01	5.73	2.32	0.01	45.62	1388.76	45.62	37.07
Main	4135	5-yr SBCFCD	2778.79	2774.51	4.28	2.38	0.00	24.36	941.29	24.36	35.57

Main	4135	2-yr SBCFCD	2777.01	2774.05	2.97	2.40	0.00	11.43	587.13	11.43	34.19
Main	3969.6	100-yr SBCFCD	2782.85	2775.17	7.68	2.39	0.50		3380.00		42.88
Main	3969.6	100-yr FIS	2781.59	2774.57	7.01	2.54	0.45		2700.00		41.05
Main	3969.6	50-yr FIS	2777.93	2773.65	4.28	2.43	0.45		1500.00		38.20
Main	3969.6	10-yr FIS	2772.65	2771.94	0.71	1.82	0.16		200.00		32.94
Main	3969.6	10-yr SBCFCD	2778.00	2773.84	4.16	2.27	0.47		1600.00		38.79
Main	3969.6	5-yr SBCFCD	2776.25	2773.32	2.93	2.15	0.41		1070.00		37.19
Main	3969.6	2-yr SBCFCD	2774.70	2772.79	1.91	2.01	0.32		650.00		35.56
Main	3835	100-yr SBCFCD	2781.93	2774.08	7.85	0.90	0.02	181.03	3017.94	181.03	42.92
Main	3835	100-yr FIS	2780.59	2773.45	7.13	0.99	0.01	125.67	2448.67	125.67	41.05
Main	3835	50-yr FIS	2777.00	2772.42	4.58	0.91	0.03	51.51	1396.97	51.51	37.94
Main	3835	10-yr FIS	2771.76	2770.49	1.28	0.82	0.06	1.95	196.09	1.95	32.15
Main	3835	10-yr SBCFCD	2777.13	2772.59	4.54	0.82	0.04	58.25	1483.51	58.25	38.45
Main	3835	5-yr SBCFCD	2775.40	2771.99	3.41	0.79	0.05	31.17	1007.67	31.17	36.66
Main	3835	2-yr SBCFCD	2773.87	2771.39	2.48	0.77	0.06	14.01	621.98	14.01	34.85
Main	3600.*	100-yr SBCFCD	2778.00	2768.60	9.40	3.77	0.15		3380.00		64.47
Main	3600.*	100-yr FIS	2776.38	2768.30	8.08	4.11	0.09		2700.00		62.67
Main	3600.*	50-yr FIS	2772.91	2767.70	5.21	4.02	0.06		1500.00		59.05
Main	3600.*	10-yr FIS	2767.46	2767.27	0.19	0.01	0.00		200.00		56.45
Main	3600.*	10-yr SBCFCD	2773.28	2767.75	5.53	3.75	0.10		1600.00		59.35
Main	3600.*	5-yr SBCFCD	2771.52	2767.43	4.10	3.81	0.07		1070.00		57.40
Main	3600.*	2-yr SBCFCD	2769.81	2767.14	2.67	4.04	0.02		650.00		55.65
Main	3598	100-yr SBCFCD	2777.63	2768.65	8.98	0.24	0.12		3380.00		64.76
Main	3598	100-yr FIS	2776.02	2768.35	7.67	0.24	0.12		2700.00		62.97
Main	3598	50-yr FIS	2772.57	2767.76	4.81	0.23	0.12		1500.00		59.39
Main	3598	10-yr FIS	2767.45	2767.25	0.20	0.00	0.06		200.00		56.34
Main	3598	10-yr SBCFCD	2772.93	2767.81	5.12	0.23	0.12		1600.00		59.69
Main	3598	5-yr SBCFCD	2771.18	2767.49	3.70	0.23	0.12		1070.00		57.76
Main	3598	2-yr SBCFCD	2769.51	2767.21	2.30	0.20	0.11		650.00		56.07
Main	3583	100-yr SBCFCD	2773.04	2772.86	0.18	0.00	0.00		3380.00		120.15
Main	3583	100-yr FIS	2772.20	2772.06	0.14	0.00	0.00		2700.00		115.35
Main	3583	50-yr FIS	2770.43	2770.36	0.07	0.00	0.00		1500.00		105.10
Main	3583	10-yr FIS	2767.39	2767.39	0.00	0.00	0.00		200.00		87.22
Main	3583	10-yr SBCFCD	2770.60	2770.52	0.08	0.00	0.00		1600.00		106.08
Main	3583	5-yr SBCFCD	2769.64	2769.60	0.04	0.00	0.00		1070.00		100.51
Main	3583	2-yr SBCFCD	2768.73	2768.70	0.02	0.00	0.00		650.00		95.14
Main	3581	100-yr SBCFCD	2773.04	2772.86	0.18	0.02	0.17		3380.00		120.15
Main	3581	100-yr FIS	2772.20	2772.06	0.14	0.01	0.16		2700.00		115.34
Main	3581	50-yr FIS	2770.43	2770.36	0.07	0.01	0.12		1500.00		105.10
Main	3581	10-yr FIS	2767.39	2767.39	0.00	0.00	0.04		200.00		87.22
Main	3581	10-yr SBCFCD	2770.60	2770.52	0.08	0.01	0.12		1600.00		106.08
Main	3581	5-yr SBCFCD	2769.64	2769.60	0.04	0.01	0.10		1070.00		100.51
Main	3581	2-yr SBCFCD	2768.73	2768.70	0.02	0.00	0.07		650.00		95.14
Main	3566	100-yr SBCFCD	2772.85	2770.93	1.92	0.46	0.02		3380.00		78.51
Main	3566	100-yr FIS	2772.03	2770.33	1.70	0.47	0.03		2700.00		74.90
Main	3566	50-yr FIS	2770.30	2769.08	1.23	0.52	0.03		1500.00		67.34

Main	3566	10-yr FIS	2767.35	2766.98	0.37	0.78	0.01	200.00	54.71
Main	3566	10-yr SBCFCD	2770.47	2769.19	1.28	0.52	0.03	1600.00	68.00
Main	3566	5-yr SBCFCD	2769.54	2768.52	1.02	0.56	0.03	1070.00	63.96
Main	3566	2-yr SBCFCD	2768.65	2767.88	0.77	0.61	0.03	650.00	60.11
Main	3520.3	100-yr SBCFCD	2771.90	2768.11	3.79	0.76	0.19	3380.00	78.36
Main	3520.3	100-yr FIS	2771.06	2767.68	3.38	0.80	0.17	2700.00	76.75
Main	3520.3	50-yr FIS	2769.27	2766.84	2.44	0.91	0.12	1500.00	73.21
Main	3520.3	10-yr FIS	2766.15	2765.57	0.58	1.18	0.02	200.00	61.61
Main	3520.3	10-yr SBCFCD	2769.44	2766.92	2.52	0.90	0.12	1600.00	73.69
Main	3520.3	5-yr SBCFCD	2768.46	2766.50	1.97	0.97	0.09	1070.00	71.10
Main	3520.3	2-yr SBCFCD	2767.52	2766.11	1.41	1.06	0.06	650.00	68.73
Main	3450.*	100-yr SBCFCD	2769.62	2768.60	1.02	0.01	0.00	3380.00	86.59
Main	3450.*	100-yr FIS	2768.76	2767.85	0.91	0.01	0.00	2700.00	82.12
Main	3450.*	50-yr FIS	2766.92	2766.27	0.65	0.01	0.00	1500.00	72.61
Main	3450.*	10-yr FIS	2763.76	2763.57	0.19	0.01	0.00	200.00	56.42
Main	3450.*	10-yr SBCFCD	2767.10	2766.42	0.68	0.01	0.00	1600.00	73.53
Main	3450.*	5-yr SBCFCD	2766.11	2765.57	0.54	0.01	0.00	1070.00	68.44
Main	3450.*	2-yr SBCFCD	2765.16	2764.76	0.40	0.01	0.00	650.00	63.55
Main	3448	100-yr SBCFCD	2769.62	2768.59	1.03	0.01	0.25	3380.00	86.53
Main	3448	100-yr FIS	2768.75	2767.84	0.91	0.01	0.23	2700.00	82.06
Main	3448	50-yr FIS	2766.92	2766.26	0.66	0.01	0.18	1500.00	72.55
Main	3448	10-yr FIS	2763.75	2763.55	0.20	0.00	0.06	200.00	56.31
Main	3448	10-yr SBCFCD	2767.09	2766.41	0.68	0.01	0.18	1600.00	73.46
Main	3448	5-yr SBCFCD	2766.10	2765.56	0.54	0.01	0.15	1070.00	68.35
Main	3448	2-yr SBCFCD	2765.15	2764.74	0.41	0.00	0.11	650.00	63.45
Main	3433	100-yr SBCFCD	2769.35	2769.17	0.18	0.00	0.00	3380.00	119.99
Main	3433	100-yr FIS	2768.51	2768.37	0.14	0.00	0.00	2700.00	115.21
Main	3433	50-yr FIS	2766.73	2766.66	0.07	0.00	0.00	1500.00	104.97
Main	3433	10-yr FIS	2763.69	2763.69	0.00	0.00	0.00	200.00	87.12
Main	3433	10-yr SBCFCD	2766.90	2766.82	0.08	0.00	0.00	1600.00	105.95
Main	3433	5-yr SBCFCD	2765.94	2765.90	0.04	0.00	0.00	1070.00	100.40
Main	3433	2-yr SBCFCD	2765.03	2765.00	0.02	0.00	0.00	650.00	95.02
Main	3431	100-yr SBCFCD	2769.35	2769.17	0.18	0.02	0.17	3380.00	119.99
Main	3431	100-yr FIS	2768.51	2768.37	0.14	0.01	0.16	2700.00	115.20
Main	3431	50-yr FIS	2766.73	2766.66	0.07	0.01	0.12	1500.00	104.97
Main	3431	10-yr FIS	2763.69	2763.69	0.00	0.00	0.04	200.00	87.12
Main	3431	10-yr SBCFCD	2766.90	2766.82	0.08	0.01	0.12	1600.00	105.94
Main	3431	5-yr SBCFCD	2765.94	2765.90	0.04	0.01	0.10	1070.00	100.40
Main	3431	2-yr SBCFCD	2765.03	2765.00	0.02	0.00	0.07	650.00	95.02
Main	3416	100-yr SBCFCD	2769.15	2767.23	1.92	0.80	0.27	3380.00	78.40
Main	3416	100-yr FIS	2768.34	2766.62	1.72	0.84	0.24	2700.00	74.70
Main	3416	50-yr FIS	2766.61	2765.37	1.23	0.90	0.17	1500.00	67.23
Main	3416	10-yr FIS	2763.65	2763.28	0.37	1.26	0.05	200.00	54.67
Main	3416	10-yr SBCFCD	2766.77	2765.49	1.28	0.89	0.18	1600.00	67.93
Main	3416	5-yr SBCFCD	2765.84	2764.81	1.03	0.95	0.15	1070.00	63.83
Main	3416	2-yr SBCFCD	2764.95	2764.18	0.77	1.03	0.11	650.00	60.07

Main	3300	100-yr SBCFCD	2766.14	2760.13	6.01	2.62	0.41	3380.00	66.74
Main	3300	100-yr FIS	2765.18	2759.70	5.48	2.78	0.38	2700.00	64.40
Main	3300	50-yr FIS	2763.11	2758.84	4.27	3.19	0.30	1500.00	59.74
Main	3300	10-yr FIS	2758.82	2757.65	1.17	4.75	0.08	200.00	52.93
Main	3300	10-yr SBCFCD	2763.32	2758.92	4.39	3.14	0.31	1600.00	60.18
Main	3300	5-yr SBCFCD	2762.09	2758.50	3.59	3.49	0.26	1070.00	57.80
Main	3300	2-yr SBCFCD	2760.85	2758.13	2.73	3.89	0.20	650.00	55.65
Main	3298	100-yr SBCFCD	2765.94	2760.18	5.76	0.12	0.08	3380.00	67.07
Main	3298	100-yr FIS	2764.97	2759.76	5.21	0.13	0.08	2700.00	64.70
Main	3298	50-yr FIS	2762.85	2758.90	3.95	0.17	0.10	1500.00	60.08
Main	3298	10-yr FIS	2758.53	2757.74	0.78	0.18	0.12	200.00	53.48
Main	3298	10-yr SBCFCD	2763.06	2758.98	4.08	0.16	0.10	1600.00	60.52
Main	3298	5-yr SBCFCD	2761.81	2758.57	3.24	0.18	0.10	1070.00	58.16
Main	3298	2-yr SBCFCD	2760.54	2758.19	2.35	0.21	0.11	650.00	56.05
Main	3283	100-yr SBCFCD	2764.06	2763.88	0.18	0.00	0.00	3380.00	120.31
Main	3283	100-yr FIS	2763.22	2763.08	0.14	0.00	0.00	2700.00	115.51
Main	3283	50-yr FIS	2761.44	2761.37	0.07	0.00	0.00	1500.00	105.27
Main	3283	10-yr FIS	2758.39	2758.38	0.00	0.00	0.00	200.00	87.40
Main	3283	10-yr SBCFCD	2761.61	2761.53	0.07	0.00	0.00	1600.00	106.26
Main	3283	5-yr SBCFCD	2760.64	2760.60	0.04	0.00	0.00	1070.00	100.67
Main	3283	2-yr SBCFCD	2759.72	2759.70	0.02	0.00	0.00	650.00	95.29
Main	3281	100-yr SBCFCD	2764.06	2763.88	0.18	0.02	0.17	3380.00	120.30
Main	3281	100-yr FIS	2763.22	2763.08	0.14	0.01	0.16	2700.00	115.51
Main	3281	50-yr FIS	2761.44	2761.37	0.07	0.01	0.12	1500.00	105.27
Main	3281	10-yr FIS	2758.39	2758.38	0.00	0.00	0.03	200.00	87.40
Main	3281	10-yr SBCFCD	2761.61	2761.53	0.07	0.01	0.12	1600.00	106.26
Main	3281	5-yr SBCFCD	2760.64	2760.60	0.04	0.01	0.10	1070.00	100.67
Main	3281	2-yr SBCFCD	2759.72	2759.70	0.02	0.00	0.07	650.00	95.29
Main	3266	100-yr SBCFCD	2763.87	2761.95	1.92	1.86	0.29	3380.00	78.29
Main	3266	100-yr FIS	2763.05	2761.34	1.71	1.91	0.26	2700.00	74.54
Main	3266	50-yr FIS	2761.31	2760.07	1.24	2.08	0.19	1500.00	66.66
Main	3266	10-yr FIS	2758.35	2758.01	0.34	2.76	0.05	200.00	54.99
Main	3266	10-yr SBCFCD	2761.47	2760.17	1.31	2.08	0.20	1600.00	67.28
Main	3266	5-yr SBCFCD	2760.54	2759.51	1.03	2.19	0.16	1070.00	63.47
Main	3266	2-yr SBCFCD	2759.64	2758.89	0.76	2.36	0.12	650.00	59.96
Main	3000	100-yr SBCFCD	2760.97	2760.00	0.97	0.01	0.00	3380.00	93.99
Main	3000	100-yr FIS	2760.16	2759.31	0.85	0.01	0.00	2700.00	89.62
Main	3000	50-yr FIS	2758.44	2757.84	0.61	0.01	0.00	1500.00	80.30
Main	3000	10-yr FIS	2755.53	2755.36	0.17	0.01	0.00	200.00	65.35
Main	3000	10-yr SBCFCD	2758.60	2757.97	0.63	0.01	0.00	1600.00	81.16
Main	3000	5-yr SBCFCD	2757.68	2757.19	0.50	0.01	0.00	1070.00	76.19
Main	3000	2-yr SBCFCD	2756.80	2756.43	0.37	0.01	0.00	650.00	71.41
Main	2998	100-yr SBCFCD	2760.96	2759.99	0.97	0.01	0.24	3380.00	93.93
Main	2998	100-yr FIS	2760.15	2759.30	0.85	0.01	0.22	2700.00	89.55
Main	2998	50-yr FIS	2758.44	2757.82	0.61	0.01	0.17	1500.00	80.21
Main	2998	10-yr FIS	2755.52	2755.34	0.18	0.00	0.05	200.00	65.25
Main	2998	10-yr SBCFCD	2758.60	2757.96	0.64	0.01	0.17	1600.00	81.09

Main	2998	5-yr SBCFCD	2757.68	2757.17	0.50	0.01	0.14		1070.00		76.09
Main	2998	2-yr SBCFCD	2756.79	2756.42	0.38	0.00	0.11		650.00		71.31
Main	2983	100-yr SBCFCD	2760.70	2760.54	0.16	0.00	0.00		3380.00		127.20
Main	2983	100-yr FIS	2759.92	2759.80	0.13	0.00	0.00		2700.00		122.71
Main	2983	50-yr FIS	2758.26	2758.20	0.06	0.00	0.00		1500.00		113.09
Main	2983	10-yr FIS	2755.46	2755.46	0.00	0.00	0.00		200.00		96.56
Main	2983	10-yr SBCFCD	2758.42	2758.35	0.07	0.00	0.00		1600.00		114.00
Main	2983	5-yr SBCFCD	2757.53	2757.49	0.04	0.00	0.00		1070.00		108.80
Main	2983	2-yr SBCFCD	2756.68	2756.66	0.02	0.00	0.00		650.00		103.81
Main	2981	100-yr SBCFCD	2760.70	2760.54	0.16	0.02	0.16		3380.00		127.19
Main	2981	100-yr FIS	2759.92	2759.80	0.13	0.01	0.15		2700.00		122.70
Main	2981	50-yr FIS	2758.26	2758.20	0.06	0.01	0.11		1500.00		113.08
Main	2981	10-yr FIS	2755.46	2755.46	0.00	0.00	0.03		200.00		96.56
Main	2981	10-yr SBCFCD	2758.42	2758.35	0.07	0.01	0.11		1600.00		114.00
Main	2981	5-yr SBCFCD	2757.53	2757.49	0.04	0.01	0.09		1070.00		108.80
Main	2981	2-yr SBCFCD	2756.68	2756.66	0.02	0.00	0.07		650.00		103.81
Main	2966	100-yr SBCFCD	2760.53	2758.80	1.73	0.23	0.02		3380.00		86.37
Main	2966	100-yr FIS	2759.76	2758.14	1.62	0.25	0.01		2700.00		82.20
Main	2966	50-yr FIS	2758.14	2756.98	1.17	0.25	0.02		1500.00		74.86
Main	2966	10-yr FIS	2755.43	2755.09	0.34	0.29	0.03		200.00		63.87
Main	2966	10-yr SBCFCD	2758.29	2757.09	1.21	0.25	0.02		1600.00		75.55
Main	2966	5-yr SBCFCD	2757.43	2756.47	0.96	0.27	0.02		1070.00		71.67
Main	2966	2-yr SBCFCD	2756.61	2755.90	0.71	0.28	0.03		650.00		68.14
Main	2942.6	100-yr SBCFCD	2760.29	2758.33	1.96	1.81	0.01		3380.00		77.16
Main	2942.6	100-yr FIS	2759.47	2757.62	1.85	0.26	0.02		2700.00		74.60
Main	2942.6	50-yr FIS	2757.80	2756.36	1.44	0.32	0.03		1500.00		70.35
Main	2942.6	10-yr FIS	2755.05	2754.82	0.24	2.00	0.00		200.00		64.88
Main	2942.6	10-yr SBCFCD	2757.96	2756.46	1.50	0.31	0.03		1600.00		70.71
Main	2942.6	5-yr SBCFCD	2757.07	2755.88	1.19	0.34	0.02		1070.00		68.75
Main	2942.6	2-yr SBCFCD	2756.22	2755.37	0.85	0.38	0.01		650.00		67.02
Main	2730.8	100-yr SBCFCD	2758.38	2756.22	2.15	1.90	0.02	2.77	3373.16	4.07	76.01
Main	2730.8	100-yr FIS	2757.53	2755.68	1.84	2.00	0.03	0.60	2698.52	0.88	74.15
Main	2730.8	50-yr FIS	2755.81	2754.59	1.22				1500.00		70.31
Main	2730.8	10-yr FIS	2753.05	2752.77	0.27	0.22	0.04		200.00		63.39
Main	2730.8	10-yr SBCFCD	2755.97	2754.70	1.27				1600.00		70.70
Main	2730.8	5-yr SBCFCD	2755.08	2754.16	0.91	0.21	0.14		1070.00		68.73
Main	2730.8	2-yr SBCFCD	2754.24	2753.61	0.63	0.21	0.10		650.00		66.67
Main	2700.*	100-yr SBCFCD	2757.77	2756.86	0.91	0.01	0.00		3380.00		101.07
Main	2700.*	100-yr FIS	2757.00	2756.20	0.80	0.01	0.00		2700.00		97.11
Main	2700.*	50-yr FIS	2755.40	2754.83	0.56	0.01	0.00		1500.00		88.88
Main	2700.*	10-yr FIS	2752.78	2752.65	0.13	0.01	0.00		200.00		75.72
Main	2700.*	10-yr SBCFCD	2755.54	2754.96	0.59	0.01	0.00		1600.00		89.62
Main	2700.*	5-yr SBCFCD	2754.72	2754.28	0.44	0.01	0.00		1070.00		85.56
Main	2700.*	2-yr SBCFCD	2753.93	2753.62	0.31	0.01	0.00		650.00		81.58
Main	2698	100-yr SBCFCD	2757.76	2756.84	0.92	0.01	0.23		3380.00		101.01
Main	2698	100-yr FIS	2756.99	2756.19	0.81	0.01	0.21		2700.00		97.05

Main	2698	50-yr FIS	2755.39	2754.82	0.57	0.01	0.16	1500.00	88.79
Main	2698	10-yr FIS	2752.77	2752.64	0.13	0.00	0.04	200.00	75.64
Main	2698	10-yr SBCFCD	2755.54	2754.94	0.59	0.01	0.16	1600.00	89.54
Main	2698	5-yr SBCFCD	2754.71	2754.27	0.45	0.00	0.12	1070.00	85.47
Main	2698	2-yr SBCFCD	2753.92	2753.61	0.31	0.00	0.09	650.00	81.50
Main	2683	100-yr SBCFCD	2757.52	2757.37	0.15	0.00	0.00	3380.00	134.19
Main	2683	100-yr FIS	2756.77	2756.66	0.11	0.00	0.00	2700.00	129.92
Main	2683	50-yr FIS	2755.23	2755.17	0.05	0.00	0.00	1500.00	120.97
Main	2683	10-yr FIS	2752.73	2752.73	0.00	0.00	0.00	200.00	106.26
Main	2683	10-yr SBCFCD	2755.37	2755.31	0.06	0.00	0.00	1600.00	121.79
Main	2683	5-yr SBCFCD	2754.58	2754.55	0.03	0.00	0.00	1070.00	117.23
Main	2683	2-yr SBCFCD	2753.83	2753.81	0.02	0.00	0.00	650.00	112.78
Main	2681	100-yr SBCFCD	2757.52	2757.37	0.15	0.01	0.16	3380.00	134.18
Main	2681	100-yr FIS	2756.77	2756.66	0.11	0.01	0.14	2700.00	129.92
Main	2681	50-yr FIS	2755.23	2755.17	0.05	0.01	0.09	1500.00	120.97
Main	2681	10-yr FIS	2752.73	2752.73	0.00	0.00	0.02	200.00	106.26
Main	2681	10-yr SBCFCD	2755.37	2755.31	0.06	0.01	0.09	1600.00	121.79
Main	2681	5-yr SBCFCD	2754.58	2754.55	0.03	0.01	0.06	1070.00	117.23
Main	2681	2-yr SBCFCD	2753.83	2753.81	0.02	0.00	0.04	650.00	112.78
Main	2666	100-yr SBCFCD	2757.34	2755.62	1.73	1.12	0.19	3380.00	93.62
Main	2666	100-yr FIS	2756.62	2755.10	1.52	1.24	0.15	2700.00	90.52
Main	2666	50-yr FIS	2755.13	2754.20	0.93	1.54	0.00	1500.00	85.07
Main	2666	10-yr FIS	2752.71	2752.55	0.16	1.59	0.02	200.00	75.12
Main	2666	10-yr SBCFCD	2755.27	2754.27	1.00	1.52	0.02	1600.00	85.48
Main	2666	5-yr SBCFCD	2754.52	2753.88	0.64	1.54	0.02	1070.00	83.14
Main	2666	2-yr SBCFCD	2753.78	2753.36	0.42	1.52	0.02	650.00	80.01
Main	2513.9	100-yr SBCFCD	2755.82	2754.74	1.08	0.54	0.03	3380.00	106.83
Main	2513.9	100-yr FIS	2755.07	2754.05	1.02	0.59	0.05	2700.00	102.80
Main	2513.9	50-yr FIS	2753.58	2752.67	0.91	0.77	0.09	1500.00	94.57
Main	2513.9	10-yr FIS	2751.11	2750.76	0.35	1.13	0.05	200.00	61.18
Main	2513.9	10-yr SBCFCD	2753.72	2752.79	0.92	0.75	0.09	1600.00	95.63
Main	2513.9	5-yr SBCFCD	2752.96	2752.14	0.82	0.86	0.10	1070.00	90.17
Main	2513.9	2-yr SBCFCD	2752.25	2751.62	0.63	0.92	0.08	650.00	79.67
Main	2400.*	100-yr SBCFCD	2755.24	2754.27	0.97	0.01	0.00	3380.00	93.59
Main	2400.*	100-yr FIS	2754.43	2753.58	0.85	0.01	0.00	2700.00	89.39
Main	2400.*	50-yr FIS	2752.72	2752.11	0.61	0.01	0.00	1500.00	80.57
Main	2400.*	10-yr FIS	2749.83	2749.66	0.17	0.01	0.00	200.00	65.76
Main	2400.*	10-yr SBCFCD	2752.88	2752.25	0.63	0.01	0.00	1600.00	81.41
Main	2400.*	5-yr SBCFCD	2751.97	2751.47	0.50	0.01	0.00	1070.00	76.69
Main	2400.*	2-yr SBCFCD	2751.09	2750.72	0.37	0.01	0.00	650.00	72.20
Main	2398	100-yr SBCFCD	2755.24	2754.26	0.97	0.01	0.24	3380.00	93.53
Main	2398	100-yr FIS	2754.42	2753.57	0.86	0.01	0.22	2700.00	89.33
Main	2398	50-yr FIS	2752.71	2752.10	0.61	0.01	0.17	1500.00	80.48
Main	2398	10-yr FIS	2749.82	2749.64	0.18	0.00	0.05	200.00	65.64
Main	2398	10-yr SBCFCD	2752.87	2752.24	0.64	0.01	0.17	1600.00	81.33
Main	2398	5-yr SBCFCD	2751.96	2751.46	0.50	0.01	0.14	1070.00	76.61
Main	2398	2-yr SBCFCD	2751.08	2750.71	0.37	0.00	0.11	650.00	72.10

Main	2383	100-yr SBCFCD	2754.98	2754.82	0.16	0.00	0.00	3380.00	126.93
Main	2383	100-yr FIS	2754.19	2754.07	0.13	0.00	0.00	2700.00	122.45
Main	2383	50-yr FIS	2752.54	2752.48	0.06	0.00	0.00	1500.00	112.95
Main	2383	10-yr FIS	2749.76	2749.76	0.00	0.00	0.00	200.00	96.55
Main	2383	10-yr SBCFCD	2752.70	2752.63	0.07	0.00	0.00	1600.00	113.87
Main	2383	5-yr SBCFCD	2751.81	2751.77	0.04	0.00	0.00	1070.00	108.70
Main	2383	2-yr SBCFCD	2750.97	2750.95	0.02	0.00	0.00	650.00	103.75
Main	2381	100-yr SBCFCD	2754.98	2754.81	0.16	0.02	0.16	3380.00	126.92
Main	2381	100-yr FIS	2754.19	2754.06	0.13	0.01	0.15	2700.00	122.45
Main	2381	50-yr FIS	2752.54	2752.48	0.06	0.01	0.11	1500.00	112.95
Main	2381	10-yr FIS	2749.76	2749.76	0.00	0.00	0.03	200.00	96.55
Main	2381	10-yr SBCFCD	2752.69	2752.63	0.07	0.01	0.11	1600.00	113.86
Main	2381	5-yr SBCFCD	2751.81	2751.77	0.04	0.01	0.09	1070.00	108.70
Main	2381	2-yr SBCFCD	2750.97	2750.95	0.02	0.00	0.07	650.00	103.75
Main	2366	100-yr SBCFCD	2754.80	2753.00	1.80	0.77	0.17	3380.00	86.04
Main	2366	100-yr FIS	2754.03	2752.44	1.59	0.84	0.13	2700.00	82.65
Main	2366	50-yr FIS	2752.42	2751.29	1.13	1.11	0.03	1500.00	75.67
Main	2366	10-yr FIS	2749.73	2749.42	0.31	1.72	0.00	200.00	64.36
Main	2366	10-yr SBCFCD	2752.57	2751.38	1.19	1.08	0.05	1600.00	76.24
Main	2366	5-yr SBCFCD	2751.72	2750.78	0.93	1.31	0.00	1070.00	72.61
Main	2366	2-yr SBCFCD	2750.90	2750.21	0.69	1.42	0.00	650.00	69.12
Main	2260.4	100-yr SBCFCD	2753.24	2752.01	1.23	0.26	0.12	3380.00	91.56
Main	2260.4	100-yr FIS	2752.48	2750.13	2.35	1.47	0.08	2700.00	79.30
Main	2260.4	50-yr FIS	2750.79	2749.19	1.60	1.58	0.05	1500.00	73.16
Main	2260.4	10-yr FIS	2748.01	2747.68	0.33	0.58	0.05	200.00	65.30
Main	2260.4	10-yr SBCFCD	2750.95	2749.29	1.66	1.57	0.05	1600.00	73.78
Main	2260.4	5-yr SBCFCD	2750.05	2748.79	1.26	1.63	0.03	1070.00	70.87
Main	2260.4	2-yr SBCFCD	2749.20	2748.35	0.85	1.69	0.02	650.00	68.64
Main	2200.*	100-yr SBCFCD	2752.86	2752.05	0.82	0.01	0.00	3380.00	96.87
Main	2200.*	100-yr FIS	2752.00	2751.27	0.73	0.01	0.00	2700.00	92.05
Main	2200.*	50-yr FIS	2750.21	2749.66	0.55	0.01	0.00	1500.00	82.07
Main	2200.*	10-yr FIS	2747.24	2747.07	0.17	0.01	0.00	200.00	66.01
Main	2200.*	10-yr SBCFCD	2750.37	2749.81	0.57	0.01	0.00	1600.00	82.99
Main	2200.*	5-yr SBCFCD	2749.42	2748.97	0.46	0.01	0.00	1070.00	77.77
Main	2200.*	2-yr SBCFCD	2748.52	2748.18	0.34	0.01	0.00	650.00	72.90
Main	2198	100-yr SBCFCD	2752.86	2752.04	0.82	0.01	0.20	3380.00	96.82
Main	2198	100-yr FIS	2752.00	2751.26	0.74	0.01	0.19	2700.00	91.99
Main	2198	50-yr FIS	2750.20	2749.65	0.55	0.01	0.15	1500.00	82.01
Main	2198	10-yr FIS	2747.22	2747.05	0.17	0.00	0.05	200.00	65.89
Main	2198	10-yr SBCFCD	2750.37	2749.80	0.57	0.01	0.15	1600.00	82.94
Main	2198	5-yr SBCFCD	2749.42	2748.96	0.46	0.01	0.13	1070.00	77.71
Main	2198	2-yr SBCFCD	2748.52	2748.17	0.35	0.00	0.10	650.00	72.82
Main	2183	100-yr SBCFCD	2752.64	2752.49	0.15	0.00	0.00	3380.00	128.87
Main	2183	100-yr FIS	2751.80	2751.68	0.12	0.00	0.00	2700.00	123.97
Main	2183	50-yr FIS	2750.04	2749.99	0.06	0.00	0.00	1500.00	113.73
Main	2183	10-yr FIS	2747.17	2747.17	0.00	0.00	0.00	200.00	96.69

Main	2183	10-yr SBCFCD	2750.21	2750.14	0.06	0.00	0.00	1600.00	114.68
Main	2183	5-yr SBCFCD	2749.28	2749.25	0.04	0.00	0.00	1070.00	109.25
Main	2183	2-yr SBCFCD	2748.41	2748.39	0.02	0.00	0.00	650.00	104.09
Main	2181	100-yr SBCFCD	2752.64	2752.49	0.15	0.01	0.18	3380.00	128.87
Main	2181	100-yr FIS	2751.80	2751.68	0.12	0.01	0.16	2700.00	123.97
Main	2181	50-yr FIS	2750.04	2749.99	0.06	0.01	0.11	1500.00	113.72
Main	2181	10-yr FIS	2747.17	2747.17	0.00	0.00	0.03	200.00	96.69
Main	2181	10-yr SBCFCD	2750.21	2750.14	0.06	0.01	0.12	1600.00	114.68
Main	2181	5-yr SBCFCD	2749.28	2749.25	0.04	0.01	0.09	1070.00	109.25
Main	2181	2-yr SBCFCD	2748.41	2748.39	0.02	0.00	0.07	650.00	104.09
Main	2166	100-yr SBCFCD	2752.45	2750.51	1.94	0.95	0.35	3380.00	77.15
Main	2166	100-yr FIS	2751.63	2749.91	1.72	1.09	0.30	2700.00	74.82
Main	2166	50-yr FIS	2749.92	2748.72	1.20	1.57	0.16	1500.00	70.18
Main	2166	10-yr FIS	2747.14	2746.80	0.34			200.00	62.72
Main	2166	10-yr SBCFCD	2750.08	2748.83	1.25	1.47	0.17	1600.00	70.63
Main	2166	5-yr SBCFCD	2749.18	2748.20	0.98	1.90	0.10	1070.00	68.15
Main	2166	2-yr SBCFCD	2748.34	2747.61	0.72	2.55	0.04	650.00	65.88
Main	1986.6	100-yr SBCFCD	2748.95	2745.35	3.60	3.34	0.17	3480.00	104.81
Main	1986.6	100-yr FIS	2748.04	2745.00	3.04	3.45	0.13	2700.00	102.67
Main	1986.6	50-yr FIS	2746.30	2744.45	1.85	3.55	0.06	1500.00	99.21
Main	1986.6	10-yr FIS	2743.79	2743.52	0.27	3.33	0.02	200.00	93.38
Main	1986.6	10-yr SBCFCD	2746.51	2744.55	1.96	3.50	0.07	1650.00	99.81
Main	1986.6	5-yr SBCFCD	2745.63	2744.27	1.36	3.52	0.04	1120.00	98.09
Main	1986.6	2-yr SBCFCD	2744.84	2743.99	0.85	3.49	0.01	680.00	96.29
Main	1900.*	100-yr SBCFCD	2748.15	2747.15	0.99	0.01	0.00	3480.00	93.93
Main	1900.*	100-yr FIS	2747.22	2746.36	0.86	0.01	0.00	2700.00	89.17
Main	1900.*	50-yr FIS	2745.52	2744.91	0.61	0.01	0.00	1500.00	80.45
Main	1900.*	10-yr FIS	2742.63	2742.46	0.17	0.01	0.00	200.00	65.73
Main	1900.*	10-yr SBCFCD	2745.76	2745.11	0.65	0.01	0.00	1650.00	81.67
Main	1900.*	5-yr SBCFCD	2744.86	2744.34	0.51	0.01	0.00	1120.00	77.06
Main	1900.*	2-yr SBCFCD	2743.96	2743.58	0.38	0.01	0.00	680.00	72.48
Main	1898	100-yr SBCFCD	2748.14	2747.14	1.00	0.01	0.25	3480.00	93.86
Main	1898	100-yr FIS	2747.22	2746.35	0.87	0.01	0.22	2700.00	89.11
Main	1898	50-yr FIS	2745.51	2744.89	0.62	0.01	0.17	1500.00	80.37
Main	1898	10-yr FIS	2742.62	2742.44	0.18	0.00	0.05	200.00	65.62
Main	1898	10-yr SBCFCD	2745.75	2745.10	0.65	0.01	0.17	1650.00	81.59
Main	1898	5-yr SBCFCD	2744.85	2744.33	0.52	0.01	0.14	1120.00	76.97
Main	1898	2-yr SBCFCD	2743.95	2743.56	0.38	0.00	0.11	680.00	72.38
Main	1883	100-yr SBCFCD	2747.88	2747.71	0.17	0.00	0.00	3480.00	128.15
Main	1883	100-yr FIS	2746.98	2746.86	0.13	0.00	0.00	2700.00	122.97
Main	1883	50-yr FIS	2745.34	2745.28	0.06	0.00	0.00	1500.00	113.35
Main	1883	10-yr FIS	2742.56	2742.56	0.00	0.00	0.00	200.00	96.83
Main	1883	10-yr SBCFCD	2745.57	2745.50	0.07	0.00	0.00	1650.00	114.71
Main	1883	5-yr SBCFCD	2744.70	2744.66	0.04	0.00	0.00	1120.00	109.59
Main	1883	2-yr SBCFCD	2743.84	2743.82	0.02	0.00	0.00	680.00	104.48
Main	1881	100-yr SBCFCD	2747.88	2747.71	0.17	0.02	0.17	3480.00	128.15

Main	1881	100-yr FIS	2746.98	2746.86	0.13	0.01	0.15	2700.00	122.96
Main	1881	50-yr FIS	2745.34	2745.28	0.06	0.01	0.11	1500.00	113.35
Main	1881	10-yr FIS	2742.56	2742.56	0.00	0.00	0.03	200.00	96.83
Main	1881	10-yr SBCFCD	2745.57	2745.50	0.07	0.01	0.11	1650.00	114.70
Main	1881	5-yr SBCFCD	2744.70	2744.66	0.04	0.01	0.09	1120.00	109.59
Main	1881	2-yr SBCFCD	2743.84	2743.82	0.02	0.00	0.07	680.00	104.48
Main	1866	100-yr SBCFCD	2747.70	2745.86	1.83	1.66	0.00	3480.00	86.85
Main	1866	100-yr FIS	2746.82	2745.24	1.59	1.73	0.00	2700.00	83.00
Main	1866	50-yr FIS	2745.22	2744.06	1.16	1.94	0.01	1500.00	75.75
Main	1866	10-yr FIS	2742.53	2742.20	0.33	2.83	0.00	200.00	64.32
Main	1866	10-yr SBCFCD	2745.44	2744.24	1.21	1.89	0.00	1650.00	76.83
Main	1866	5-yr SBCFCD	2744.60	2743.65	0.95	2.04	0.00	1120.00	73.21
Main	1866	2-yr SBCFCD	2743.76	2743.05	0.71	2.25	0.00	680.00	69.55
Main	1699.2	100-yr SBCFCD	2744.85	2741.29	3.56	2.67	0.17	3480.00	79.74
Main	1699.2	100-yr FIS	2743.89	2740.80	3.09	2.78	0.15	2700.00	76.80
Main	1699.2	50-yr FIS	2742.06	2739.96	2.10	3.07	0.09	1500.00	71.74
Main	1699.2	10-yr FIS	2739.04	2738.62	0.43	3.48	0.01	200.00	63.70
Main	1699.2	10-yr SBCFCD	2742.33	2740.07	2.26	3.01	0.11	1650.00	72.40
Main	1699.2	5-yr SBCFCD	2741.37	2739.63	1.74	3.15	0.08	1120.00	69.78
Main	1699.2	2-yr SBCFCD	2740.41	2739.22	1.18	3.30	0.05	680.00	67.34
Main	1600.*	100-yr SBCFCD	2743.15	2742.16	0.99	0.00	0.25	3480.00	93.96
Main	1600.*	100-yr FIS	2742.22	2741.36	0.86	0.00	0.22	2700.00	89.18
Main	1600.*	50-yr FIS	2740.51	2739.90	0.62	0.00	0.17	1500.00	80.37
Main	1600.*	10-yr FIS	2737.62	2737.44	0.18	0.00	0.05	200.00	65.63
Main	1600.*	10-yr SBCFCD	2740.75	2740.10	0.65	0.00	0.17	1650.00	81.61
Main	1600.*	5-yr SBCFCD	2739.85	2739.33	0.52	0.00	0.14	1120.00	77.00
Main	1600.*	2-yr SBCFCD	2738.95	2738.56	0.38	0.00	0.11	680.00	72.39
Main	1598	100-yr SBCFCD	2742.90	2742.73	0.17	0.01	0.00	3480.00	127.39
Main	1598	100-yr FIS	2742.00	2741.88	0.13	0.00	0.00	2700.00	122.25
Main	1598	50-yr FIS	2740.34	2740.28	0.06	0.00	0.00	1500.00	112.69
Main	1598	10-yr FIS	2737.56	2737.56	0.00	0.00	0.00	200.00	96.36
Main	1598	10-yr SBCFCD	2740.58	2740.51	0.07	0.00	0.00	1650.00	114.05
Main	1598	5-yr SBCFCD	2739.71	2739.66	0.04	0.00	0.00	1120.00	108.98
Main	1598	2-yr SBCFCD	2738.84	2738.82	0.02	0.00	0.00	680.00	103.91
Main	1583	100-yr SBCFCD	2742.90	2742.73	0.17	0.00	0.00	3480.00	127.36
Main	1583	100-yr FIS	2742.00	2741.87	0.13	0.00	0.00	2700.00	122.22
Main	1583	50-yr FIS	2740.34	2740.28	0.06	0.00	0.00	1500.00	112.68
Main	1583	10-yr FIS	2737.56	2737.56	0.00	0.00	0.00	200.00	96.36
Main	1583	10-yr SBCFCD	2740.57	2740.51	0.07	0.00	0.00	1650.00	114.03
Main	1583	5-yr SBCFCD	2739.70	2739.66	0.04	0.00	0.00	1120.00	108.97
Main	1583	2-yr SBCFCD	2738.84	2738.82	0.02	0.00	0.00	680.00	103.91
Main	1581	100-yr SBCFCD	2742.90	2742.73	0.17	0.02	0.17	3480.00	127.35
Main	1581	100-yr FIS	2742.00	2741.87	0.13	0.01	0.15	2700.00	122.21
Main	1581	50-yr FIS	2740.34	2740.28	0.06	0.01	0.11	1500.00	112.67
Main	1581	10-yr FIS	2737.56	2737.56	0.00	0.00	0.03	200.00	96.36
Main	1581	10-yr SBCFCD	2740.57	2740.50	0.07	0.01	0.11	1650.00	114.02
Main	1581	5-yr SBCFCD	2739.70	2739.66	0.04	0.01	0.09	1120.00	108.97

Main	1581	2-yr SBCFCD	2738.84	2738.82	0.02	0.00	0.07		680.00	103.91
Main	1566	100-yr SBCFCD	2742.71	2740.87	1.84	1.27	0.04		3480.00	86.23
Main	1566	100-yr FIS	2741.84	2740.24	1.60	1.34	0.02		2700.00	82.43
Main	1566	50-yr FIS	2740.22	2739.09	1.14	1.48	0.02		1500.00	75.53
Main	1566	10-yr FIS	2737.53	2737.19	0.34	2.21	0.01		200.00	64.12
Main	1566	10-yr SBCFCD	2740.45	2739.24	1.21	1.44	0.02		1650.00	76.46
Main	1566	5-yr SBCFCD	2739.60	2738.64	0.96	1.57	0.02		1120.00	72.84
Main	1566	2-yr SBCFCD	2738.77	2738.06	0.71	1.69	0.02		680.00	69.35
Main	1439.8	100-yr SBCFCD	2740.49	2737.04	3.45	2.07	0.16		3480.00	85.97
Main	1439.8	100-yr FIS	2739.55	2736.59	2.95	2.15	0.14		2700.00	83.99
Main	1439.8	50-yr FIS	2737.81	2735.83	1.98	2.33	0.08		1500.00	80.61
Main	1439.8	10-yr FIS	2735.00	2734.64	0.36	2.53	0.00		200.00	70.27
Main	1439.8	10-yr SBCFCD	2738.05	2735.93	2.12	2.31	0.09		1650.00	81.20
Main	1439.8	5-yr SBCFCD	2737.14	2735.55	1.58	2.41	0.06		1120.00	79.10
Main	1439.8	2-yr SBCFCD	2736.25	2735.19	1.06	2.48	0.04		680.00	77.08
Main	957.5	100-yr SBCFCD	2731.65	2729.94	1.71	8.31	0.52	79.80	3400.20	181.21
Main	957.5	100-yr FIS	2731.01	2729.63	1.37	8.07	0.47	26.56	2673.44	160.47
Main	957.5	50-yr FIS	2729.81	2728.95	0.87				1500.00	117.17
Main	957.5	10-yr FIS	2727.79	2727.55	0.24				200.00	97.13
Main	957.5	10-yr SBCFCD	2729.98	2729.06	0.92			0.05	1649.95	122.08
Main	957.5	5-yr SBCFCD	2729.35	2728.61	0.74				1120.00	112.41
Main	957.5	2-yr SBCFCD	2728.72	2728.18	0.54				680.00	106.16

Profile Output Table - Standard Table 3

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	E.G. Slope (ft/ft)	Vel Total (ft/s)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl	Froude # XS	Shear Chan (lb/sq ft)
Main	12028.1	100-yr SBCFCD	1730.00	2858.50	2865.53	0.000004	0.83	0.83	2076.14	300.00	0.06	0.06	0.00
Main	12028.1	100-yr FIS	700.00	2858.50	2862.67	0.000004	0.58	0.58	1216.13	300.00	0.05	0.05	0.00
Main	12028.1	50-yr FIS	500.00	2858.50	2861.89	0.000004	0.51	0.51	983.88	300.00	0.05	0.05	0.00
Main	12028.1	10-yr FIS	100.00	2858.50	2859.65	0.000006	0.31	0.31	321.78	285.82	0.05	0.05	0.00
Main	12028.1	10-yr SBCFCD	810.00	2858.50	2863.05	0.000004	0.61	0.61	1330.24	300.00	0.05	0.05	0.00
Main	12028.1	5-yr SBCFCD	550.00	2858.50	2862.10	0.000004	0.53	0.53	1045.40	300.00	0.05	0.05	0.00
Main	12028.1	2-yr SBCFCD	340.00	2858.50	2861.16	0.000004	0.45	0.45	763.51	298.77	0.05	0.05	0.00
Main	11915	100-yr SBCFCD	1730.00	2858.30	2863.42	0.012467	11.15	11.15	155.18	40.62	1.01	1.01	2.81
Main	11915	100-yr FIS	700.00	2858.30	2861.31	0.014185	8.91	8.91	78.53	32.14	1.00	1.00	2.07
Main	11915	50-yr FIS	500.00	2858.30	2860.75	0.015009	8.18	8.18	61.15	29.88	1.01	1.01	1.85
Main	11915	10-yr FIS	100.00	2858.30	2859.19	0.019750	5.17	5.17	19.35	23.58	1.01	1.01	0.99
Main	11915	10-yr SBCFCD	810.00	2858.30	2861.59	0.013916	9.26	9.26	87.46	33.24	1.01	1.01	2.18
Main	11915	5-yr SBCFCD	550.00	2858.30	2860.90	0.014707	8.37	8.37	65.72	30.49	1.00	1.00	1.90
Main	11915	2-yr SBCFCD	340.00	2858.30	2860.24	0.015873	7.35	7.35	46.25	27.80	1.00	1.00	1.60
Main	11864	100-yr SBCFCD	1730.00	2856.70	2860.79	0.028579	14.96	14.96	115.62	36.49	1.48	1.48	5.37
Main	11864	100-yr FIS	700.00	2856.70	2859.02	0.035787	12.23	12.23	57.21	29.34	1.54	1.54	4.20
Main	11864	50-yr FIS	500.00	2856.70	2858.57	0.038661	11.25	11.25	44.45	27.53	1.56	1.56	3.78
Main	11864	10-yr FIS	100.00	2856.70	2857.39	0.045705	6.75	6.75	14.82	22.79	1.47	1.47	1.83
Main	11864	10-yr SBCFCD	810.00	2856.70	2859.25	0.034499	12.66	12.66	63.98	30.26	1.53	1.53	4.38
Main	11864	5-yr SBCFCD	550.00	2856.70	2858.69	0.037831	11.53	11.53	47.72	28.01	1.56	1.56	3.89
Main	11864	2-yr SBCFCD	340.00	2856.70	2858.16	0.041933	10.15	10.15	33.51	25.88	1.57	1.57	3.30
Main	11841	100-yr SBCFCD	1730.00	2850.50	2859.42	0.001446	5.11	5.11	338.43	55.87	0.37	0.37	0.51
Main	11841	100-yr FIS	700.00	2850.50	2856.76	0.000949	3.43	3.43	204.31	45.23	0.28	0.28	0.25
Main	11841	50-yr FIS	500.00	2850.50	2856.03	0.000778	2.90	2.90	172.21	42.28	0.25	0.25	0.19

Main	11841	10-yr FIS	100.00	2850.50	2853.87	0.000193	1.11	1.11	90.32	33.58	0.12	0.12	0.03
Main	11841	10-yr SBCFCD	810.00	2850.50	2857.12	0.001028	3.67	3.67	220.51	46.65	0.30	0.30	0.28
Main	11841	5-yr SBCFCD	550.00	2850.50	2856.22	0.000826	3.05	3.05	180.49	43.06	0.26	0.26	0.20
Main	11841	2-yr SBCFCD	340.00	2850.50	2855.33	0.000597	2.36	2.36	143.77	39.48	0.22	0.22	0.13
Main	11792	100-yr SBCFCD	1730.00	2850.50	2859.33	0.001504	5.18	5.18	333.71	55.58	0.37	0.37	0.52
Main	11792	100-yr FIS	700.00	2850.50	2856.71	0.000979	3.47	3.47	201.97	45.03	0.29	0.29	0.26
Main	11792	50-yr FIS	500.00	2850.50	2855.99	0.000801	2.93	2.93	170.45	42.11	0.26	0.26	0.19
Main	11792	10-yr FIS	100.00	2850.50	2853.86	0.000195	1.11	1.11	89.99	33.54	0.12	0.12	0.03
Main	11792	10-yr SBCFCD	810.00	2850.50	2857.06	0.001063	3.72	3.72	217.86	46.42	0.30	0.30	0.29
Main	11792	5-yr SBCFCD	550.00	2850.50	2856.18	0.000851	3.08	3.08	178.58	42.88	0.27	0.27	0.21
Main	11792	2-yr SBCFCD	340.00	2850.50	2855.30	0.000611	2.39	2.39	142.53	39.35	0.22	0.22	0.13
Main	11788	100-yr SBCFCD	1730.00	2852.50	2858.12	0.008816	9.86	9.86	175.49	42.47	0.85	0.85	2.14
Main	11788	100-yr FIS	700.00	2852.50	2855.90	0.009231	7.69	7.69	91.06	33.59	0.82	0.82	1.49
Main	11788	50-yr FIS	500.00	2852.50	2855.29	0.009576	7.02	7.02	71.26	31.15	0.82	0.82	1.31
Main	11788	10-yr FIS	100.00	2852.50	2853.59	0.010009	4.16	4.16	24.06	24.34	0.74	0.74	0.60
Main	11788	10-yr SBCFCD	810.00	2852.50	2856.18	0.009246	8.04	8.04	100.77	34.73	0.83	0.83	1.59
Main	11788	5-yr SBCFCD	550.00	2852.50	2855.44	0.009530	7.22	7.22	76.21	31.78	0.82	0.82	1.37
Main	11788	2-yr SBCFCD	340.00	2852.50	2854.73	0.009684	6.23	6.23	54.58	28.92	0.80	0.80	1.10
Main	11785	100-yr SBCFCD	1730.00	2852.50	2857.62	0.012485	11.15	11.15	155.10	40.62	1.01	1.01	2.81
Main	11785	100-yr FIS	700.00	2852.50	2855.51	0.014197	8.92	8.92	78.50	32.13	1.01	1.01	2.07
Main	11785	50-yr FIS	500.00	2852.50	2854.96	0.014836	8.14	8.14	61.40	29.91	1.00	1.00	1.83
Main	11785	10-yr FIS	100.00	2852.50	2853.39	0.019750	5.17	5.17	19.35	23.58	1.01	1.01	0.99
Main	11785	10-yr SBCFCD	810.00	2852.50	2855.79	0.013813	9.24	9.24	87.68	33.26	1.00	1.00	2.17
Main	11785	5-yr SBCFCD	550.00	2852.50	2855.11	0.014649	8.36	8.36	65.81	30.50	1.00	1.00	1.90
Main	11785	2-yr SBCFCD	340.00	2852.50	2854.44	0.015817	7.34	7.34	46.30	27.80	1.00	1.00	1.59
Main	11663.9	100-yr SBCFCD	1730.00	2849.70	2853.06	0.028964	16.19	16.19	106.87	38.58	1.71	1.71	4.81
Main	11663.9	100-yr FIS	700.00	2849.70	2851.62	0.033482	12.64	12.64	55.40	32.75	1.71	1.71	3.44
Main	11663.9	50-yr FIS	500.00	2849.70	2851.27	0.034320	11.35	11.35	44.07	31.32	1.69	1.69	2.95
Main	11663.9	10-yr FIS	100.00	2849.70	2850.33	0.029435	6.02	6.02	16.61	27.55	1.37	1.37	1.10
Main	11663.9	10-yr SBCFCD	810.00	2849.70	2851.80	0.032869	13.19	13.19	61.39	33.48	1.72	1.72	3.66
Main	11663.9	5-yr SBCFCD	550.00	2849.70	2851.36	0.034109	11.70	11.70	46.99	31.70	1.69	1.69	3.08
Main	11663.9	2-yr SBCFCD	340.00	2849.70	2850.95	0.034369	9.91	9.91	34.32	30.04	1.63	1.63	2.40
Main	11313.9	100-yr SBCFCD	1960.00	2844.50	2849.48	0.009119	11.27	11.27	173.86	44.90	1.01	1.01	2.09
Main	11313.9	100-yr FIS	1700.00	2844.50	2849.09	0.009196	10.84	10.84	156.88	43.36	1.00	1.00	1.98
Main	11313.9	50-yr FIS	1000.00	2844.50	2847.83	0.010033	9.48	9.48	105.44	38.32	1.01	1.01	1.66
Main	11313.9	10-yr FIS	150.00	2844.50	2845.51	0.013886	5.52	5.52	27.16	29.02	1.01	1.01	0.80
Main	11313.9	10-yr SBCFCD	920.00	2844.50	2847.67	0.010128	9.27	9.27	99.28	37.67	1.01	1.01	1.60
Main	11313.9	5-yr SBCFCD	620.00	2844.50	2846.98	0.010815	8.34	8.34	74.35	34.93	1.01	1.01	1.39
Main	11313.9	2-yr SBCFCD	380.00	2844.50	2846.32	0.011749	7.27	7.27	52.26	32.30	1.01	1.01	1.16
Main	11170.*	100-yr SBCFCD	1960.00	2842.40	2848.40	0.004883	7.60	7.60	257.97	61.00	0.65	0.65	1.25
Main	11170.*	100-yr FIS	1700.00	2842.40	2847.96	0.004957	7.34	7.34	231.53	58.34	0.65	0.65	1.19
Main	11170.*	50-yr FIS	1000.00	2842.40	2846.55	0.005239	6.44	6.44	155.35	49.89	0.64	0.64	0.99
Main	11170.*	10-yr FIS	150.00	2842.40	2843.75	0.006670	3.84	3.84	39.06	33.07	0.62	0.62	0.49
Main	11170.*	10-yr SBCFCD	920.00	2842.40	2846.36	0.005287	6.30	6.30	145.97	48.75	0.64	0.64	0.96
Main	11170.*	5-yr SBCFCD	620.00	2842.40	2845.56	0.005549	5.70	5.70	108.78	43.94	0.64	0.64	0.84
Main	11170.*	2-yr SBCFCD	380.00	2842.40	2844.77	0.005884	5.00	5.00	76.02	39.21	0.63	0.63	0.70
Main	11168	100-yr SBCFCD	1960.00	2842.40	2848.39	0.004918	7.62	7.62	257.31	60.93	0.65	0.65	1.26
Main	11168	100-yr FIS	1700.00	2842.40	2847.95	0.004994	7.36	7.36	230.92	58.27	0.65	0.65	1.20
Main	11168	50-yr FIS	1000.00	2842.40	2846.53	0.005308	6.47	6.47	154.63	49.81	0.65	0.65	1.00
Main	11168	10-yr FIS	150.00	2842.40	2843.73	0.006989	3.90	3.90	38.46	32.96	0.64	0.64	0.50
Main	11168	10-yr SBCFCD	920.00	2842.40	2846.34	0.005360	6.33	6.33	145.27	48.66	0.65	0.65	0.97
Main	11168	5-yr SBCFCD	620.00	2842.40	2845.54	0.005647	5.73	5.73	108.12	43.84	0.64	0.64	0.85
Main	11168	2-yr SBCFCD	380.00	2842.40	2844.75	0.006025	5.04	5.04	75.41	39.11	0.64	0.64	0.71
Main	11153	100-yr SBCFCD	1960.00	2837.40	2848.92	0.000338	2.86	2.86	685.90	94.10	0.19	0.19	0.15
Main	11153	100-yr FIS	1700.00	2837.40	2848.45	0.000304	2.65	2.65	642.22	91.28	0.18	0.18	0.13
Main	11153	50-yr FIS	1000.00	2837.40	2846.94	0.000195	1.96	1.96	511.31	82.22	0.14	0.14	0.07
Main	11153	10-yr FIS	150.00	2837.40	2843.89	0.000021	0.52	0.52	288.42	63.92	0.04	0.04	0.01
Main	11153	10-yr SBCFCD	920.00	2837.40	2846.73	0.000181	1.86	1.86	494.60	80.99	0.13	0.13	0.07

Main	11153	5-yr SBCFCD	620.00	2837.40	2845.87	0.000123	1.45	1.45	426.89	75.81	0.11	0.11	0.04
Main	11153	2-yr SBCFCD	380.00	2837.40	2845.01	0.000071	1.04	1.04	364.03	70.66	0.08	0.08	0.02
Main	11151	100-yr SBCFCD	1960.00	2837.40	2848.92	0.000338	2.86	2.86	685.83	94.10	0.19	0.19	0.15
Main	11151	100-yr FIS	1700.00	2837.40	2848.45	0.000304	2.65	2.65	642.18	91.27	0.18	0.18	0.13
Main	11151	50-yr FIS	1000.00	2837.40	2846.94	0.000195	1.96	1.96	511.27	82.22	0.14	0.14	0.07
Main	11151	10-yr FIS	150.00	2837.40	2843.89	0.000021	0.52	0.52	288.42	63.92	0.04	0.04	0.01
Main	11151	10-yr SBCFCD	920.00	2837.40	2846.73	0.000181	1.86	1.86	494.58	80.99	0.13	0.13	0.07
Main	11151	5-yr SBCFCD	620.00	2837.40	2845.87	0.000123	1.45	1.45	426.88	75.81	0.11	0.11	0.04
Main	11151	2-yr SBCFCD	380.00	2837.40	2845.01	0.000071	1.04	1.04	364.01	70.66	0.08	0.08	0.02
Main	11136	100-yr SBCFCD	1960.00	2842.40	2847.12	0.012403	10.62	10.62	184.55	53.29	1.01	1.01	2.61
Main	11136	100-yr FIS	1700.00	2842.40	2846.75	0.012674	10.27	10.27	165.47	51.09	1.01	1.01	2.49
Main	11136	50-yr FIS	1000.00	2842.40	2845.60	0.013665	9.02	9.02	110.88	44.22	1.00	1.00	2.09
Main	11136	10-yr FIS	150.00	2842.40	2843.40	0.018741	5.38	5.38	27.88	30.98	1.00	1.00	1.04
Main	11136	10-yr SBCFCD	920.00	2842.40	2845.45	0.013840	8.83	8.83	104.16	43.30	1.00	1.00	2.03
Main	11136	5-yr SBCFCD	620.00	2842.40	2844.81	0.014764	7.99	7.99	77.57	39.44	1.00	1.00	1.78
Main	11136	2-yr SBCFCD	380.00	2842.40	2844.19	0.015985	7.01	7.01	54.19	35.71	1.00	1.00	1.49
Main	10963.9	100-yr SBCFCD	1960.00	2839.30	2843.12	0.019603	13.84	13.84	141.67	49.09	1.44	1.44	3.45
Main	10963.9	100-yr FIS	1700.00	2839.30	2842.84	0.019784	13.31	13.31	127.72	47.27	1.43	1.43	3.26
Main	10963.9	50-yr FIS	1000.00	2839.30	2841.94	0.020086	11.40	11.40	87.74	41.60	1.38	1.38	2.59
Main	10963.9	10-yr FIS	150.00	2839.30	2840.23	0.017230	5.77	5.77	26.02	30.87	1.11	1.11	0.90
Main	10963.9	10-yr SBCFCD	920.00	2839.30	2841.82	0.020070	11.10	11.10	82.86	40.85	1.37	1.37	2.49
Main	10963.9	5-yr SBCFCD	620.00	2839.30	2841.32	0.019923	9.78	9.78	63.43	37.74	1.33	1.33	2.06
Main	10963.9	2-yr SBCFCD	380.00	2839.30	2840.85	0.019280	8.24	8.24	46.14	34.73	1.26	1.26	1.58
Main	10745	100-yr SBCFCD	1960.00	2836.00	2843.96	0.001706	6.26	6.26	313.32	54.71	0.46	0.46	0.57
Main	10745	100-yr FIS	1700.00	2836.00	2842.41	0.002922	7.29	7.29	233.11	48.73	0.59	0.59	0.82
Main	10745	50-yr FIS	1000.00	2836.00	2839.42	0.009982	9.57	9.57	104.48	37.18	1.01	1.01	1.68
Main	10745	10-yr FIS	150.00	2836.00	2837.03	0.013769	5.59	5.59	26.85	27.98	1.01	1.01	0.81
Main	10745	10-yr SBCFCD	920.00	2836.00	2839.25	0.010108	9.36	9.36	98.25	36.52	1.01	1.01	1.63
Main	10745	5-yr SBCFCD	620.00	2836.00	2838.55	0.010736	8.42	8.42	73.66	33.83	1.01	1.01	1.41
Main	10745	2-yr SBCFCD	380.00	2836.00	2837.87	0.011679	7.35	7.35	51.70	31.22	1.01	1.01	1.17
Main	10720.4	100-yr SBCFCD	1960.00	2831.60	2844.27	0.000260	3.13	3.13	626.59	74.94	0.19	0.19	0.13
Main	10720.4	100-yr FIS	1700.00	2831.60	2842.86	0.000317	3.24	3.24	524.98	69.27	0.21	0.21	0.14
Main	10720.4	50-yr FIS	1000.00	2831.60	2839.54	0.000436	3.15	3.15	317.37	55.94	0.23	0.23	0.14
Main	10720.4	10-yr FIS	150.00	2831.60	2833.93	0.000854	2.25	2.25	66.69	33.35	0.28	0.28	0.10
Main	10720.4	10-yr SBCFCD	920.00	2831.60	2838.97	0.000492	3.22	3.22	286.01	53.63	0.25	0.25	0.15
Main	10720.4	5-yr SBCFCD	620.00	2831.60	2837.31	0.000587	3.06	3.06	202.36	46.94	0.26	0.26	0.15
Main	10720.4	2-yr SBCFCD	380.00	2831.60	2835.77	0.000696	2.81	2.81	135.05	40.77	0.27	0.27	0.14
Main	10694.4		Culvert										
Main	10659.4	100-yr SBCFCD	1960.00	2831.60	2839.54	0.001677	6.18	6.18	317.19	55.92	0.46	0.46	0.56
Main	10659.4	100-yr FIS	1700.00	2831.60	2839.99	0.001017	4.96	4.96	342.99	57.75	0.36	0.36	0.35
Main	10659.4	50-yr FIS	1000.00	2831.60	2837.69	0.001196	4.53	4.53	220.83	48.50	0.37	0.37	0.32
Main	10659.4	10-yr FIS	150.00	2831.60	2833.53	0.001638	2.79	2.79	53.71	31.75	0.38	0.38	0.17
Main	10659.4	10-yr SBCFCD	920.00	2831.60	2836.93	0.001666	4.97	4.97	184.95	45.43	0.43	0.43	0.40
Main	10659.4	5-yr SBCFCD	620.00	2831.60	2835.90	0.001662	4.42	4.42	140.26	41.28	0.42	0.42	0.34
Main	10659.4	2-yr SBCFCD	380.00	2831.60	2834.87	0.001656	3.80	3.80	100.06	37.16	0.41	0.41	0.27
Main	10613.9	100-yr SBCFCD	2590.00	2831.50	2839.39	0.001674	6.47	6.47	400.52	66.55	0.46	0.46	0.60
Main	10613.9	100-yr FIS	2700.00	2831.50	2839.56	0.001682	6.56	6.56	411.88	67.23	0.47	0.47	0.61
Main	10613.9	50-yr FIS	1500.00	2831.50	2837.46	0.001560	5.36	5.36	279.74	58.85	0.43	0.43	0.44
Main	10613.9	10-yr FIS	200.00	2831.50	2833.47	0.001315	2.61	2.61	76.67	42.88	0.34	0.34	0.14
Main	10613.9	10-yr SBCFCD	1220.00	2831.50	2836.85	0.001521	4.99	4.99	244.56	56.40	0.42	0.42	0.39
Main	10613.9	5-yr SBCFCD	820.00	2831.50	2835.83	0.001452	4.33	4.33	189.22	52.33	0.40	0.40	0.32
Main	10613.9	2-yr SBCFCD	500.00	2831.50	2834.82	0.001376	3.62	3.62	137.99	48.26	0.38	0.38	0.24
Main	10213.9	100-yr SBCFCD	2590.00	2830.90	2838.66	0.001786	6.62	6.62	390.99	65.75	0.48	0.48	0.63
Main	10213.9	100-yr FIS	2700.00	2830.90	2838.83	0.001795	6.72	6.72	401.91	66.41	0.48	0.48	0.64
Main	10213.9	50-yr FIS	1500.00	2830.90	2836.82	0.001610	5.43	5.43	276.38	58.44	0.44	0.44	0.45
Main	10213.9	10-yr FIS	200.00	2830.90	2833.02	0.001030	2.41	2.41	82.94	43.38	0.31	0.31	0.12
Main	10213.9	10-yr SBCFCD	1220.00	2830.90	2836.23	0.001545	5.02	5.02	242.96	56.13	0.43	0.43	0.40

Main	10213.9	5-yr SBCFCD	820.00	2830.90	2835.26	0.001422	4.31	4.31	190.37	52.28	0.40	0.40	0.31
Main	10213.9	2-yr SBCFCD	500.00	2830.90	2834.29	0.001272	3.53	3.53	141.57	48.44	0.36	0.36	0.22
Main	10170.*	100-yr SBCFCD	2590.00	2830.80	2838.73	0.001774	5.55	5.55	466.66	82.76	0.41	0.41	0.61
Main	10170.*	100-yr FIS	2700.00	2830.80	2838.90	0.001773	5.61	5.61	480.89	83.79	0.41	0.41	0.62
Main	10170.*	50-yr FIS	1500.00	2830.80	2836.82	0.001703	4.68	4.68	320.22	71.31	0.39	0.39	0.46
Main	10170.*	10-yr FIS	200.00	2830.80	2832.98	0.001190	2.21	2.21	90.50	48.12	0.28	0.28	0.14
Main	10170.*	10-yr SBCFCD	1220.00	2830.80	2836.23	0.001667	4.38	4.38	278.73	67.71	0.38	0.38	0.42
Main	10170.*	5-yr SBCFCD	820.00	2830.80	2835.24	0.001583	3.82	3.82	214.77	61.76	0.36	0.36	0.34
Main	10170.*	2-yr SBCFCD	500.00	2830.80	2834.26	0.001453	3.18	3.18	157.10	55.85	0.33	0.33	0.25
Main	10168	100-yr SBCFCD	2590.00	2830.80	2838.72	0.001784	5.57	5.57	465.29	82.51	0.41	0.41	0.61
Main	10168	100-yr FIS	2700.00	2830.80	2838.89	0.001784	5.63	5.63	479.48	83.54	0.41	0.41	0.62
Main	10168	50-yr FIS	1500.00	2830.80	2836.82	0.001713	4.70	4.70	319.37	71.12	0.39	0.39	0.47
Main	10168	10-yr FIS	200.00	2830.80	2832.98	0.001196	2.21	2.21	90.31	48.05	0.28	0.28	0.14
Main	10168	10-yr SBCFCD	1220.00	2830.80	2836.22	0.001675	4.39	4.39	278.06	67.54	0.38	0.38	0.42
Main	10168	5-yr SBCFCD	820.00	2830.80	2835.24	0.001591	3.83	3.83	214.25	61.61	0.36	0.36	0.34
Main	10168	2-yr SBCFCD	500.00	2830.80	2834.26	0.001460	3.19	3.19	156.77	55.73	0.34	0.34	0.25
Main	10153	100-yr SBCFCD	2590.00	2825.80	2838.97	0.000230	2.64	2.64	980.98	113.95	0.16	0.16	0.12
Main	10153	100-yr FIS	2700.00	2825.80	2839.15	0.000237	2.70	2.70	1001.02	115.00	0.16	0.16	0.12
Main	10153	50-yr FIS	1500.00	2825.80	2837.01	0.000150	1.95	1.95	769.13	102.20	0.13	0.13	0.07
Main	10153	10-yr FIS	200.00	2825.80	2833.03	0.000015	0.49	0.49	409.31	78.31	0.04	0.04	0.00
Main	10153	10-yr SBCFCD	1220.00	2825.80	2836.40	0.000125	1.72	1.72	707.27	98.51	0.11	0.11	0.05
Main	10153	5-yr SBCFCD	820.00	2825.80	2835.37	0.000085	1.35	1.35	609.57	92.37	0.09	0.09	0.03
Main	10153	2-yr SBCFCD	500.00	2825.80	2834.35	0.000049	0.96	0.96	518.66	86.27	0.07	0.07	0.02
Main	10151	100-yr SBCFCD	2590.00	2825.80	2838.97	0.000230	2.64	2.64	982.01	114.11	0.16	0.16	0.12
Main	10151	100-yr FIS	2700.00	2825.80	2839.15	0.000236	2.69	2.69	1002.08	115.16	0.16	0.16	0.12
Main	10151	50-yr FIS	1500.00	2825.80	2837.01	0.000150	1.95	1.95	769.90	102.34	0.13	0.13	0.07
Main	10151	10-yr FIS	200.00	2825.80	2833.03	0.000015	0.49	0.49	409.63	78.39	0.04	0.04	0.00
Main	10151	10-yr SBCFCD	1220.00	2825.80	2836.40	0.000125	1.72	1.72	707.93	98.63	0.11	0.11	0.05
Main	10151	5-yr SBCFCD	820.00	2825.80	2835.37	0.000085	1.34	1.34	610.10	92.49	0.09	0.09	0.03
Main	10151	2-yr SBCFCD	500.00	2825.80	2834.35	0.000049	0.96	0.96	519.10	86.37	0.07	0.07	0.02
Main	10136	100-yr SBCFCD	2590.00	2830.80	2838.52	0.001971	5.77	5.77	449.10	81.43	0.43	0.43	0.66
Main	10136	100-yr FIS	2700.00	2830.80	2838.68	0.001971	5.83	5.83	462.79	82.43	0.43	0.43	0.67
Main	10136	50-yr FIS	1500.00	2830.80	2836.67	0.001881	4.85	4.85	309.04	70.32	0.41	0.41	0.50
Main	10136	10-yr FIS	200.00	2830.80	2832.94	0.001262	2.25	2.25	88.75	47.89	0.29	0.29	0.14
Main	10136	10-yr SBCFCD	1220.00	2830.80	2836.09	0.001835	4.53	4.53	269.41	66.84	0.40	0.40	0.45
Main	10136	5-yr SBCFCD	820.00	2830.80	2835.13	0.001729	3.94	3.94	208.21	61.08	0.38	0.38	0.36
Main	10136	2-yr SBCFCD	500.00	2830.80	2834.19	0.001571	3.27	3.27	152.94	55.37	0.35	0.35	0.27
Main	9863.9	100-yr SBCFCD	2590.00	2830.70	2837.28	0.003235	8.14	8.14	318.37	61.83	0.63	0.63	0.99
Main	9863.9	100-yr FIS	2700.00	2830.70	2837.43	0.003235	8.24	8.24	327.81	62.45	0.63	0.63	1.01
Main	9863.9	50-yr FIS	1500.00	2830.70	2835.68	0.002961	6.68	6.68	224.66	55.30	0.58	0.58	0.72
Main	9863.9	10-yr FIS	200.00	2830.70	2832.46	0.001909	2.94	2.94	68.06	42.20	0.41	0.41	0.19
Main	9863.9	10-yr SBCFCD	1220.00	2830.70	2835.17	0.002854	6.18	6.18	197.44	53.26	0.57	0.57	0.64
Main	9863.9	5-yr SBCFCD	820.00	2830.70	2834.34	0.002658	5.31	5.31	154.49	49.86	0.53	0.53	0.50
Main	9863.9	2-yr SBCFCD	500.00	2830.70	2833.52	0.002387	4.34	4.34	115.08	46.52	0.49	0.49	0.36
Main	9736	100-yr SBCFCD	2590.00	2830.60	2835.59	0.008524	11.30	11.30	229.22	56.84	0.99	0.99	2.07
Main	9736	100-yr FIS	2700.00	2830.60	2835.69	0.008668	11.51	11.51	234.54	57.25	1.00	1.00	2.13
Main	9736	50-yr FIS	1500.00	2830.60	2834.17	0.009406	9.83	9.83	152.62	50.60	1.00	1.00	1.72
Main	9736	10-yr FIS	200.00	2830.60	2831.59	0.013368	5.44	5.44	36.78	39.33	0.99	0.99	0.77
Main	9736	10-yr SBCFCD	1220.00	2830.60	2833.74	0.009748	9.30	9.30	131.25	48.72	1.00	1.00	1.59
Main	9736	5-yr SBCFCD	820.00	2830.60	2833.05	0.010297	8.28	8.28	99.00	45.73	0.99	0.99	1.36
Main	9736	2-yr SBCFCD	500.00	2830.60	2832.38	0.011405	7.21	7.21	69.35	42.80	1.00	1.00	1.13
Main	9728	100-yr SBCFCD	2590.00	2825.30	2834.49	0.001228	6.13	6.13	422.52	56.99	0.40	0.40	0.51
Main	9728	100-yr FIS	2700.00	2825.30	2834.77	0.001201	6.16	6.16	438.49	57.65	0.39	0.39	0.51
Main	9728	50-yr FIS	1500.00	2825.30	2831.54	0.001589	5.67	5.67	264.74	49.92	0.43	0.43	0.48
Main	9728	10-yr FIS	200.00	2825.30	2825.62	0.585178	17.58	17.58	11.38	35.77	5.49	5.49	11.54
Main	9728	10-yr SBCFCD	1220.00	2825.30	2826.92	0.098974	20.37	20.37	59.88	38.88	2.89	2.89	9.24
Main	9728	5-yr SBCFCD	820.00	2825.30	2826.45	0.141673	19.65	19.65	41.74	37.75	3.29	3.29	9.57
Main	9728	2-yr SBCFCD	500.00	2825.30	2826.04	0.226894	18.82	18.82	26.57	36.77	3.90	3.90	10.09

Main	9536.1	100-yr SBCFCD	2590.00	2825.00	2834.52	0.000156	5.04	5.04	514.23	73.07	0.33	0.33	0.06
Main	9536.1	100-yr FIS	2700.00	2825.00	2834.80	0.000152	5.05	5.05	534.99	74.20	0.33	0.33	0.06
Main	9536.1	50-yr FIS	1500.00	2825.00	2831.52	0.000212	4.79	4.79	313.16	61.08	0.37	0.37	0.06
Main	9536.1	10-yr FIS	200.00	2825.00	2826.74	0.000376	2.99	2.99	66.95	41.96	0.42	0.42	0.04
Main	9536.1	10-yr SBCFCD	1220.00	2825.00	2830.65	0.000235	4.66	4.66	261.73	57.61	0.39	0.39	0.06
Main	9536.1	5-yr SBCFCD	820.00	2825.00	2829.31	0.000278	4.36	4.36	187.87	52.23	0.41	0.41	0.06
Main	9536.1	2-yr SBCFCD	500.00	2825.00	2828.11	0.000324	3.91	3.91	128.00	47.42	0.42	0.42	0.05
Main	9525.6		Culvert										
Main	9515.2	100-yr SBCFCD	2620.00	2825.00	2831.00	0.000872	9.28	9.28	282.19	59.01	0.75	0.75	0.25
Main	9515.2	100-yr FIS	2700.00	2825.00	2831.09	0.000880	9.40	9.40	287.19	59.35	0.75	0.75	0.25
Main	9515.2	50-yr FIS	1500.00	2825.00	2829.34	0.000909	7.92	7.92	189.45	52.35	0.73	0.73	0.20
Main	9515.2	10-yr FIS	200.00	2825.00	2826.48	0.000647	3.55	3.55	56.28	40.93	0.53	0.53	0.05
Main	9515.2	10-yr SBCFCD	1230.00	2825.00	2828.85	0.000929	7.48	7.48	164.39	50.40	0.73	0.73	0.18
Main	9515.2	5-yr SBCFCD	830.00	2825.00	2828.09	0.000907	6.52	6.52	127.29	47.36	0.70	0.70	0.15
Main	9515.2	2-yr SBCFCD	510.00	2825.00	2827.40	0.000819	5.34	5.34	95.47	44.60	0.64	0.64	0.11
Main	9313.9	100-yr SBCFCD	2620.00	2824.70	2829.69	0.008748	11.45	11.45	228.75	56.65	1.00	1.00	2.12
Main	9313.9	100-yr FIS	2700.00	2824.70	2829.80	0.008624	11.50	11.50	234.70	57.10	1.00	1.00	2.13
Main	9313.9	50-yr FIS	1500.00	2824.70	2828.42	0.008146	9.37	9.37	160.08	51.12	0.93	0.93	1.54
Main	9313.9	10-yr FIS	200.00	2824.70	2826.25	0.002915	3.35	3.35	59.62	41.74	0.49	0.49	0.26
Main	9313.9	10-yr SBCFCD	1230.00	2824.70	2828.13	0.007279	8.46	8.46	145.44	49.87	0.87	0.87	1.29
Main	9313.9	5-yr SBCFCD	830.00	2824.70	2827.60	0.005941	6.94	6.94	119.64	47.57	0.77	0.77	0.91
Main	9313.9	2-yr SBCFCD	510.00	2824.70	2827.07	0.004477	5.36	5.36	95.20	45.29	0.65	0.65	0.57
Main	9125	100-yr SBCFCD	2620.00	2824.40	2829.59	0.002670	7.01	7.01	373.62	72.00	0.54	0.54	0.76
Main	9125	100-yr FIS	2700.00	2824.40	2829.80	0.002503	6.95	6.95	388.65	72.00	0.53	0.53	0.73
Main	9125	50-yr FIS	1500.00	2824.40	2826.78	0.010771	8.77	8.77	171.04	72.00	1.00	1.00	1.50
Main	9125	10-yr FIS	200.00	2824.40	2825.02	0.015700	4.47	4.47	44.75	72.00	1.00	1.00	0.60
Main	9125	10-yr SBCFCD	1230.00	2824.40	2826.47	0.011332	8.25	8.25	149.06	72.00	1.01	1.01	1.39
Main	9125	5-yr SBCFCD	830.00	2824.40	2826.01	0.011761	7.16	7.16	115.86	72.00	1.00	1.00	1.13
Main	9125	2-yr SBCFCD	510.00	2824.40	2825.55	0.013351	6.15	6.15	82.86	72.00	1.01	1.01	0.93
Main	9116	100-yr SBCFCD	2620.00	2820.10	2829.85	0.000375	3.73	3.73	702.30	72.00	0.21	0.21	0.18
Main	9116	100-yr FIS	2700.00	2820.10	2830.05	0.000375	3.77	3.77	716.70	72.16	0.21	0.21	0.18
Main	9116	50-yr FIS	1500.00	2820.10	2826.79	0.000394	3.11	3.11	481.68	72.00	0.21	0.21	0.14
Main	9116	10-yr FIS	200.00	2820.10	2821.78	0.000592	1.65	1.65	121.03	72.00	0.22	0.22	0.06
Main	9116	10-yr SBCFCD	1230.00	2820.10	2825.95	0.000404	2.92	2.92	421.03	72.00	0.21	0.21	0.13
Main	9116	5-yr SBCFCD	830.00	2820.10	2824.58	0.000429	2.58	2.58	322.22	72.00	0.21	0.21	0.11
Main	9116	2-yr SBCFCD	510.00	2820.10	2823.31	0.000471	2.21	2.21	230.99	72.00	0.22	0.22	0.09
Main	9035.8	100-yr SBCFCD	2620.00	2820.00	2829.94	0.000011	1.62	1.62	1615.76	162.56	0.09	0.09	0.01
Main	9035.8	100-yr FIS	2700.00	2820.00	2830.14	0.000011	1.64	1.64	1648.54	162.56	0.09	0.09	0.01
Main	9035.8	50-yr FIS	1500.00	2820.00	2826.85	0.000012	1.35	1.35	1113.31	162.56	0.09	0.09	0.00
Main	9035.8	10-yr FIS	200.00	2820.00	2821.79	0.000017	0.69	0.69	291.70	162.56	0.09	0.09	0.00
Main	9035.8	10-yr SBCFCD	1230.00	2820.00	2826.00	0.000012	1.26	1.26	975.16	162.56	0.09	0.09	0.00
Main	9035.8	5-yr SBCFCD	830.00	2820.00	2824.61	0.000013	1.11	1.11	750.09	162.56	0.09	0.09	0.00
Main	9035.8	2-yr SBCFCD	510.00	2820.00	2823.34	0.000014	0.94	0.94	542.29	162.56	0.09	0.09	0.00
Main	9020.4		Culvert										
Main	9005	100-yr SBCFCD	2620.00	2820.00	2824.08	0.000835	7.47	7.47	350.96	102.15	0.71	0.71	0.18
Main	9005	100-yr FIS	2700.00	2820.00	2824.21	0.000799	7.43	7.43	363.49	103.12	0.70	0.70	0.17
Main	9005	50-yr FIS	1500.00	2820.00	2822.31	0.001974	8.22	8.22	182.58	88.11	1.01	1.01	0.25
Main	9005	10-yr FIS	200.00	2820.00	2820.63	0.002937	4.42	4.42	45.20	74.72	1.00	1.00	0.11
Main	9005	10-yr SBCFCD	1230.00	2820.00	2822.04	0.002049	7.75	7.75	158.63	85.93	1.01	1.01	0.23
Main	9005	5-yr SBCFCD	830.00	2820.00	2821.58	0.002211	6.90	6.90	120.31	82.31	1.01	1.01	0.20
Main	9005	2-yr SBCFCD	510.00	2820.00	2821.15	0.002439	5.95	5.95	85.71	78.91	1.01	1.01	0.16
Main	8713.9	100-yr SBCFCD	2620.00	2817.35	2822.04	0.008815	11.34	11.34	231.08	58.45	1.00	1.00	2.10
Main	8713.9	100-yr FIS	2700.00	2817.35	2822.13	0.008780	11.43	11.43	236.16	58.79	1.01	1.01	2.12
Main	8713.9	50-yr FIS	1500.00	2817.35	2820.73	0.009059	9.52	9.52	157.56	53.28	0.98	0.98	1.62
Main	8713.9	10-yr FIS	200.00	2817.35	2818.06	0.032219	6.85	6.85	29.18	42.77	1.46	1.46	1.36
Main	8713.9	10-yr SBCFCD	1230.00	2817.35	2820.11	0.012208	9.82	9.82	125.31	50.84	1.10	1.10	1.83

Main	8713.9	5-yr SBCFCD	830.00	2817.35	2819.34	0.016783	9.48	9.48	87.58	47.84	1.23	1.23	1.88
Main	8713.9	2-yr SBCFCD	510.00	2817.35	2818.72	0.022834	8.76	8.76	58.24	45.36	1.36	1.36	1.80
Main	8470.*	100-yr SBCFCD	2620.00	2815.20	2821.20	0.004807	7.73	7.73	339.05	78.04	0.65	0.65	1.28
Main	8470.*	100-yr FIS	2700.00	2815.20	2821.30	0.004792	7.78	7.78	346.83	78.75	0.65	0.65	1.29
Main	8470.*	50-yr FIS	1500.00	2815.20	2819.60	0.005094	6.71	6.71	223.50	66.57	0.65	0.65	1.05
Main	8470.*	10-yr FIS	200.00	2815.20	2816.52	0.006586	3.82	3.82	52.34	44.45	0.62	0.62	0.48
Main	8470.*	10-yr SBCFCD	1230.00	2815.20	2819.13	0.005207	6.37	6.37	192.96	63.19	0.64	0.64	0.98
Main	8470.*	5-yr SBCFCD	830.00	2815.20	2818.33	0.005450	5.74	5.74	144.57	57.44	0.64	0.64	0.84
Main	8470.*	2-yr SBCFCD	510.00	2815.20	2817.54	0.005794	5.02	5.02	101.57	51.79	0.63	0.63	0.70
Main	8468	100-yr SBCFCD	2620.00	2815.20	2821.19	0.004840	7.75	7.75	338.24	77.96	0.66	0.66	1.28
Main	8468	100-yr FIS	2700.00	2815.20	2821.29	0.004824	7.80	7.80	346.00	78.67	0.66	0.66	1.30
Main	8468	50-yr FIS	1500.00	2815.20	2819.59	0.005141	6.73	6.73	222.77	66.49	0.65	0.65	1.06
Main	8468	10-yr FIS	200.00	2815.20	2816.50	0.006906	3.88	3.88	51.54	44.32	0.63	0.63	0.50
Main	8468	10-yr SBCFCD	1230.00	2815.20	2819.12	0.005261	6.40	6.40	192.27	63.12	0.65	0.65	0.98
Main	8468	5-yr SBCFCD	830.00	2815.20	2818.31	0.005544	5.78	5.78	143.72	57.33	0.64	0.64	0.85
Main	8468	2-yr SBCFCD	510.00	2815.20	2817.53	0.005933	5.06	5.06	100.76	51.68	0.64	0.64	0.71
Main	8453	100-yr SBCFCD	2620.00	2810.20	2821.71	0.000407	3.26	3.26	804.05	104.71	0.21	0.21	0.19
Main	8453	100-yr FIS	2700.00	2810.20	2821.82	0.000417	3.31	3.31	815.02	105.34	0.21	0.21	0.19
Main	8453	50-yr FIS	1500.00	2810.20	2820.01	0.000255	2.36	2.36	634.82	94.42	0.16	0.16	0.10
Main	8453	10-yr FIS	200.00	2810.20	2816.66	0.000023	0.57	0.57	352.21	74.10	0.05	0.05	0.01
Main	8453	10-yr SBCFCD	1230.00	2810.20	2819.51	0.000212	2.09	2.09	587.92	91.36	0.15	0.15	0.08
Main	8453	5-yr SBCFCD	830.00	2810.20	2818.64	0.000142	1.62	1.62	511.06	86.11	0.12	0.12	0.05
Main	8453	2-yr SBCFCD	510.00	2810.20	2817.78	0.000081	1.16	1.16	439.47	80.92	0.09	0.09	0.03
Main	8451	100-yr SBCFCD	2620.00	2810.20	2821.71	0.000407	3.26	3.26	803.97	104.71	0.21	0.21	0.19
Main	8451	100-yr FIS	2700.00	2810.20	2821.81	0.000417	3.31	3.31	814.95	105.34	0.21	0.21	0.19
Main	8451	50-yr FIS	1500.00	2810.20	2820.01	0.000255	2.36	2.36	634.78	94.41	0.16	0.16	0.10
Main	8451	10-yr FIS	200.00	2810.20	2816.66	0.000023	0.57	0.57	352.21	74.10	0.05	0.05	0.01
Main	8451	10-yr SBCFCD	1230.00	2810.20	2819.51	0.000212	2.09	2.09	587.88	91.36	0.15	0.15	0.08
Main	8451	5-yr SBCFCD	830.00	2810.20	2818.64	0.000142	1.62	1.62	511.04	86.11	0.12	0.12	0.05
Main	8451	2-yr SBCFCD	510.00	2810.20	2817.78	0.000081	1.16	1.16	439.45	80.92	0.09	0.09	0.03
Main	8436	100-yr SBCFCD	2620.00	2815.20	2819.90	0.012129	10.74	10.74	243.92	68.74	1.00	1.00	2.64
Main	8436	100-yr FIS	2700.00	2815.20	2819.99	0.012071	10.82	10.82	249.58	69.32	1.00	1.00	2.66
Main	8436	50-yr FIS	1500.00	2815.20	2818.59	0.013281	9.38	9.38	159.95	59.33	1.01	1.01	2.20
Main	8436	10-yr FIS	200.00	2815.20	2816.17	0.019124	5.39	5.39	37.11	41.92	1.01	1.01	1.05
Main	8436	10-yr SBCFCD	1230.00	2815.20	2818.21	0.013706	8.91	8.91	137.99	56.61	1.01	1.01	2.06
Main	8436	5-yr SBCFCD	830.00	2815.20	2817.57	0.014713	8.06	8.06	103.03	51.99	1.01	1.01	1.80
Main	8436	2-yr SBCFCD	510.00	2815.20	2816.96	0.015909	7.04	7.04	72.46	47.59	1.01	1.01	1.50
Main	8413.9	100-yr SBCFCD	2620.00	2814.70	2819.10	0.010954	12.16	12.16	215.52	57.98	1.11	1.11	2.46
Main	8413.9	100-yr FIS	2700.00	2814.70	2819.20	0.010715	12.18	12.18	221.60	58.40	1.10	1.10	2.45
Main	8413.9	50-yr FIS	1500.00	2814.70	2817.59	0.015414	11.31	11.31	132.59	51.80	1.25	1.25	2.40
Main	8413.9	10-yr FIS	200.00	2814.70	2815.84	0.006398	4.14	4.14	48.29	44.66	0.70	0.70	0.43
Main	8413.9	10-yr SBCFCD	1230.00	2814.70	2817.20	0.017016	10.91	10.91	112.73	50.21	1.28	1.28	2.33
Main	8413.9	5-yr SBCFCD	830.00	2814.70	2816.60	0.019869	9.98	9.98	83.14	47.74	1.33	1.33	2.12
Main	8413.9	2-yr SBCFCD	510.00	2814.70	2816.05	0.023399	8.81	8.81	57.88	45.53	1.38	1.38	1.83
Main	8113.9	100-yr SBCFCD	2620.00	2812.00	2816.69	0.008826	11.32	11.32	231.39	58.75	1.01	1.01	2.09
Main	8113.9	100-yr FIS	2700.00	2812.00	2816.77	0.008782	11.41	11.41	236.57	59.10	1.01	1.01	2.11
Main	8113.9	50-yr FIS	1500.00	2812.00	2815.31	0.009703	9.73	9.73	154.22	53.23	1.01	1.01	1.70
Main	8113.9	10-yr FIS	200.00	2812.00	2812.90	0.014213	5.32	5.32	37.62	43.60	1.01	1.01	0.76
Main	8113.9	10-yr SBCFCD	1230.00	2812.00	2814.92	0.010018	9.19	9.19	133.87	51.68	1.01	1.01	1.58
Main	8113.9	5-yr SBCFCD	830.00	2812.00	2814.28	0.010711	8.19	8.19	101.33	49.10	1.00	1.00	1.35
Main	8113.9	2-yr SBCFCD	510.00	2812.00	2813.66	0.011748	7.09	7.09	71.95	46.64	1.01	1.01	1.11
Main	7840	100-yr SBCFCD	2620.00	2809.65	2813.26	0.004108	15.34	15.34	170.79	54.69	1.53	1.53	0.78
Main	7840	100-yr FIS	2700.00	2809.65	2813.33	0.004079	15.46	15.46	174.66	54.98	1.53	1.53	0.78
Main	7840	50-yr FIS	1500.00	2809.65	2812.17	0.004642	13.21	13.21	113.57	50.25	1.55	1.55	0.64
Main	7840	10-yr FIS	200.00	2809.65	2810.38	0.005379	6.60	6.60	30.28	42.97	1.39	1.39	0.23
Main	7840	10-yr SBCFCD	1230.00	2809.65	2811.87	0.004817	12.47	12.47	98.64	49.02	1.55	1.55	0.59
Main	7840	5-yr SBCFCD	830.00	2809.65	2811.38	0.005114	11.05	11.05	75.14	47.03	1.54	1.54	0.50
Main	7840	2-yr SBCFCD	510.00	2809.65	2810.93	0.005346	9.37	9.37	54.40	45.20	1.51	1.51	0.40

Main	7761.1	100-yr SBCFCD	2620.00	2806.00	2814.87	0.000063	3.31	3.31	791.08	108.34	0.22	0.22	0.03
Main	7761.1	100-yr FIS	2700.00	2806.00	2814.69	0.000072	3.50	3.50	771.55	107.56	0.23	0.23	0.03
Main	7761.1	50-yr FIS	1500.00	2806.00	2811.92	0.000085	3.06	3.06	490.03	95.58	0.24	0.24	0.03
Main	7761.1	10-yr FIS	200.00	2806.00	2807.55	0.000142	1.76	1.76	113.86	76.71	0.25	0.25	0.01
Main	7761.1	10-yr SBCFCD	1230.00	2806.00	2811.39	0.000079	2.80	2.80	439.61	93.27	0.23	0.23	0.02
Main	7761.1	5-yr SBCFCD	830.00	2806.00	2810.14	0.000089	2.54	2.54	327.06	87.90	0.23	0.23	0.02
Main	7761.1	2-yr SBCFCD	510.00	2806.00	2809.00	0.000100	2.22	2.22	229.47	82.97	0.24	0.24	0.02
Main	7749.9		Culvert										
Main	7738.6	100-yr SBCFCD	2970.00	2806.00	2813.15	0.000110	4.09	4.09	726.52	110.20	0.28	0.28	0.04
Main	7738.6	100-yr FIS	2700.00	2806.00	2812.76	0.000110	3.95	3.95	683.07	109.25	0.28	0.28	0.04
Main	7738.6	50-yr FIS	1500.00	2806.00	2810.71	0.000113	3.23	3.23	464.93	104.33	0.27	0.27	0.03
Main	7738.6	10-yr FIS	200.00	2806.00	2807.24	0.000172	1.70	1.70	117.47	95.99	0.27	0.27	0.01
Main	7738.6	10-yr SBCFCD	1400.00	2806.00	2810.51	0.000114	3.15	3.15	444.17	103.85	0.27	0.27	0.03
Main	7738.6	5-yr SBCFCD	930.00	2806.00	2809.48	0.000120	2.75	2.75	338.00	101.36	0.27	0.27	0.02
Main	7738.6	2-yr SBCFCD	570.00	2806.00	2808.53	0.000131	2.35	2.35	242.68	99.08	0.26	0.26	0.02
Main	7456.8	100-yr SBCFCD	2970.00	2805.60	2811.49	0.005054	9.72	9.72	305.43	63.80	0.78	0.78	1.45
Main	7456.8	100-yr FIS	2700.00	2805.60	2811.18	0.005063	9.45	9.45	285.86	62.55	0.78	0.78	1.39
Main	7456.8	50-yr FIS	1500.00	2805.60	2809.59	0.005046	7.81	7.81	191.99	56.15	0.74	0.74	1.04
Main	7456.8	10-yr FIS	200.00	2805.60	2806.91	0.004010	3.58	3.58	55.92	45.30	0.57	0.57	0.30
Main	7456.8	10-yr SBCFCD	1400.00	2805.60	2809.44	0.005040	7.63	7.63	183.39	55.53	0.74	0.74	1.01
Main	7456.8	5-yr SBCFCD	930.00	2805.60	2808.65	0.004943	6.61	6.61	140.64	52.32	0.71	0.71	0.81
Main	7456.8	2-yr SBCFCD	570.00	2805.60	2807.92	0.004725	5.50	5.50	103.63	49.38	0.67	0.67	0.61
Main	7347	100-yr SBCFCD	2970.00	2805.40	2810.51	0.001583	11.62	11.62	255.53	60.11	0.99	0.99	0.40
Main	7347	100-yr FIS	2700.00	2805.40	2810.21	0.001611	11.34	11.34	238.10	58.96	0.99	0.99	0.39
Main	7347	50-yr FIS	1500.00	2805.40	2808.74	0.001770	9.64	9.64	155.53	53.15	0.99	0.99	0.31
Main	7347	10-yr FIS	200.00	2805.40	2806.31	0.002560	5.25	5.25	38.09	43.59	0.99	0.99	0.14
Main	7347	10-yr SBCFCD	1400.00	2805.40	2808.60	0.001790	9.46	9.46	148.04	52.60	0.99	0.99	0.31
Main	7347	5-yr SBCFCD	930.00	2805.40	2807.87	0.001922	8.41	8.41	110.61	49.71	0.99	0.99	0.26
Main	7347	2-yr SBCFCD	570.00	2805.40	2807.20	0.002113	7.28	7.28	78.26	47.08	1.00	1.00	0.22
Main	7267	100-yr SBCFCD	2970.00	2802.00	2810.96	0.000146	5.16	5.16	575.34	70.38	0.32	0.32	0.07
Main	7267	100-yr FIS	2700.00	2802.00	2810.36	0.000152	5.06	5.06	533.37	69.55	0.32	0.32	0.06
Main	7267	50-yr FIS	1500.00	2802.00	2807.71	0.000164	4.24	4.24	353.72	65.89	0.32	0.32	0.05
Main	7267	10-yr FIS	200.00	2802.00	2802.24	0.100795	14.10	14.10	14.19	58.34	5.04	5.04	1.52
Main	7267	10-yr SBCFCD	1400.00	2802.00	2807.53	0.000160	4.10	4.10	341.55	65.63	0.32	0.32	0.05
Main	7267	5-yr SBCFCD	930.00	2802.00	2806.26	0.000166	3.58	3.58	259.57	63.88	0.31	0.31	0.04
Main	7267	2-yr SBCFCD	570.00	2802.00	2805.12	0.000173	3.03	3.03	187.81	62.31	0.31	0.31	0.03
Main	7246.1		Culvert										
Main	7231.3	100-yr SBCFCD	3150.00	2802.00	2808.90	0.000378	7.16	7.16	439.73	69.44	0.50	0.50	0.14
Main	7231.3	100-yr FIS	2700.00	2802.00	2808.33	0.000369	6.74	6.74	400.55	68.50	0.49	0.49	0.12
Main	7231.3	50-yr FIS	1500.00	2802.00	2806.51	0.000350	5.39	5.39	278.51	65.48	0.46	0.46	0.09
Main	7231.3	10-yr FIS	200.00	2802.00	2803.32	0.000367	2.57	2.57	77.94	60.19	0.40	0.40	0.03
Main	7231.3	10-yr SBCFCD	1480.00	2802.00	2806.47	0.000350	5.36	5.36	276.08	65.42	0.46	0.46	0.09
Main	7231.3	5-yr SBCFCD	990.00	2802.00	2805.52	0.000348	4.62	4.62	214.21	63.83	0.44	0.44	0.07
Main	7231.3	2-yr SBCFCD	610.00	2802.00	2804.62	0.000349	3.87	3.87	157.81	62.35	0.43	0.43	0.05
Main	7010.2	100-yr SBCFCD	3150.00	2801.65	2807.85	0.004705	9.65	9.65	326.30	65.25	0.76	0.76	1.41
Main	7010.2	100-yr FIS	2700.00	2801.65	2807.35	0.004679	9.19	9.19	293.94	63.20	0.75	0.75	1.30
Main	7010.2	50-yr FIS	1500.00	2801.65	2805.75	0.004592	7.56	7.56	198.30	56.70	0.71	0.71	0.97
Main	7010.2	10-yr FIS	200.00	2801.65	2803.04	0.003286	3.36	3.36	59.56	45.66	0.52	0.52	0.26
Main	7010.2	10-yr SBCFCD	1480.00	2801.65	2805.72	0.004609	7.54	7.54	196.27	56.55	0.71	0.71	0.97
Main	7010.2	5-yr SBCFCD	990.00	2801.65	2804.90	0.004505	6.55	6.55	151.22	53.21	0.68	0.68	0.78
Main	7010.2	2-yr SBCFCD	610.00	2801.65	2804.14	0.004221	5.43	5.43	112.39	50.15	0.64	0.64	0.58
Main	6880	100-yr SBCFCD	3150.00	2801.45	2806.74	0.001566	11.79	11.79	267.26	61.02	0.99	0.99	0.41
Main	6880	100-yr FIS	2700.00	2801.45	2806.26	0.001605	11.32	11.32	238.59	59.13	0.99	0.99	0.39
Main	6880	50-yr FIS	1500.00	2801.45	2804.78	0.001787	9.67	9.67	155.14	53.23	1.00	1.00	0.32
Main	6880	10-yr FIS	200.00	2801.45	2802.33	0.002855	5.43	5.43	36.83	43.50	1.04	1.04	0.15
Main	6880	10-yr SBCFCD	1480.00	2801.45	2804.76	0.001773	9.60	9.60	154.17	53.15	0.99	0.99	0.31

Main	6880	5-yr SBCFCD	990.00	2801.45	2804.02	0.001901	8.56	8.56	115.68	50.19	0.99	0.99	0.27
Main	6880	2-yr SBCFCD	610.00	2801.45	2803.32	0.002102	7.45	7.45	81.90	47.44	1.00	1.00	0.22
Main	6801.6	100-yr SBCFCD	3150.00	2796.65	2805.97	0.000136	5.02	5.02	627.28	67.36	0.29	0.29	0.06
Main	6801.6	100-yr FIS	2700.00	2796.65	2805.13	0.000134	4.73	4.73	570.62	67.35	0.29	0.29	0.06
Main	6801.6	50-yr FIS	1500.00	2796.65	2802.55	0.000127	3.78	3.78	396.98	67.32	0.27	0.27	0.04
Main	6801.6	10-yr FIS	200.00	2796.65	2796.83	0.199036	16.33	16.33	12.25	67.26	6.74	6.74	2.25
Main	6801.6	10-yr SBCFCD	1480.00	2796.65	2802.50	0.000127	3.76	3.76	393.70	67.32	0.27	0.27	0.04
Main	6801.6	5-yr SBCFCD	990.00	2796.65	2801.21	0.000125	3.23	3.23	306.64	67.31	0.27	0.27	0.03
Main	6801.6	2-yr SBCFCD	610.00	2796.65	2800.02	0.000125	2.69	2.69	226.44	67.30	0.26	0.26	0.02
Main	6785.6		Culvert										
Main	6769.7	100-yr SBCFCD	3150.00	2796.55	2803.95	0.000277	6.32	6.32	498.08	67.35	0.41	0.41	0.10
Main	6769.7	100-yr FIS	2700.00	2796.55	2803.41	0.000257	5.84	5.84	461.97	67.34	0.39	0.39	0.09
Main	6769.7	50-yr FIS	1500.00	2796.55	2801.58	0.000210	4.43	4.43	338.42	67.32	0.35	0.35	0.06
Main	6769.7	10-yr FIS	200.00	2796.55	2798.12	0.000162	1.90	1.90	105.27	67.28	0.27	0.27	0.02
Main	6769.7	10-yr SBCFCD	1480.00	2796.55	2801.54	0.000209	4.41	4.41	335.91	67.32	0.35	0.35	0.06
Main	6769.7	5-yr SBCFCD	990.00	2796.55	2800.54	0.000191	3.69	3.69	268.48	67.31	0.33	0.33	0.04
Main	6769.7	2-yr SBCFCD	610.00	2796.55	2799.58	0.000176	2.99	2.99	203.69	67.30	0.30	0.30	0.03
Main	6690	100-yr SBCFCD	3150.00	2796.45	2803.24	0.000632	8.57	8.57	367.47	68.23	0.65	0.65	0.20
Main	6690	100-yr FIS	2700.00	2796.45	2802.77	0.000603	8.05	8.05	335.48	66.25	0.63	0.63	0.18
Main	6690	50-yr FIS	1500.00	2796.45	2801.10	0.000554	6.50	6.50	230.74	59.31	0.58	0.58	0.13
Main	6690	10-yr FIS	200.00	2796.45	2797.98	0.000442	3.02	3.02	66.25	46.38	0.45	0.45	0.04
Main	6690	10-yr SBCFCD	1480.00	2796.45	2801.06	0.000554	6.47	6.47	228.72	59.17	0.58	0.58	0.13
Main	6690	5-yr SBCFCD	990.00	2796.45	2800.16	0.000531	5.60	5.60	176.92	55.41	0.55	0.55	0.10
Main	6690	2-yr SBCFCD	610.00	2796.45	2799.30	0.000502	4.67	4.67	130.72	51.83	0.52	0.52	0.08
Main	6555.8	100-yr SBCFCD	3150.00	2796.25	2803.05	0.003399	8.64	8.64	364.53	67.20	0.65	0.65	1.10
Main	6555.8	100-yr FIS	2700.00	2796.25	2802.60	0.003191	8.07	8.07	334.76	65.41	0.63	0.63	0.98
Main	6555.8	50-yr FIS	1500.00	2796.25	2800.96	0.002846	6.45	6.45	232.67	58.83	0.57	0.57	0.68
Main	6555.8	10-yr FIS	200.00	2796.25	2797.88	0.001910	2.83	2.83	70.69	46.54	0.40	0.40	0.18
Main	6555.8	10-yr SBCFCD	1480.00	2796.25	2800.92	0.002842	6.42	6.42	230.67	58.70	0.57	0.57	0.67
Main	6555.8	5-yr SBCFCD	990.00	2796.25	2800.03	0.002666	5.51	5.51	179.79	55.12	0.54	0.54	0.53
Main	6555.8	2-yr SBCFCD	610.00	2796.25	2799.18	0.002441	4.54	4.54	134.29	51.71	0.50	0.50	0.39
Main	6400	100-yr SBCFCD	3150.00	2796.00	2801.39	0.008778	11.18	11.18	281.86	73.31	1.00	1.00	2.05
Main	6400	100-yr FIS	2700.00	2796.00	2800.89	0.008920	10.93	10.93	247.01	67.13	1.00	1.00	1.99
Main	6400	50-yr FIS	1500.00	2796.00	2799.32	0.009639	9.70	9.70	154.56	53.26	1.00	1.00	1.70
Main	6400	10-yr FIS	200.00	2796.00	2796.90	0.014187	5.31	5.31	37.64	43.60	1.01	1.01	0.76
Main	6400	10-yr SBCFCD	1480.00	2796.00	2799.29	0.009643	9.66	9.66	153.17	53.15	1.00	1.00	1.69
Main	6400	5-yr SBCFCD	990.00	2796.00	2798.55	0.010386	8.63	8.63	114.77	50.18	1.01	1.01	1.45
Main	6400	2-yr SBCFCD	610.00	2796.00	2797.86	0.011369	7.48	7.48	81.52	47.46	1.01	1.01	1.20
Main	6344.7	100-yr SBCFCD	3150.00	2792.00	2801.47	0.000042	2.99	2.99	1055.03	111.78	0.17	0.17	0.02
Main	6344.7	100-yr FIS	2700.00	2792.00	2800.54	0.000043	2.84	2.84	951.39	111.70	0.17	0.17	0.02
Main	6344.7	50-yr FIS	1500.00	2792.00	2797.77	0.000046	2.34	2.34	641.76	111.48	0.17	0.17	0.02
Main	6344.7	10-yr FIS	200.00	2792.00	2793.52	0.000064	1.19	1.19	168.33	111.12	0.17	0.17	0.01
Main	6344.7	10-yr SBCFCD	1480.00	2792.00	2797.72	0.000046	2.33	2.33	635.99	111.47	0.17	0.17	0.01
Main	6344.7	5-yr SBCFCD	990.00	2792.00	2796.37	0.000049	2.04	2.04	486.09	111.36	0.17	0.17	0.01
Main	6344.7	2-yr SBCFCD	610.00	2792.00	2795.17	0.000053	1.73	1.73	351.95	111.26	0.17	0.17	0.01
Main	6328.7		Culvert										
Main	6312.5	100-yr SBCFCD	3150.00	2792.00	2797.10	0.000302	5.55	5.55	567.15	111.53	0.43	0.43	0.09
Main	6312.5	100-yr FIS	2700.00	2792.00	2796.15	0.000431	5.85	5.85	461.63	111.43	0.51	0.51	0.10
Main	6312.5	50-yr FIS	1500.00	2792.00	2793.78	0.002139	7.60	7.60	197.42	111.18	1.00	1.00	0.23
Main	6312.5	10-yr FIS	200.00	2792.00	2792.47	0.003194	3.86	3.86	51.77	111.05	1.00	1.00	0.09
Main	6312.5	10-yr SBCFCD	1480.00	2792.00	2793.76	0.002134	7.55	7.55	195.95	111.18	1.00	1.00	0.23
Main	6312.5	5-yr SBCFCD	990.00	2792.00	2793.35	0.002308	6.60	6.60	149.93	111.14	1.00	1.00	0.19
Main	6312.5	2-yr SBCFCD	610.00	2792.00	2792.98	0.002542	5.62	5.62	108.64	111.10	1.00	1.00	0.15
Main	6000	100-yr SBCFCD	3150.00	2788.00	2793.78	0.001917	13.61	13.61	231.38	40.00	1.00	1.00	0.54
Main	6000	100-yr FIS	2700.00	2788.00	2793.23	0.001918	12.91	12.91	209.08	40.00	1.00	1.00	0.50
Main	6000	50-yr FIS	1500.00	2788.00	2791.02	0.003249	12.40	12.40	120.94	40.00	1.26	1.26	0.53

Main	6000	10-yr FIS	200.00	2788.00	2788.48	0.022546	10.38	10.38	19.27	40.00	2.64	2.64	0.66
Main	6000	10-yr SBCFCD	1480.00	2788.00	2790.98	0.003318	12.42	12.42	119.12	40.00	1.27	1.27	0.54
Main	6000	5-yr SBCFCD	990.00	2788.00	2789.97	0.005567	12.58	12.58	78.70	40.00	1.58	1.58	0.62
Main	6000	2-yr SBCFCD	610.00	2788.00	2789.25	0.009167	12.20	12.20	50.01	40.00	1.92	1.92	0.67
Main	5778.8	100-yr SBCFCD	3150.00	2785.00	2791.52	0.015325	16.10	16.10	195.62	41.19	1.30	1.30	4.07
Main	5778.8	100-yr FIS	2700.00	2785.00	2791.00	0.015284	15.44	15.44	174.85	39.14	1.29	1.29	3.82
Main	5778.8	50-yr FIS	1500.00	2785.00	2789.33	0.014333	13.03	13.03	115.14	31.55	1.20	1.20	2.91
Main	5778.8	10-yr FIS	200.00	2785.00	2786.31	0.013034	6.37	6.37	31.41	25.07	1.00	1.00	0.97
Main	5778.8	10-yr SBCFCD	1480.00	2785.00	2789.29	0.014315	12.98	12.98	113.99	31.35	1.20	1.20	2.90
Main	5778.8	5-yr SBCFCD	990.00	2785.00	2788.53	0.011936	10.84	10.84	91.36	28.98	1.08	1.08	2.11
Main	5778.8	2-yr SBCFCD	610.00	2785.00	2787.71	0.011006	8.96	8.96	68.04	27.53	1.00	1.00	1.56
Main	5742	100-yr SBCFCD	3150.00	2785.00	2794.35	0.000291	6.76	6.76	465.82	58.88	0.42	0.42	0.12
Main	5742	100-yr FIS	2700.00	2785.00	2793.24	0.000325	6.71	6.71	402.14	56.11	0.44	0.44	0.12
Main	5742	50-yr FIS	1500.00	2785.00	2790.30	0.000398	6.02	6.02	249.05	47.83	0.47	0.47	0.11
Main	5742	10-yr FIS	200.00	2785.00	2786.24	0.000725	3.43	3.43	58.28	47.00	0.54	0.54	0.05
Main	5742	10-yr SBCFCD	1480.00	2785.00	2790.24	0.000400	6.01	6.01	246.40	47.68	0.47	0.47	0.11
Main	5742	5-yr SBCFCD	990.00	2785.00	2786.44	0.011001	14.67	14.67	67.49	47.00	2.16	2.16	0.93
Main	5742	2-yr SBCFCD	610.00	2785.00	2786.05	0.011649	12.37	12.37	49.31	47.00	2.13	2.13	0.73
Main	5679.8		Culvert										
Main	5609.6	100-yr SBCFCD	3150.00	2784.00	2793.55	0.000309	7.17	7.17	439.25	46.00	0.41	0.41	0.13
Main	5609.6	100-yr FIS	2700.00	2784.00	2792.75	0.000294	6.71	6.71	402.44	46.00	0.40	0.40	0.12
Main	5609.6	50-yr FIS	1500.00	2784.00	2790.03	0.000279	5.41	5.41	277.22	46.00	0.39	0.39	0.08
Main	5609.6	10-yr FIS	200.00	2784.00	2785.24	0.000767	3.52	3.52	56.81	46.00	0.56	0.56	0.06
Main	5609.6	10-yr SBCFCD	1480.00	2784.00	2789.97	0.000279	5.39	5.39	274.81	46.00	0.39	0.39	0.08
Main	5609.6	5-yr SBCFCD	990.00	2784.00	2786.43	0.002091	8.84	8.84	111.95	46.00	1.00	1.00	0.29
Main	5609.6	2-yr SBCFCD	610.00	2784.00	2785.77	0.002212	7.49	7.49	81.45	46.00	0.99	0.99	0.23
Main	5581.3	100-yr SBCFCD	3150.00	2783.60	2790.79	0.001835	13.69	13.69	230.16	39.35	1.00	1.00	0.54
Main	5581.3	100-yr FIS	2700.00	2783.60	2790.10	0.001873	13.25	13.25	203.84	36.99	0.99	0.99	0.51
Main	5581.3	50-yr FIS	1500.00	2783.60	2787.92	0.002045	11.52	11.52	130.17	31.06	0.99	0.99	0.42
Main	5581.3	10-yr FIS	200.00	2783.60	2784.69	0.002809	6.12	6.12	32.68	30.02	1.03	1.03	0.18
Main	5581.3	10-yr SBCFCD	1480.00	2783.60	2787.87	0.002062	11.50	11.50	128.66	31.00	1.00	1.00	0.42
Main	5581.3	5-yr SBCFCD	990.00	2783.60	2786.85	0.002130	10.15	10.15	97.50	30.03	0.99	0.99	0.36
Main	5581.3	2-yr SBCFCD	610.00	2783.60	2785.95	0.002223	8.65	8.65	70.55	30.02	0.99	0.99	0.28
Main	5515.3	100-yr SBCFCD	3150.00	2783.00	2787.05	0.006258	19.86	19.86	158.58	46.69	1.90	1.90	1.27
Main	5515.3	100-yr FIS	2700.00	2783.00	2786.68	0.006422	19.06	19.06	141.65	45.36	1.90	1.90	1.20
Main	5515.3	50-yr FIS	1500.00	2783.00	2785.57	0.006887	16.03	16.03	93.55	41.31	1.88	1.88	0.94
Main	5515.3	10-yr FIS	200.00	2783.00	2783.70	0.010169	8.76	8.76	22.84	34.15	1.89	1.89	0.42
Main	5515.3	10-yr SBCFCD	1480.00	2783.00	2785.55	0.006894	15.97	15.97	92.70	41.23	1.88	1.88	0.94
Main	5515.3	5-yr SBCFCD	990.00	2783.00	2784.99	0.007157	14.06	14.06	70.39	39.16	1.85	1.85	0.78
Main	5515.3	2-yr SBCFCD	610.00	2783.00	2784.47	0.007644	12.10	12.10	50.43	37.17	1.83	1.83	0.64
Main	5135	100-yr SBCFCD	3150.00	2782.21	2786.70	0.004476	19.12	20.80	164.79	43.46	1.73	1.81	1.25
Main	5135	100-yr FIS	2700.00	2782.21	2786.26	0.004750	18.51	20.00	145.88	42.13	1.75	1.83	1.20
Main	5135	50-yr FIS	1500.00	2782.21	2784.94	0.005815	16.12	17.02	93.06	38.19	1.82	1.87	0.99
Main	5135	10-yr FIS	200.00	2782.21	2782.89	0.011926	9.50	9.64	21.05	32.04	2.06	2.08	0.51
Main	5135	10-yr SBCFCD	1480.00	2782.21	2784.91	0.005850	16.07	16.97	92.08	38.11	1.82	1.88	0.99
Main	5135	5-yr SBCFCD	990.00	2782.21	2784.28	0.006642	14.48	15.11	68.36	36.20	1.85	1.90	0.86
Main	5135	2-yr SBCFCD	610.00	2782.21	2783.69	0.007866	12.77	13.18	47.75	34.45	1.91	1.95	0.73
Main	4875	100-yr SBCFCD	3150.00	2779.75	2783.87	0.006072	21.15	22.88	148.93	42.35	1.99	2.07	1.56
Main	4875	100-yr FIS	2700.00	2779.75	2783.46	0.006448	20.47	21.99	131.90	41.13	2.01	2.09	1.49
Main	4875	50-yr FIS	1500.00	2779.75	2782.26	0.007767	17.69	18.61	84.79	37.53	2.07	2.13	1.22
Main	4875	10-yr FIS	200.00	2779.75	2780.50	0.008395	8.53	8.67	23.45	32.26	1.76	1.78	0.39
Main	4875	10-yr SBCFCD	1480.00	2779.75	2782.24	0.007801	17.63	18.54	83.94	37.47	2.07	2.13	1.21
Main	4875	5-yr SBCFCD	990.00	2779.75	2781.67	0.008595	15.72	16.35	63.00	35.75	2.08	2.13	1.03
Main	4875	2-yr SBCFCD	610.00	2779.75	2781.16	0.009262	13.44	13.85	45.37	34.24	2.05	2.09	0.82
Main	4635	100-yr SBCFCD	3150.00	2777.45	2781.38	0.007137	22.31	24.06	141.20	41.80	2.14	2.23	1.75
Main	4635	100-yr FIS	2700.00	2777.45	2781.00	0.007522	21.53	23.07	125.41	40.65	2.16	2.24	1.67
Main	4635	50-yr FIS	1500.00	2777.45	2779.88	0.008699	18.35	19.27	81.76	37.29	2.18	2.24	1.32

Main	4635	10-yr FIS	200.00	2777.45	2778.17	0.009990	9.00	9.14	22.23	32.15	1.90	1.92	0.45
Main	4635	10-yr SBCFCD	1480.00	2777.45	2779.86	0.008727	18.28	19.19	80.98	37.23	2.18	2.24	1.31
Main	4635	5-yr SBCFCD	990.00	2777.45	2779.33	0.009220	16.07	16.70	61.61	35.63	2.15	2.20	1.08
Main	4635	2-yr SBCFCD	610.00	2777.45	2778.85	0.009523	13.56	13.97	44.98	34.20	2.08	2.12	0.83
Main	4385	100-yr SBCFCD	3150.00	2775.05	2778.87	0.007917	23.09	24.85	136.45	41.46	2.24	2.33	1.89
Main	4385	100-yr FIS	2700.00	2775.05	2778.51	0.008267	22.21	23.76	121.59	40.37	2.25	2.34	1.78
Main	4385	50-yr FIS	1500.00	2775.05	2777.45	0.009155	18.65	19.57	80.44	37.18	2.23	2.29	1.37
Main	4385	10-yr FIS	200.00	2775.05	2775.78	0.009393	8.83	8.97	22.65	32.19	1.85	1.87	0.43
Main	4385	10-yr SBCFCD	1480.00	2775.05	2777.43	0.009175	18.57	19.49	79.69	37.12	2.23	2.29	1.36
Main	4385	5-yr SBCFCD	990.00	2775.05	2776.91	0.009467	16.20	16.84	61.10	35.59	2.17	2.23	1.10
Main	4385	2-yr SBCFCD	610.00	2775.05	2776.45	0.009597	13.59	14.00	44.87	34.19	2.09	2.13	0.84
Main	4135	100-yr SBCFCD	3150.00	2772.65	2776.40	0.008459	23.59	25.37	133.51	41.24	2.31	2.40	1.98
Main	4135	100-yr FIS	2700.00	2772.65	2776.05	0.008741	22.61	24.17	119.40	40.20	2.31	2.40	1.86
Main	4135	50-yr FIS	1500.00	2772.65	2775.03	0.009388	18.80	19.73	79.79	37.13	2.25	2.32	1.39
Main	4135	10-yr FIS	200.00	2772.65	2773.37	0.009696	8.92	9.06	22.43	32.17	1.88	1.90	0.44
Main	4135	10-yr SBCFCD	1480.00	2772.65	2775.01	0.009400	18.72	19.63	79.08	37.07	2.25	2.32	1.38
Main	4135	5-yr SBCFCD	990.00	2772.65	2774.51	0.009570	16.26	16.89	60.89	35.57	2.18	2.24	1.11
Main	4135	2-yr SBCFCD	610.00	2772.65	2774.05	0.009603	13.60	14.00	44.86	34.19	2.09	2.13	0.84
Main	3969.6	100-yr SBCFCD	3380.00	2771.00	2775.17	0.007553	22.25	22.25	151.94	42.88	2.08	2.08	1.58
Main	3969.6	100-yr FIS	2700.00	2771.00	2774.57	0.008198	21.25	21.25	127.03	41.05	2.13	2.13	1.51
Main	3969.6	50-yr FIS	1500.00	2771.00	2773.65	0.007068	16.61	16.61	90.33	38.20	1.90	1.90	1.00
Main	3969.6	10-yr FIS	200.00	2771.00	2771.94	0.004139	6.77	6.77	29.56	32.94	1.26	1.26	0.23
Main	3969.6	10-yr SBCFCD	1600.00	2771.00	2773.84	0.006329	16.37	16.37	97.74	38.79	1.82	1.82	0.95
Main	3969.6	5-yr SBCFCD	1070.00	2771.00	2773.32	0.005646	13.73	13.73	77.93	37.19	1.67	1.67	0.71
Main	3969.6	2-yr SBCFCD	650.00	2771.00	2772.79	0.005015	11.08	11.08	58.65	35.56	1.52	1.52	0.50
Main	3835	100-yr SBCFCD	3380.00	2769.77	2774.08	0.005966	21.53	23.37	156.97	42.92	1.98	2.07	1.60
Main	3835	100-yr FIS	2700.00	2769.77	2773.45	0.006606	20.63	22.16	130.86	41.05	2.03	2.12	1.52
Main	3835	50-yr FIS	1500.00	2769.77	2772.42	0.006471	16.68	17.59	89.91	37.94	1.91	1.97	1.07
Main	3835	10-yr FIS	200.00	2769.77	2770.49	0.009990	9.00	9.14	22.23	32.15	1.90	1.92	0.45
Main	3835	10-yr SBCFCD	1600.00	2769.77	2772.59	0.005921	16.59	17.55	96.46	38.45	1.84	1.90	1.04
Main	3835	5-yr SBCFCD	1070.00	2769.77	2771.99	0.006051	14.46	15.13	73.99	36.66	1.79	1.84	0.84
Main	3835	2-yr SBCFCD	650.00	2769.77	2771.39	0.006634	12.40	12.82	52.42	34.85	1.78	1.82	0.67
Main	3600.*	100-yr SBCFCD	3380.00	2766.20	2768.60	0.124377	24.60	24.60	137.41	64.47	2.97	2.97	16.35
Main	3600.*	100-yr FIS	2700.00	2766.20	2768.30	0.125449	22.81	22.81	118.36	62.67	2.93	2.93	14.63
Main	3600.*	50-yr FIS	1500.00	2766.20	2767.70	0.121800	18.32	18.32	81.87	59.05	2.74	2.74	10.46
Main	3600.*	10-yr FIS	200.00	2766.20	2767.27	0.006811	3.51	3.51	56.97	56.45	0.62	0.62	0.43
Main	3600.*	10-yr SBCFCD	1600.00	2766.20	2767.75	0.124170	18.87	18.87	84.79	59.35	2.78	2.78	10.98
Main	3600.*	5-yr SBCFCD	1070.00	2766.20	2767.43	0.122920	16.24	16.24	65.88	57.40	2.67	2.67	8.75
Main	3600.*	2-yr SBCFCD	650.00	2766.20	2767.14	0.112368	13.12	13.12	49.54	55.65	2.45	2.45	6.21
Main	3598	100-yr SBCFCD	3380.00	2766.20	2768.65	0.116162	24.05	24.05	140.51	64.76	2.88	2.88	15.54
Main	3598	100-yr FIS	2700.00	2766.20	2768.35	0.115721	22.22	22.22	121.51	62.97	2.82	2.82	13.79
Main	3598	50-yr FIS	1500.00	2766.20	2767.76	0.107400	17.60	17.60	85.22	59.39	2.59	2.59	9.54
Main	3598	10-yr FIS	200.00	2766.20	2767.25	0.007225	3.58	3.58	55.92	56.34	0.63	0.63	0.45
Main	3598	10-yr SBCFCD	1600.00	2766.20	2767.81	0.110138	18.16	18.16	88.10	59.69	2.63	2.63	10.06
Main	3598	5-yr SBCFCD	1070.00	2766.20	2767.49	0.104427	15.43	15.43	69.36	57.76	2.48	2.48	7.77
Main	3598	2-yr SBCFCD	650.00	2766.20	2767.21	0.088421	12.17	12.17	53.40	56.07	2.20	2.20	5.23
Main	3583	100-yr SBCFCD	3380.00	2761.20	2772.86	0.000402	3.41	3.41	992.15	120.15	0.21	0.21	0.20
Main	3583	100-yr FIS	2700.00	2761.20	2772.06	0.000338	3.01	3.01	898.09	115.35	0.19	0.19	0.16
Main	3583	50-yr FIS	1500.00	2761.20	2770.36	0.000201	2.11	2.11	710.34	105.10	0.14	0.14	0.08
Main	3583	10-yr FIS	200.00	2761.20	2767.39	0.000015	0.47	0.47	424.49	87.22	0.04	0.04	0.00
Main	3583	10-yr SBCFCD	1600.00	2761.20	2770.52	0.000214	2.20	2.20	727.56	106.08	0.15	0.15	0.09
Main	3583	5-yr SBCFCD	1070.00	2761.20	2769.60	0.000142	1.69	1.69	631.95	100.51	0.12	0.12	0.05
Main	3583	2-yr SBCFCD	650.00	2761.20	2768.70	0.000080	1.19	1.19	544.51	95.14	0.09	0.09	0.03
Main	3581	100-yr SBCFCD	3380.00	2761.20	2772.86	0.000402	3.41	3.41	992.06	120.15	0.21	0.21	0.20
Main	3581	100-yr FIS	2700.00	2761.20	2772.06	0.000338	3.01	3.01	898.00	115.34	0.19	0.19	0.16
Main	3581	50-yr FIS	1500.00	2761.20	2770.36	0.000201	2.11	2.11	710.29	105.10	0.14	0.14	0.08
Main	3581	10-yr FIS	200.00	2761.20	2767.39	0.000015	0.47	0.47	424.49	87.22	0.04	0.04	0.00
Main	3581	10-yr SBCFCD	1600.00	2761.20	2770.52	0.000214	2.20	2.20	727.51	106.08	0.15	0.15	0.09

Main	3581	5-yr SBCFCD	1070.00	2761.20	2769.60	0.000142	1.69	1.69	631.93	100.51	0.12	0.12	0.05
Main	3581	2-yr SBCFCD	650.00	2761.20	2768.70	0.000080	1.19	1.19	544.49	95.14	0.09	0.09	0.03
Main	3566	100-yr SBCFCD	3380.00	2766.20	2770.93	0.011591	11.12	11.12	303.87	78.51	1.00	1.00	2.75
Main	3566	100-yr FIS	2700.00	2766.20	2770.33	0.011975	10.47	10.47	257.89	74.90	0.99	0.99	2.53
Main	3566	50-yr FIS	1500.00	2766.20	2769.08	0.013117	8.89	8.89	168.75	67.34	0.99	0.99	2.02
Main	3566	10-yr FIS	200.00	2766.20	2766.98	0.019732	4.89	4.89	40.86	54.71	1.00	1.00	0.92
Main	3566	10-yr SBCFCD	1600.00	2766.20	2769.19	0.013103	9.08	9.08	176.19	68.00	0.99	0.99	2.09
Main	3566	5-yr SBCFCD	1070.00	2766.20	2768.52	0.014110	8.11	8.11	131.95	63.96	0.99	0.99	1.80
Main	3566	2-yr SBCFCD	650.00	2766.20	2767.88	0.015719	7.04	7.04	92.30	60.11	1.00	1.00	1.49
Main	3520.3	100-yr SBCFCD	3380.00	2765.00	2768.11	0.026260	15.62	15.62	216.36	78.36	1.66	1.66	4.45
Main	3520.3	100-yr FIS	2700.00	2765.00	2767.68	0.028381	14.75	14.75	183.02	76.75	1.68	1.68	4.17
Main	3520.3	50-yr FIS	1500.00	2765.00	2766.84	0.033584	12.52	12.52	119.77	73.21	1.73	1.73	3.40
Main	3520.3	10-yr FIS	200.00	2765.00	2765.57	0.035393	6.10	6.10	32.77	61.61	1.47	1.47	1.17
Main	3520.3	10-yr SBCFCD	1600.00	2765.00	2766.92	0.033010	12.75	12.75	125.49	73.69	1.72	1.72	3.48
Main	3520.3	5-yr SBCFCD	1070.00	2765.00	2766.50	0.035428	11.26	11.26	95.05	71.10	1.72	1.72	2.93
Main	3520.3	2-yr SBCFCD	650.00	2765.00	2766.11	0.037591	9.52	9.52	68.25	68.73	1.68	1.68	2.32
Main	3450.*	100-yr SBCFCD	3380.00	2762.50	2768.60	0.004639	8.12	8.12	416.47	86.59	0.65	0.65	1.36
Main	3450.*	100-yr FIS	2700.00	2762.50	2767.85	0.004748	7.64	7.64	353.60	82.12	0.65	0.65	1.25
Main	3450.*	50-yr FIS	1500.00	2762.50	2766.27	0.005111	6.49	6.49	231.02	72.61	0.64	0.64	1.00
Main	3450.*	10-yr FIS	200.00	2762.50	2763.57	0.006802	3.51	3.51	56.98	56.42	0.62	0.62	0.43
Main	3450.*	10-yr SBCFCD	1600.00	2762.50	2766.42	0.005054	6.61	6.61	242.20	73.53	0.64	0.64	1.02
Main	3450.*	5-yr SBCFCD	1070.00	2762.50	2765.57	0.005311	5.88	5.88	181.95	68.44	0.64	0.64	0.87
Main	3450.*	2-yr SBCFCD	650.00	2762.50	2764.76	0.005684	5.07	5.07	128.18	63.55	0.63	0.63	0.71
Main	3448	100-yr SBCFCD	3380.00	2762.50	2768.59	0.004667	8.13	8.13	415.58	86.53	0.65	0.65	1.37
Main	3448	100-yr FIS	2700.00	2762.50	2767.84	0.004781	7.65	7.65	352.75	82.06	0.65	0.65	1.26
Main	3448	50-yr FIS	1500.00	2762.50	2766.26	0.005163	6.52	6.52	230.24	72.55	0.64	0.64	1.01
Main	3448	10-yr FIS	200.00	2762.50	2763.55	0.007221	3.58	3.58	55.92	56.31	0.63	0.63	0.44
Main	3448	10-yr SBCFCD	1600.00	2762.50	2766.41	0.005104	6.63	6.63	241.41	73.46	0.64	0.64	1.03
Main	3448	5-yr SBCFCD	1070.00	2762.50	2765.56	0.005399	5.91	5.91	180.96	68.35	0.64	0.64	0.88
Main	3448	2-yr SBCFCD	650.00	2762.50	2764.74	0.005819	5.11	5.11	127.21	63.45	0.64	0.64	0.72
Main	3433	100-yr SBCFCD	3380.00	2757.50	2769.17	0.000402	3.41	3.41	991.56	119.99	0.21	0.21	0.20
Main	3433	100-yr FIS	2700.00	2757.50	2768.37	0.000338	3.01	3.01	897.73	115.21	0.19	0.19	0.16
Main	3433	50-yr FIS	1500.00	2757.50	2766.66	0.000201	2.11	2.11	709.91	104.97	0.14	0.14	0.08
Main	3433	10-yr FIS	200.00	2757.50	2763.69	0.000015	0.47	0.47	424.21	87.12	0.04	0.04	0.00
Main	3433	10-yr SBCFCD	1600.00	2757.50	2766.82	0.000214	2.20	2.20	727.06	105.95	0.15	0.15	0.09
Main	3433	5-yr SBCFCD	1070.00	2757.50	2765.90	0.000142	1.69	1.69	631.65	100.40	0.12	0.12	0.05
Main	3433	2-yr SBCFCD	650.00	2757.50	2765.00	0.000080	1.19	1.19	544.14	95.02	0.09	0.09	0.03
Main	3431	100-yr SBCFCD	3380.00	2757.50	2769.17	0.000402	3.41	3.41	991.47	119.99	0.21	0.21	0.20
Main	3431	100-yr FIS	2700.00	2757.50	2768.37	0.000338	3.01	3.01	897.65	115.20	0.19	0.19	0.16
Main	3431	50-yr FIS	1500.00	2757.50	2766.66	0.000201	2.11	2.11	709.86	104.97	0.14	0.14	0.08
Main	3431	10-yr FIS	200.00	2757.50	2763.69	0.000015	0.47	0.47	424.21	87.12	0.04	0.04	0.00
Main	3431	10-yr SBCFCD	1600.00	2757.50	2766.82	0.000214	2.20	2.20	727.01	105.94	0.15	0.15	0.09
Main	3431	5-yr SBCFCD	1070.00	2757.50	2765.90	0.000142	1.69	1.69	631.60	100.40	0.12	0.12	0.05
Main	3431	2-yr SBCFCD	650.00	2757.50	2765.00	0.000080	1.19	1.19	544.12	95.02	0.09	0.09	0.03
Main	3416	100-yr SBCFCD	3380.00	2762.50	2767.23	0.011564	11.12	11.12	303.92	78.40	1.00	1.00	2.74
Main	3416	100-yr FIS	2700.00	2762.50	2766.62	0.012118	10.52	10.52	256.71	74.70	1.00	1.00	2.55
Main	3416	50-yr FIS	1500.00	2762.50	2765.37	0.013194	8.91	8.91	168.35	67.23	0.99	0.99	2.03
Main	3416	10-yr FIS	200.00	2762.50	2763.28	0.019924	4.91	4.91	40.73	54.67	1.00	1.00	0.92
Main	3416	10-yr SBCFCD	1600.00	2762.50	2765.49	0.013073	9.08	9.08	176.24	67.93	0.99	0.99	2.09
Main	3416	5-yr SBCFCD	1070.00	2762.50	2764.81	0.014331	8.15	8.15	131.23	63.83	1.00	1.00	1.82
Main	3416	2-yr SBCFCD	650.00	2762.50	2764.18	0.015656	7.04	7.04	92.39	60.07	1.00	1.00	1.49
Main	3300	100-yr SBCFCD	3380.00	2757.20	2760.13	0.062076	19.67	19.67	171.84	66.74	2.16	2.16	9.83
Main	3300	100-yr FIS	2700.00	2757.20	2759.70	0.068252	18.78	18.78	143.79	64.40	2.21	2.21	9.39
Main	3300	50-yr FIS	1500.00	2757.20	2758.84	0.088847	16.58	16.58	90.45	59.74	2.37	2.37	8.32
Main	3300	10-yr FIS	200.00	2757.20	2757.65	0.127819	8.69	8.69	23.01	52.93	2.32	2.32	3.46
Main	3300	10-yr SBCFCD	1600.00	2757.20	2758.92	0.086404	16.82	16.82	95.11	60.18	2.36	2.36	8.44
Main	3300	5-yr SBCFCD	1070.00	2757.20	2758.50	0.099553	15.20	15.20	70.40	57.80	2.43	2.43	7.51
Main	3300	2-yr SBCFCD	650.00	2757.20	2758.13	0.116360	13.26	13.26	49.03	55.65	2.49	2.49	6.36

Main	3298	100-yr SBCFCD	3380.00	2757.20	2760.18	0.058225	19.26	19.26	175.53	67.07	2.10	2.10	9.37
Main	3298	100-yr FIS	2700.00	2757.20	2759.76	0.063202	18.31	18.31	147.43	64.70	2.14	2.14	8.87
Main	3298	50-yr FIS	1500.00	2757.20	2758.90	0.078563	15.94	15.94	94.08	60.08	2.25	2.25	7.61
Main	3298	10-yr FIS	200.00	2757.20	2757.74	0.065994	7.10	7.10	28.18	53.48	1.72	1.72	2.16
Main	3298	10-yr SBCFCD	1600.00	2757.20	2758.98	0.076883	16.21	16.21	98.73	60.52	2.24	2.24	7.75
Main	3298	5-yr SBCFCD	1070.00	2757.20	2758.57	0.084738	14.44	14.44	74.08	58.16	2.26	2.26	6.68
Main	3298	2-yr SBCFCD	650.00	2757.20	2758.19	0.091363	12.29	12.29	52.87	56.05	2.23	2.23	5.35
Main	3283	100-yr SBCFCD	3380.00	2752.20	2763.88	0.000397	3.39	3.39	996.85	120.31	0.21	0.21	0.20
Main	3283	100-yr FIS	2700.00	2752.20	2763.08	0.000334	2.99	2.99	902.41	115.51	0.19	0.19	0.16
Main	3283	50-yr FIS	1500.00	2752.20	2761.37	0.000198	2.10	2.10	713.51	105.27	0.14	0.14	0.08
Main	3283	10-yr FIS	200.00	2752.20	2758.38	0.000015	0.47	0.47	425.96	87.40	0.04	0.04	0.00
Main	3283	10-yr SBCFCD	1600.00	2752.20	2761.53	0.000211	2.19	2.19	731.01	106.26	0.15	0.15	0.09
Main	3283	5-yr SBCFCD	1070.00	2752.20	2760.60	0.000140	1.69	1.69	634.44	100.67	0.12	0.12	0.05
Main	3283	2-yr SBCFCD	650.00	2752.20	2759.70	0.000079	1.19	1.19	546.34	95.29	0.09	0.09	0.03
Main	3281	100-yr SBCFCD	3380.00	2752.20	2763.88	0.000397	3.39	3.39	996.76	120.30	0.21	0.21	0.20
Main	3281	100-yr FIS	2700.00	2752.20	2763.08	0.000334	2.99	2.99	902.29	115.51	0.19	0.19	0.16
Main	3281	50-yr FIS	1500.00	2752.20	2761.37	0.000198	2.10	2.10	713.46	105.27	0.14	0.14	0.08
Main	3281	10-yr FIS	200.00	2752.20	2758.38	0.000015	0.47	0.47	425.96	87.40	0.04	0.04	0.00
Main	3281	10-yr SBCFCD	1600.00	2752.20	2761.53	0.000211	2.19	2.19	730.96	106.26	0.15	0.15	0.09
Main	3281	5-yr SBCFCD	1070.00	2752.20	2760.60	0.000141	1.69	1.69	634.42	100.67	0.12	0.12	0.05
Main	3281	2-yr SBCFCD	650.00	2752.20	2759.70	0.000079	1.19	1.19	546.32	95.29	0.09	0.09	0.03
Main	3266	100-yr SBCFCD	3380.00	2757.20	2761.95	0.011555	11.12	11.12	303.88	78.29	0.99	0.99	2.74
Main	3266	100-yr FIS	2700.00	2757.20	2761.34	0.011963	10.48	10.48	257.54	74.54	0.99	0.99	2.53
Main	3266	50-yr FIS	1500.00	2757.20	2760.07	0.013236	8.95	8.95	167.67	66.66	0.99	0.99	2.05
Main	3266	10-yr FIS	200.00	2757.20	2758.01	0.017206	4.69	4.69	42.67	54.99	0.94	0.94	0.83
Main	3266	10-yr SBCFCD	1600.00	2757.20	2760.17	0.013385	9.18	9.18	174.38	67.28	1.00	1.00	2.13
Main	3266	5-yr SBCFCD	1070.00	2757.20	2759.51	0.014197	8.15	8.15	131.34	63.47	1.00	1.00	1.81
Main	3266	2-yr SBCFCD	650.00	2757.20	2758.89	0.015212	6.98	6.98	93.14	59.96	0.99	0.99	1.46
Main	3000	100-yr SBCFCD	3380.00	2754.40	2760.00	0.004692	7.89	7.89	428.31	93.99	0.65	0.65	1.31
Main	3000	100-yr FIS	2700.00	2754.40	2759.31	0.004785	7.40	7.40	364.88	89.62	0.65	0.65	1.19
Main	3000	50-yr FIS	1500.00	2754.40	2757.84	0.005143	6.25	6.25	239.83	80.30	0.64	0.64	0.95
Main	3000	10-yr FIS	200.00	2754.40	2755.36	0.006940	3.33	3.33	60.04	65.35	0.61	0.61	0.40
Main	3000	10-yr SBCFCD	1600.00	2754.40	2757.97	0.005117	6.38	6.38	250.79	81.16	0.64	0.64	0.97
Main	3000	5-yr SBCFCD	1070.00	2754.40	2757.19	0.005384	5.66	5.66	189.00	76.19	0.63	0.63	0.82
Main	3000	2-yr SBCFCD	650.00	2754.40	2756.43	0.005808	4.87	4.87	133.36	71.41	0.63	0.63	0.67
Main	2998	100-yr SBCFCD	3380.00	2754.40	2759.99	0.004723	7.91	7.91	427.35	93.93	0.65	0.65	1.32
Main	2998	100-yr FIS	2700.00	2754.40	2759.30	0.004821	7.42	7.42	363.96	89.55	0.65	0.65	1.20
Main	2998	50-yr FIS	1500.00	2754.40	2757.82	0.005217	6.28	6.28	238.69	80.21	0.64	0.64	0.96
Main	2998	10-yr FIS	200.00	2754.40	2755.34	0.007418	3.40	3.40	58.82	65.25	0.63	0.63	0.42
Main	2998	10-yr SBCFCD	1600.00	2754.40	2757.96	0.005170	6.40	6.40	249.92	81.09	0.64	0.64	0.98
Main	2998	5-yr SBCFCD	1070.00	2754.40	2757.17	0.005482	5.69	5.69	187.89	76.09	0.64	0.64	0.83
Main	2998	2-yr SBCFCD	650.00	2754.40	2756.42	0.005964	4.92	4.92	132.23	71.31	0.64	0.64	0.68
Main	2983	100-yr SBCFCD	3380.00	2749.40	2760.54	0.000366	3.24	3.24	1042.75	127.20	0.20	0.20	0.18
Main	2983	100-yr FIS	2700.00	2749.40	2759.80	0.000304	2.84	2.84	949.70	122.71	0.18	0.18	0.14
Main	2983	50-yr FIS	1500.00	2749.40	2758.20	0.000175	1.97	1.97	761.66	113.09	0.13	0.13	0.07
Main	2983	10-yr FIS	200.00	2749.40	2755.46	0.000012	0.42	0.42	474.50	96.56	0.03	0.03	0.00
Main	2983	10-yr SBCFCD	1600.00	2749.40	2758.35	0.000187	2.05	2.05	778.88	114.00	0.14	0.14	0.08
Main	2983	5-yr SBCFCD	1070.00	2749.40	2757.49	0.000121	1.57	1.57	682.84	108.80	0.11	0.11	0.05
Main	2983	2-yr SBCFCD	650.00	2749.40	2756.66	0.000067	1.09	1.09	594.86	103.81	0.08	0.08	0.02
Main	2981	100-yr SBCFCD	3380.00	2749.40	2760.54	0.000366	3.24	3.24	1042.65	127.19	0.20	0.20	0.18
Main	2981	100-yr FIS	2700.00	2749.40	2759.80	0.000304	2.84	2.84	949.61	122.70	0.18	0.18	0.14
Main	2981	50-yr FIS	1500.00	2749.40	2758.20	0.000175	1.97	1.97	761.64	113.08	0.13	0.13	0.07
Main	2981	10-yr FIS	200.00	2749.40	2755.46	0.000012	0.42	0.42	474.50	96.56	0.03	0.03	0.00
Main	2981	10-yr SBCFCD	1600.00	2749.40	2758.35	0.000187	2.05	2.05	778.82	114.00	0.14	0.14	0.08
Main	2981	5-yr SBCFCD	1070.00	2749.40	2757.49	0.000121	1.57	1.57	682.82	108.80	0.11	0.11	0.05
Main	2981	2-yr SBCFCD	650.00	2749.40	2756.66	0.000067	1.09	1.09	594.84	103.81	0.08	0.08	0.02
Main	2966	100-yr SBCFCD	3380.00	2754.40	2758.80	0.011067	10.57	10.57	319.77	86.37	0.97	0.97	2.52

Main	2966	100-yr FIS	2700.00	2754.40	2758.14	0.012457	10.22	10.22	264.25	82.20	1.00	1.00	2.46
Main	2966	50-yr FIS	1500.00	2754.40	2756.98	0.013829	8.66	8.66	173.14	74.86	1.00	1.00	1.97
Main	2966	10-yr FIS	200.00	2754.40	2755.09	0.020537	4.66	4.66	42.94	63.87	1.00	1.00	0.86
Main	2966	10-yr SBCFCD	1600.00	2754.40	2757.09	0.013648	8.82	8.82	181.39	75.55	1.00	1.00	2.02
Main	2966	5-yr SBCFCD	1070.00	2754.40	2756.47	0.014706	7.85	7.85	136.32	71.67	1.00	1.00	1.73
Main	2966	2-yr SBCFCD	650.00	2754.40	2755.90	0.016262	6.77	6.77	96.03	68.14	1.00	1.00	1.42
Main	2942.6	100-yr SBCFCD	3380.00	2754.00	2758.33	0.008728	11.24	11.24	300.67	77.16	1.00	1.00	2.06
Main	2942.6	100-yr FIS	2700.00	2754.00	2757.62	0.010188	10.93	10.93	247.09	74.60	1.06	1.06	2.06
Main	2942.6	50-yr FIS	1500.00	2754.00	2756.36	0.013436	9.64	9.64	155.60	70.35	1.14	1.14	1.83
Main	2942.6	10-yr FIS	200.00	2754.00	2754.82	0.008476	3.89	3.89	51.40	64.88	0.77	0.77	0.42
Main	2942.6	10-yr SBCFCD	1600.00	2754.00	2756.46	0.013180	9.81	9.81	163.06	70.71	1.14	1.14	1.87
Main	2942.6	5-yr SBCFCD	1070.00	2754.00	2755.88	0.014671	8.74	8.74	122.44	68.75	1.15	1.15	1.61
Main	2942.6	2-yr SBCFCD	650.00	2754.00	2755.37	0.015844	7.41	7.41	87.68	67.02	1.14	1.14	1.28
Main	2730.8	100-yr SBCFCD	3380.00	2752.00	2756.22	0.009195	11.70	11.78	288.84	76.01	1.04	1.06	2.24
Main	2730.8	100-yr FIS	2700.00	2752.00	2755.68	0.009551	10.87	10.90	248.36	74.15	1.03	1.05	2.01
Main	2730.8	50-yr FIS	1500.00	2752.00	2754.59	0.010102	8.85	8.85	169.54	70.31	1.00	1.00	1.49
Main	2730.8	10-yr FIS	200.00	2752.00	2752.77	0.010604	4.20	4.20	47.62	63.39	0.85	0.85	0.49
Main	2730.8	10-yr SBCFCD	1600.00	2752.00	2754.70	0.010037	9.04	9.04	177.01	70.70	1.01	1.01	1.54
Main	2730.8	5-yr SBCFCD	1070.00	2752.00	2754.16	0.009504	7.67	7.67	139.56	68.73	0.95	0.95	1.19
Main	2730.8	2-yr SBCFCD	650.00	2752.00	2753.61	0.009526	6.37	6.37	102.01	66.67	0.91	0.91	0.90
Main	2700.*	100-yr SBCFCD	3380.00	2751.70	2756.86	0.004675	7.67	7.67	440.91	101.07	0.65	0.65	1.25
Main	2700.*	100-yr FIS	2700.00	2751.70	2756.20	0.004807	7.18	7.18	375.81	97.11	0.64	0.64	1.14
Main	2700.*	50-yr FIS	1500.00	2751.70	2754.83	0.005190	6.03	6.03	248.79	88.88	0.64	0.64	0.90
Main	2700.*	10-yr FIS	200.00	2751.70	2752.65	0.005273	2.89	2.89	69.12	75.72	0.53	0.53	0.30
Main	2700.*	10-yr SBCFCD	1600.00	2751.70	2754.96	0.005170	6.16	6.16	259.81	89.62	0.64	0.64	0.92
Main	2700.*	5-yr SBCFCD	1070.00	2751.70	2754.28	0.005121	5.33	5.33	200.75	85.56	0.61	0.61	0.74
Main	2700.*	2-yr SBCFCD	650.00	2751.70	2753.62	0.005164	4.47	4.47	145.56	81.58	0.59	0.59	0.57
Main	2698	100-yr SBCFCD	3380.00	2751.70	2756.84	0.004708	7.68	7.68	439.88	101.01	0.65	0.65	1.26
Main	2698	100-yr FIS	2700.00	2751.70	2756.19	0.004846	7.20	7.20	374.82	97.05	0.65	0.65	1.15
Main	2698	50-yr FIS	1500.00	2751.70	2754.82	0.005271	6.06	6.06	247.53	88.79	0.64	0.64	0.91
Main	2698	10-yr FIS	200.00	2751.70	2752.64	0.005532	2.94	2.94	68.11	75.64	0.55	0.55	0.31
Main	2698	10-yr SBCFCD	1600.00	2751.70	2754.94	0.005248	6.19	6.19	258.54	89.54	0.64	0.64	0.94
Main	2698	5-yr SBCFCD	1070.00	2751.70	2754.27	0.005215	5.36	5.36	199.58	85.47	0.62	0.62	0.75
Main	2698	2-yr SBCFCD	650.00	2751.70	2753.61	0.005285	4.50	4.50	144.49	81.50	0.60	0.60	0.58
Main	2683	100-yr SBCFCD	3380.00	2746.70	2757.37	0.000339	3.10	3.10	1089.20	134.19	0.19	0.19	0.17
Main	2683	100-yr FIS	2700.00	2746.70	2756.66	0.000279	2.71	2.71	995.57	129.92	0.17	0.17	0.13
Main	2683	50-yr FIS	1500.00	2746.70	2755.17	0.000156	1.85	1.85	808.91	120.97	0.13	0.13	0.06
Main	2683	10-yr FIS	200.00	2746.70	2752.73	0.000009	0.38	0.38	531.12	106.26	0.03	0.03	0.00
Main	2683	10-yr SBCFCD	1600.00	2746.70	2755.31	0.000167	1.94	1.94	825.56	121.79	0.13	0.13	0.07
Main	2683	5-yr SBCFCD	1070.00	2746.70	2754.55	0.000105	1.46	1.46	734.91	117.23	0.10	0.10	0.04
Main	2683	2-yr SBCFCD	650.00	2746.70	2753.81	0.000055	1.00	1.00	649.92	112.78	0.07	0.07	0.02
Main	2681	100-yr SBCFCD	3380.00	2746.70	2757.37	0.000339	3.10	3.10	1089.07	134.18	0.19	0.19	0.17
Main	2681	100-yr FIS	2700.00	2746.70	2756.66	0.000279	2.71	2.71	995.51	129.92	0.17	0.17	0.13
Main	2681	50-yr FIS	1500.00	2746.70	2755.17	0.000156	1.85	1.85	808.88	120.97	0.13	0.13	0.06
Main	2681	10-yr FIS	200.00	2746.70	2752.73	0.000009	0.38	0.38	531.12	106.26	0.03	0.03	0.00
Main	2681	10-yr SBCFCD	1600.00	2746.70	2755.31	0.000167	1.94	1.94	825.53	121.79	0.13	0.13	0.07
Main	2681	5-yr SBCFCD	1070.00	2746.70	2754.55	0.000105	1.46	1.46	734.88	117.23	0.10	0.10	0.04
Main	2681	2-yr SBCFCD	650.00	2746.70	2753.81	0.000055	1.00	1.00	649.92	112.78	0.07	0.07	0.02
Main	2666	100-yr SBCFCD	3380.00	2751.70	2755.62	0.012200	10.55	10.55	320.30	93.62	1.01	1.01	2.57
Main	2666	100-yr FIS	2700.00	2751.70	2755.10	0.012655	9.89	9.89	273.01	90.52	1.00	1.00	2.35
Main	2666	50-yr FIS	1500.00	2751.70	2754.20	0.011232	7.74	7.74	193.79	85.07	0.90	0.90	1.58
Main	2666	10-yr FIS	200.00	2751.70	2752.55	0.007681	3.25	3.25	61.54	75.12	0.63	0.63	0.39
Main	2666	10-yr SBCFCD	1600.00	2751.70	2754.27	0.011674	8.02	8.02	199.51	85.48	0.93	0.93	1.68
Main	2666	5-yr SBCFCD	1070.00	2751.70	2753.88	0.009124	6.41	6.41	166.81	83.14	0.80	0.80	1.13
Main	2666	2-yr SBCFCD	650.00	2751.70	2753.36	0.008461	5.22	5.22	124.50	80.01	0.74	0.74	0.82
Main	2513.9	100-yr SBCFCD	3380.00	2750.00	2754.74	0.004895	8.36	8.36	404.49	106.83	0.76	0.76	1.14
Main	2513.9	100-yr FIS	2700.00	2750.00	2754.05	0.005681	8.12	8.12	332.63	102.80	0.80	0.80	1.14
Main	2513.9	50-yr FIS	1500.00	2750.00	2752.67	0.009188	7.68	7.68	195.41	94.57	0.94	0.94	1.18

Main	2513.9	10-yr FIS	200.00	2750.00	2750.76	0.015093	4.74	4.74	42.17	61.18	1.01	1.01	0.65
Main	2513.9	10-yr SBCFCD	1600.00	2750.00	2752.79	0.008696	7.71	7.71	207.46	95.63	0.92	0.92	1.17
Main	2513.9	5-yr SBCFCD	1070.00	2750.00	2752.14	0.011273	7.27	7.27	147.17	90.17	1.00	1.00	1.14
Main	2513.9	2-yr SBCFCD	650.00	2750.00	2751.62	0.011913	6.37	6.37	102.12	79.67	0.99	0.99	0.95
Main	2400.*	100-yr SBCFCD	3380.00	2748.70	2754.27	0.004675	7.90	7.90	428.03	93.59	0.65	0.65	1.31
Main	2400.*	100-yr FIS	2700.00	2748.70	2753.58	0.004796	7.41	7.41	364.21	89.39	0.65	0.65	1.20
Main	2400.*	50-yr FIS	1500.00	2748.70	2752.11	0.005161	6.25	6.25	239.83	80.57	0.64	0.64	0.95
Main	2400.*	10-yr FIS	200.00	2748.70	2749.66	0.006970	3.33	3.33	60.10	65.76	0.61	0.61	0.40
Main	2400.*	10-yr SBCFCD	1600.00	2748.70	2752.25	0.005108	6.37	6.37	251.16	81.41	0.64	0.64	0.97
Main	2400.*	5-yr SBCFCD	1070.00	2748.70	2751.47	0.005398	5.65	5.65	189.29	76.69	0.63	0.63	0.82
Main	2400.*	2-yr SBCFCD	650.00	2748.70	2750.72	0.005827	4.86	4.86	133.76	72.20	0.63	0.63	0.67
Main	2398	100-yr SBCFCD	3380.00	2748.70	2754.26	0.004706	7.91	7.91	427.07	93.53	0.65	0.65	1.32
Main	2398	100-yr FIS	2700.00	2748.70	2753.57	0.004832	7.43	7.43	363.29	89.33	0.65	0.65	1.21
Main	2398	50-yr FIS	1500.00	2748.70	2752.10	0.005236	6.28	6.28	238.69	80.48	0.64	0.64	0.96
Main	2398	10-yr FIS	200.00	2748.70	2749.64	0.007465	3.40	3.40	58.83	65.64	0.63	0.63	0.42
Main	2398	10-yr SBCFCD	1600.00	2748.70	2752.24	0.005179	6.40	6.40	250.01	81.33	0.64	0.64	0.98
Main	2398	5-yr SBCFCD	1070.00	2748.70	2751.46	0.005496	5.69	5.69	188.18	76.61	0.64	0.64	0.83
Main	2398	2-yr SBCFCD	650.00	2748.70	2750.71	0.005985	4.90	4.90	132.62	72.10	0.64	0.64	0.68
Main	2383	100-yr SBCFCD	3380.00	2743.70	2754.82	0.000369	3.25	3.25	1039.46	126.93	0.20	0.20	0.18
Main	2383	100-yr FIS	2700.00	2743.70	2754.07	0.000307	2.85	2.85	945.95	122.45	0.18	0.18	0.14
Main	2383	50-yr FIS	1500.00	2743.70	2752.48	0.000177	1.98	1.98	759.01	112.95	0.13	0.13	0.07
Main	2383	10-yr FIS	200.00	2743.70	2749.76	0.000012	0.42	0.42	474.24	96.55	0.03	0.03	0.00
Main	2383	10-yr SBCFCD	1600.00	2743.70	2752.63	0.000189	2.06	2.06	776.23	113.87	0.14	0.14	0.08
Main	2383	5-yr SBCFCD	1070.00	2743.70	2751.77	0.000122	1.57	1.57	680.92	108.70	0.11	0.11	0.05
Main	2383	2-yr SBCFCD	650.00	2743.70	2750.95	0.000067	1.09	1.09	593.83	103.75	0.08	0.08	0.02
Main	2381	100-yr SBCFCD	3380.00	2743.70	2754.81	0.000369	3.25	3.25	1039.34	126.92	0.20	0.20	0.18
Main	2381	100-yr FIS	2700.00	2743.70	2754.06	0.000307	2.85	2.85	945.86	122.45	0.18	0.18	0.14
Main	2381	50-yr FIS	1500.00	2743.70	2752.48	0.000177	1.98	1.98	758.98	112.95	0.13	0.13	0.07
Main	2381	10-yr FIS	200.00	2743.70	2749.76	0.000012	0.42	0.42	474.24	96.55	0.03	0.03	0.00
Main	2381	10-yr SBCFCD	1600.00	2743.70	2752.63	0.000189	2.06	2.06	776.17	113.86	0.14	0.14	0.08
Main	2381	5-yr SBCFCD	1070.00	2743.70	2751.77	0.000122	1.57	1.57	680.89	108.70	0.11	0.11	0.05
Main	2381	2-yr SBCFCD	650.00	2743.70	2750.95	0.000067	1.09	1.09	593.81	103.75	0.08	0.08	0.02
Main	2366	100-yr SBCFCD	3380.00	2748.70	2753.00	0.011661	10.76	10.76	314.22	86.04	0.99	0.99	2.62
Main	2366	100-yr FIS	2700.00	2748.70	2752.44	0.012143	10.12	10.12	266.79	82.65	0.99	0.99	2.41
Main	2366	50-yr FIS	1500.00	2748.70	2751.29	0.013396	8.55	8.55	175.50	75.67	0.99	0.99	1.92
Main	2366	10-yr FIS	200.00	2748.70	2749.42	0.018053	4.47	4.47	44.77	64.36	0.94	0.94	0.78
Main	2366	10-yr SBCFCD	1600.00	2748.70	2751.38	0.013484	8.76	8.76	182.64	76.24	1.00	1.00	1.99
Main	2366	5-yr SBCFCD	1070.00	2748.70	2750.78	0.014331	7.75	7.75	138.03	72.61	0.99	0.99	1.69
Main	2366	2-yr SBCFCD	650.00	2748.70	2750.21	0.015912	6.69	6.69	97.17	69.12	0.99	0.99	1.39
Main	2260.4	100-yr SBCFCD	3380.00	2747.00	2752.01	0.004947	8.89	8.89	380.24	91.56	0.77	0.77	1.26
Main	2260.4	100-yr FIS	2700.00	2747.00	2750.13	0.016171	12.30	12.30	219.54	79.30	1.30	1.30	2.75
Main	2260.4	50-yr FIS	1500.00	2747.00	2749.19	0.016733	10.15	10.15	147.73	73.16	1.26	1.26	2.08
Main	2260.4	10-yr FIS	200.00	2747.00	2747.68	0.014843	4.59	4.59	43.55	65.30	0.99	0.99	0.62
Main	2260.4	10-yr SBCFCD	1600.00	2747.00	2749.29	0.016521	10.34	10.34	154.69	73.78	1.26	1.26	2.14
Main	2260.4	5-yr SBCFCD	1070.00	2747.00	2748.79	0.016764	8.99	8.99	118.96	70.87	1.22	1.22	1.74
Main	2260.4	2-yr SBCFCD	650.00	2747.00	2748.35	0.016187	7.39	7.39	87.93	68.64	1.15	1.15	1.28
Main	2200.*	100-yr SBCFCD	3380.00	2746.10	2752.05	0.003680	7.25	7.25	466.27	96.87	0.58	0.58	1.08
Main	2200.*	100-yr FIS	2700.00	2746.10	2751.27	0.003877	6.87	6.87	392.77	92.05	0.59	0.59	1.02
Main	2200.*	50-yr FIS	1500.00	2746.10	2749.66	0.004443	5.94	5.94	252.71	82.07	0.60	0.60	0.84
Main	2200.*	10-yr FIS	200.00	2746.10	2747.07	0.006665	3.28	3.28	61.00	66.01	0.60	0.60	0.38
Main	2200.*	10-yr SBCFCD	1600.00	2746.10	2749.81	0.004381	6.04	6.04	265.02	82.99	0.60	0.60	0.86
Main	2200.*	5-yr SBCFCD	1070.00	2746.10	2748.97	0.004780	5.42	5.42	197.41	77.77	0.60	0.60	0.75
Main	2200.*	2-yr SBCFCD	650.00	2746.10	2748.18	0.005287	4.70	4.70	138.26	72.90	0.60	0.60	0.62
Main	2198	100-yr SBCFCD	3380.00	2746.10	2752.04	0.003698	7.26	7.26	465.51	96.82	0.58	0.58	1.09
Main	2198	100-yr FIS	2700.00	2746.10	2751.26	0.003900	6.89	6.89	392.01	91.99	0.59	0.59	1.02
Main	2198	50-yr FIS	1500.00	2746.10	2749.65	0.004483	5.95	5.95	251.95	82.01	0.60	0.60	0.85
Main	2198	10-yr FIS	200.00	2746.10	2747.05	0.007107	3.34	3.34	59.80	65.89	0.62	0.62	0.40
Main	2198	10-yr SBCFCD	1600.00	2746.10	2749.80	0.004419	6.05	6.05	264.27	82.94	0.60	0.60	0.87

Main	2198	5-yr SBCFCD	1070.00	2746.10	2748.96	0.004838	5.44	5.44	196.63	77.71	0.60	0.60	0.76
Main	2198	2-yr SBCFCD	650.00	2746.10	2748.17	0.005409	4.74	4.74	137.24	72.82	0.61	0.61	0.63
Main	2183	100-yr SBCFCD	3380.00	2741.10	2752.49	0.000336	3.14	3.14	1075.67	128.87	0.19	0.19	0.17
Main	2183	100-yr FIS	2700.00	2741.10	2751.68	0.000284	2.77	2.77	973.13	123.97	0.17	0.17	0.14
Main	2183	50-yr FIS	1500.00	2741.10	2749.99	0.000169	1.94	1.94	771.80	113.73	0.13	0.13	0.07
Main	2183	10-yr FIS	200.00	2741.10	2747.17	0.000012	0.42	0.42	475.41	96.69	0.03	0.03	0.00
Main	2183	10-yr SBCFCD	1600.00	2741.10	2750.14	0.000180	2.03	2.03	789.92	114.68	0.14	0.14	0.08
Main	2183	5-yr SBCFCD	1070.00	2741.10	2749.25	0.000118	1.55	1.55	689.30	109.25	0.11	0.11	0.05
Main	2183	2-yr SBCFCD	650.00	2741.10	2748.39	0.000066	1.09	1.09	598.30	104.09	0.08	0.08	0.02
Main	2181	100-yr SBCFCD	3380.00	2741.10	2752.49	0.000336	3.14	3.14	1075.57	128.87	0.19	0.19	0.17
Main	2181	100-yr FIS	2700.00	2741.10	2751.68	0.000284	2.77	2.77	973.07	123.97	0.17	0.17	0.14
Main	2181	50-yr FIS	1500.00	2741.10	2749.99	0.000169	1.94	1.94	771.77	113.72	0.13	0.13	0.07
Main	2181	10-yr FIS	200.00	2741.10	2747.17	0.000012	0.42	0.42	475.41	96.69	0.03	0.03	0.00
Main	2181	10-yr SBCFCD	1600.00	2741.10	2750.14	0.000180	2.03	2.03	789.89	114.68	0.14	0.14	0.08
Main	2181	5-yr SBCFCD	1070.00	2741.10	2749.25	0.000118	1.55	1.55	689.27	109.25	0.11	0.11	0.05
Main	2181	2-yr SBCFCD	650.00	2741.10	2748.39	0.000066	1.09	1.09	598.28	104.09	0.08	0.08	0.02
Main	2166	100-yr SBCFCD	3380.00	2746.10	2750.51	0.011632	11.18	11.18	302.39	77.15	0.99	0.99	2.77
Main	2166	100-yr FIS	2700.00	2746.10	2749.91	0.012226	10.51	10.51	256.87	74.82	1.00	1.00	2.56
Main	2166	50-yr FIS	1500.00	2746.10	2748.72	0.013496	8.80	8.80	170.38	70.18	1.00	1.00	2.01
Main	2166	10-yr FIS	200.00	2746.10	2746.80	0.020053	4.65	4.65	42.97	62.72	0.99	0.99	0.85
Main	2166	10-yr SBCFCD	1600.00	2746.10	2748.83	0.013266	8.96	8.96	178.53	70.63	0.99	0.99	2.05
Main	2166	5-yr SBCFCD	1070.00	2746.10	2748.20	0.014522	7.96	7.96	134.35	68.15	1.00	1.00	1.76
Main	2166	2-yr SBCFCD	650.00	2746.10	2747.61	0.016044	6.82	6.82	95.24	65.88	1.00	1.00	1.43
Main	1986.6	100-yr SBCFCD	3480.00	2743.00	2745.35	0.033717	15.22	15.22	228.58	104.81	1.82	1.82	4.56
Main	1986.6	100-yr FIS	2700.00	2743.00	2745.00	0.034634	13.99	13.99	193.05	102.67	1.80	1.80	4.04
Main	1986.6	50-yr FIS	1500.00	2743.00	2744.45	0.031674	10.92	10.92	137.38	99.21	1.64	1.64	2.73
Main	1986.6	10-yr FIS	200.00	2743.00	2743.52	0.017202	4.16	4.16	48.02	93.38	1.02	1.02	0.55
Main	1986.6	10-yr SBCFCD	1650.00	2743.00	2744.55	0.030862	11.23	11.23	146.98	99.81	1.63	1.63	2.82
Main	1986.6	5-yr SBCFCD	1120.00	2743.00	2744.27	0.027436	9.35	9.35	119.80	98.09	1.49	1.49	2.08
Main	1986.6	2-yr SBCFCD	680.00	2743.00	2743.99	0.023774	7.39	7.39	91.99	96.29	1.33	1.33	1.41
Main	1900.*	100-yr SBCFCD	3480.00	2741.50	2747.15	0.004714	8.00	8.00	435.17	93.93	0.65	0.65	1.34
Main	1900.*	100-yr FIS	2700.00	2741.50	2746.36	0.004849	7.44	7.44	362.66	89.17	0.65	0.65	1.21
Main	1900.*	50-yr FIS	1500.00	2741.50	2744.91	0.005185	6.27	6.27	239.36	80.45	0.64	0.64	0.95
Main	1900.*	10-yr FIS	200.00	2741.50	2742.46	0.006978	3.33	3.33	60.07	65.73	0.61	0.61	0.40
Main	1900.*	10-yr SBCFCD	1650.00	2741.50	2745.11	0.005129	6.45	6.45	255.88	81.67	0.64	0.64	0.99
Main	1900.*	5-yr SBCFCD	1120.00	2741.50	2744.34	0.005405	5.75	5.75	194.87	77.06	0.64	0.64	0.84
Main	1900.*	2-yr SBCFCD	680.00	2741.50	2743.58	0.005817	4.94	4.94	137.73	72.48	0.63	0.63	0.68
Main	1898	100-yr SBCFCD	3480.00	2741.50	2747.14	0.004744	8.01	8.01	434.21	93.86	0.66	0.66	1.34
Main	1898	100-yr FIS	2700.00	2741.50	2746.35	0.004886	7.46	7.46	361.73	89.11	0.65	0.65	1.22
Main	1898	50-yr FIS	1500.00	2741.50	2744.89	0.005261	6.30	6.30	238.22	80.37	0.64	0.64	0.96
Main	1898	10-yr FIS	200.00	2741.50	2742.44	0.007473	3.40	3.40	58.81	65.62	0.63	0.63	0.42
Main	1898	10-yr SBCFCD	1650.00	2741.50	2745.10	0.005199	6.48	6.48	254.73	81.59	0.65	0.65	1.00
Main	1898	5-yr SBCFCD	1120.00	2741.50	2744.33	0.005500	5.78	5.78	193.76	76.97	0.64	0.64	0.85
Main	1898	2-yr SBCFCD	680.00	2741.50	2743.56	0.005971	4.98	4.98	136.58	72.38	0.64	0.64	0.70
Main	1883	100-yr SBCFCD	3480.00	2736.50	2747.71	0.000377	3.30	3.30	1054.55	128.15	0.20	0.20	0.19
Main	1883	100-yr FIS	2700.00	2736.50	2746.86	0.000307	2.85	2.85	947.50	122.97	0.18	0.18	0.14
Main	1883	50-yr FIS	1500.00	2736.50	2745.28	0.000176	1.97	1.97	760.60	113.35	0.13	0.13	0.07
Main	1883	10-yr FIS	200.00	2736.50	2742.56	0.000012	0.42	0.42	475.08	96.83	0.03	0.03	0.00
Main	1883	10-yr SBCFCD	1650.00	2736.50	2745.50	0.000194	2.10	2.10	785.99	114.71	0.14	0.14	0.08
Main	1883	5-yr SBCFCD	1120.00	2736.50	2744.66	0.000129	1.62	1.62	691.64	109.59	0.11	0.11	0.05
Main	1883	2-yr SBCFCD	680.00	2736.50	2743.82	0.000071	1.13	1.13	601.64	104.48	0.08	0.08	0.02
Main	1881	100-yr SBCFCD	3480.00	2736.50	2747.71	0.000377	3.30	3.30	1054.46	128.15	0.20	0.20	0.19
Main	1881	100-yr FIS	2700.00	2736.50	2746.86	0.000307	2.85	2.85	947.38	122.96	0.18	0.18	0.14
Main	1881	50-yr FIS	1500.00	2736.50	2745.28	0.000176	1.97	1.97	760.57	113.35	0.13	0.13	0.07
Main	1881	10-yr FIS	200.00	2736.50	2742.56	0.000012	0.42	0.42	475.08	96.83	0.03	0.03	0.00
Main	1881	10-yr SBCFCD	1650.00	2736.50	2745.50	0.000194	2.10	2.10	785.93	114.70	0.14	0.14	0.08
Main	1881	5-yr SBCFCD	1120.00	2736.50	2744.66	0.000129	1.62	1.62	691.61	109.59	0.11	0.11	0.05
Main	1881	2-yr SBCFCD	680.00	2736.50	2743.82	0.000071	1.13	1.13	601.61	104.48	0.08	0.08	0.02

Main	1866	100-yr SBCFCD	3480.00	2741.50	2745.86	0.011730	10.86	10.86	320.38	86.85	1.00	1.00	2.66
Main	1866	100-yr FIS	2700.00	2741.50	2745.24	0.012148	10.11	10.11	267.17	83.00	0.99	0.99	2.41
Main	1866	50-yr FIS	1500.00	2741.50	2744.06	0.013870	8.63	8.63	173.73	75.75	1.00	1.00	1.96
Main	1866	10-yr FIS	200.00	2741.50	2742.20	0.019650	4.58	4.58	43.63	64.32	0.98	0.98	0.83
Main	1866	10-yr SBCFCD	1650.00	2741.50	2744.24	0.013371	8.82	8.82	187.09	76.83	1.00	1.00	2.01
Main	1866	5-yr SBCFCD	1120.00	2741.50	2743.65	0.014123	7.83	7.83	142.97	73.21	0.99	0.99	1.71
Main	1866	2-yr SBCFCD	680.00	2741.50	2743.05	0.015670	6.76	6.76	100.55	69.55	0.99	0.99	1.40
Main	1699.2	100-yr SBCFCD	3480.00	2738.00	2741.29	0.023176	15.14	15.14	229.88	79.74	1.57	1.57	4.12
Main	1699.2	100-yr FIS	2700.00	2738.00	2740.80	0.024348	14.10	14.10	191.49	76.80	1.57	1.57	3.75
Main	1699.2	50-yr FIS	1500.00	2738.00	2739.96	0.025584	11.64	11.64	128.88	71.74	1.53	1.53	2.84
Main	1699.2	10-yr FIS	200.00	2738.00	2738.62	0.022210	5.24	5.24	38.19	63.70	1.19	1.19	0.83
Main	1699.2	10-yr SBCFCD	1650.00	2738.00	2740.07	0.025702	12.06	12.06	136.79	72.40	1.55	1.55	3.00
Main	1699.2	5-yr SBCFCD	1120.00	2738.00	2739.63	0.026548	10.59	10.59	105.73	69.78	1.52	1.52	2.49
Main	1699.2	2-yr SBCFCD	680.00	2738.00	2739.22	0.025785	8.73	8.73	77.89	67.34	1.43	1.43	1.85
Main	1600.*	100-yr SBCFCD	3480.00	2736.50	2742.16	0.004696	7.99	7.99	435.72	93.96	0.65	0.65	1.33
Main	1600.*	100-yr FIS	2700.00	2736.50	2741.36	0.004844	7.44	7.44	362.79	89.18	0.65	0.65	1.21
Main	1600.*	50-yr FIS	1500.00	2736.50	2739.90	0.005255	6.29	6.29	238.30	80.37	0.64	0.64	0.96
Main	1600.*	10-yr FIS	200.00	2736.50	2737.44	0.007414	3.39	3.39	58.95	65.63	0.63	0.63	0.41
Main	1600.*	10-yr SBCFCD	1650.00	2736.50	2740.10	0.005180	6.47	6.47	255.05	81.61	0.64	0.64	1.00
Main	1600.*	5-yr SBCFCD	1120.00	2736.50	2739.33	0.005477	5.77	5.77	194.02	77.00	0.64	0.64	0.85
Main	1600.*	2-yr SBCFCD	680.00	2736.50	2738.56	0.005963	4.98	4.98	136.64	72.39	0.64	0.64	0.70
Main	1598	100-yr SBCFCD	3480.00	2731.50	2742.73	0.000377	3.31	3.31	1052.45	127.39	0.20	0.20	0.19
Main	1598	100-yr FIS	2700.00	2731.50	2741.88	0.000307	2.86	2.86	945.39	122.25	0.18	0.18	0.14
Main	1598	50-yr FIS	1500.00	2731.50	2740.28	0.000177	1.98	1.98	758.29	112.69	0.13	0.13	0.07
Main	1598	10-yr FIS	200.00	2731.50	2737.56	0.000012	0.42	0.42	473.85	96.36	0.03	0.03	0.00
Main	1598	10-yr SBCFCD	1650.00	2731.50	2740.51	0.000195	2.10	2.10	783.86	114.05	0.14	0.14	0.08
Main	1598	5-yr SBCFCD	1120.00	2731.50	2739.66	0.000129	1.62	1.62	689.77	108.98	0.11	0.11	0.05
Main	1598	2-yr SBCFCD	680.00	2731.50	2738.82	0.000071	1.13	1.13	599.83	103.91	0.08	0.08	0.03
Main	1583	100-yr SBCFCD	3480.00	2731.50	2742.73	0.000378	3.31	3.31	1051.70	127.36	0.20	0.20	0.19
Main	1583	100-yr FIS	2700.00	2731.50	2741.87	0.000307	2.86	2.86	944.83	122.22	0.18	0.18	0.14
Main	1583	50-yr FIS	1500.00	2731.50	2740.28	0.000177	1.98	1.98	757.99	112.68	0.13	0.13	0.07
Main	1583	10-yr FIS	200.00	2731.50	2737.56	0.000012	0.42	0.42	473.82	96.36	0.03	0.03	0.00
Main	1583	10-yr SBCFCD	1650.00	2731.50	2740.51	0.000195	2.11	2.11	783.53	114.03	0.14	0.14	0.08
Main	1583	5-yr SBCFCD	1120.00	2731.50	2739.66	0.000129	1.62	1.62	689.56	108.97	0.11	0.11	0.05
Main	1583	2-yr SBCFCD	680.00	2731.50	2738.82	0.000071	1.13	1.13	599.73	103.91	0.08	0.08	0.03
Main	1581	100-yr SBCFCD	3480.00	2731.50	2742.73	0.000378	3.31	3.31	1051.58	127.35	0.20	0.20	0.19
Main	1581	100-yr FIS	2700.00	2731.50	2741.87	0.000307	2.86	2.86	944.71	122.21	0.18	0.18	0.14
Main	1581	50-yr FIS	1500.00	2731.50	2740.28	0.000177	1.98	1.98	757.96	112.67	0.13	0.13	0.07
Main	1581	10-yr FIS	200.00	2731.50	2737.56	0.000012	0.42	0.42	473.82	96.36	0.03	0.03	0.00
Main	1581	10-yr SBCFCD	1650.00	2731.50	2740.50	0.000195	2.11	2.11	783.47	114.02	0.14	0.14	0.08
Main	1581	5-yr SBCFCD	1120.00	2731.50	2739.66	0.000129	1.62	1.62	689.53	108.97	0.11	0.11	0.05
Main	1581	2-yr SBCFCD	680.00	2731.50	2738.82	0.000071	1.13	1.13	599.70	103.91	0.08	0.08	0.03
Main	1566	100-yr SBCFCD	3480.00	2736.50	2740.87	0.011719	10.89	10.89	319.61	86.23	1.00	1.00	2.67
Main	1566	100-yr FIS	2700.00	2736.50	2740.24	0.012184	10.14	10.14	266.26	82.43	0.99	0.99	2.42
Main	1566	50-yr FIS	1500.00	2736.50	2739.09	0.013390	8.55	8.55	175.40	75.53	0.99	0.99	1.92
Main	1566	10-yr FIS	200.00	2736.50	2737.19	0.021132	4.69	4.69	42.64	64.12	1.01	1.01	0.87
Main	1566	10-yr SBCFCD	1650.00	2736.50	2739.24	0.013261	8.81	8.81	187.22	76.46	0.99	0.99	2.00
Main	1566	5-yr SBCFCD	1120.00	2736.50	2738.64	0.014292	7.88	7.88	142.18	72.84	0.99	0.99	1.73
Main	1566	2-yr SBCFCD	680.00	2736.50	2738.06	0.015492	6.75	6.75	100.79	69.35	0.99	0.99	1.40
Main	1439.8	100-yr SBCFCD	3480.00	2734.00	2737.04	0.024466	14.90	14.90	233.49	85.97	1.59	1.59	4.08
Main	1439.8	100-yr FIS	2700.00	2734.00	2736.59	0.025606	13.79	13.79	195.76	83.99	1.59	1.59	3.67
Main	1439.8	50-yr FIS	1500.00	2734.00	2735.83	0.027114	11.30	11.30	132.80	80.61	1.55	1.55	2.76
Main	1439.8	10-yr FIS	200.00	2734.00	2734.64	0.019036	4.81	4.81	41.61	70.27	1.10	1.10	0.70
Main	1439.8	10-yr SBCFCD	1650.00	2734.00	2735.93	0.026912	11.67	11.67	141.37	81.20	1.56	1.56	2.89
Main	1439.8	5-yr SBCFCD	1120.00	2734.00	2735.55	0.026800	10.10	10.10	110.92	79.10	1.50	1.50	2.32
Main	1439.8	2-yr SBCFCD	680.00	2734.00	2735.19	0.025708	8.26	8.26	82.33	77.08	1.41	1.41	1.70
Main	957.5	100-yr SBCFCD	3480.00	2727.00	2729.94	0.012792	9.99	10.59	348.43	181.21	1.16	1.33	2.08

Main	957.5	100-yr FIS	2700.00	2727.00	2729.63	0.011788	9.13	9.44	295.58	160.47	1.09	1.22	1.71
Main	957.5	50-yr FIS	1500.00	2727.00	2728.95	0.011113	7.47	7.47	200.88	117.17	1.00	1.00	1.19
Main	957.5	10-yr FIS	200.00	2727.00	2727.55	0.015007	3.94	3.94	50.80	97.13	0.96	0.96	0.49
Main	957.5	10-yr SBCFCD	1650.00	2727.00	2729.06	0.010935	7.69	7.69	214.67	122.08	1.01	1.02	1.24
Main	957.5	5-yr SBCFCD	1120.00	2727.00	2728.61	0.011835	6.88	6.88	162.68	112.41	1.01	1.01	1.07
Main	957.5	2-yr SBCFCD	680.00	2727.00	2728.18	0.012866	5.92	5.92	114.93	106.16	1.00	1.00	0.87

E. Cost Estimates & ROW Impacts

DESERT KNOLLS WASH CONCEPTUAL ALTERNATIVE PLAN # 1, UPSTREAM OF EXISTING CONCRETE CHANNEL

PRELIMINARY COST ESTIMATE				
QUANTITY	UNITS	ITEM DESCRIPTION	UNIT PRICE	ITEM TOTAL
		CHANNEL AND TRANSITION		
54,000	CY	Excavation	$7.00	$378,000
6,500	CY	Fill and Compaction	$10.00	$65,000
12,000	CY	Trapezoidal Channel Concrete including reinforcement	$450.00	$5,400,000
100	CY	Transition to existing concrete incl. reinforcement	$525.00	$52,500
			Subtotal	**$5,895,500**
		RCBs and Energy Dissipaters at Quantico, Tuscola, Kasota, Olalee, Mondamon, Pohez and Private Rd.		
9,000	CY	Excavation	$7.00	$63,000
4,000	CY	Structural backfill	$14.00	$56,000
1,000	CY	Culvert concrete incl. reinforcement	$625.00	$625,000
840	CY	Energy dissipaters concrete inc. reinforcement downstream of culverts	$625.00	$525,000
			Subtotal	**$1,269,000**
		Low Flow Channel, Access Roads and Existing Sewer Relocation		
13,000	CY	Excavation	$7.00	$91,000
2,000	CY	Fill and Compaction	$10.00	$20,000
16,500	SY	Topsoil, Hydro-Mulching and Seeding	$0.40	$6,600
6	EA	Low Flow Channel Control Berms	$8,000.00	$48,000
3,300	TON	Main Channel Access Road	$300.00	$990,000
2,326	LF	24-Inch RCP	$300.00	$697,800
352	LF	36-Inch RCP	$500.00	$176,000
6	EA	Concrete Collar for 36-inch RCP	$3,000.00	$18,000
6	EA	Concrete Collar for 24-inch RCP	$2,000.00	$12,000
6,300	LF	Relocate the Sewer Pipe	$400.00	$2,520,000
			Subtotal	**$4,579,400**
		Additional Impacts		
1	LS	Mobilization (field office & etc)	$200,000.00	$200,000
11000	LF	6-ft Chain Link Right of Way Fence	$16.00	$176,000
8	EA	20-ft Double Drive Gates	$2,000.00	$16,000
			Subtotal	**$392,000**
Subtotal Direct Construction Cost				**$12,135,900**
Misc. (30% of Subtotal Direct Construction Cost)				$3,640,770
Total Direct Construction Cost				$15,776,670
20 % Contingency				$3,155,334
15% Construction Management				$2,839,801
Total Construction cost				**$21,771,805**
		Right-Of-Way Acquisition		
1	LS	Permanent Channel Right-Of-Way	$3,190,000.00	$3,190,000
1	LS	Temporary Right of Way	$179,000.00	$179,000
0	SF		$1.00	$0
0	SF		$1.00	$0
0	SF		$1.00	$0
			Project Total Cost for the Upstream Reach	**$25,140,805**
			SAY,	**$25,000,000**
Project Total Cost for the Downstream Reach				**$11,200,000**
Project Total Cost for the Downstream and Upstream Reaches				**$36,200,000**

DESERT KNOLLS WASH CONCEPTUAL ALTERNATIVE PLAN # 1, DOWNSTREAM OF EXISTING CONCRETE CHANNEL

PRELIMINARY COST ESTIMATE				
QUANTITY	UNITS	ITEM DESCRIPTION	UNIT PRICE	ITEM TOTAL
		CHANNEL, TRANSITION & DISSIPATERS		
18,000	CY	Excavation	$7.00	$126,000
1,000	CY	Fill and Compaction	$10.00	$10,000
4,300	CY	Trapezoidal Channel Concrete including reinforcement	$450.00	$1,935,000
680	CY	Two Energy Dissipaters including reinforcement	$500.00	$340,000
100	CY	Transition to existing concrete incl. reinforcement	$525.00	$52,500
			Subtotal	**$2,463,500**
		Parkway Crossing Bridge		
2,600	CY	Excavation	$7.00	$18,200
1,000	CY	Structural Backfill	$14.00	$14,000
400	CY	Concrete incl. reinforcement	$625.00	$250,000
			Subtotal	**$282,200**
		Low Flow Channel, Access Roads and Existing Sewer Relocation		
6,000	CY	Excavation	$7.00	$42,000
200	CY	Fill and Compaction	$10.00	$2,000
8,000	SY	Topsoil, Hydro-Mulching and Seeding	$0.40	$3,200
5	EA	Low Flow Channel Control Berms	$8,000.00	$40,000
1,600	TON	Main Channel Access Road	$300.00	$480,000
2,100	LF	24-Inch RCP	$300.00	$630,000
180	LF	48-Inch RCP	$550.00	$99,000
4	EA	Concrete Collar for 48-inch RCP	$3,000.00	$12,000
5	EA	Concrete Collar for 24-inch RCP	$2,000.00	$10,000
2,500	LF	Relocate the Sewer Pipe	$400.00	$1,000,000
			Subtotal	**$2,318,200**
		Additional Impacts		
1	LS	Mobilization (field office & etc)	$200,000.00	$200,000
5600	LF	6-ft Chain Link Right of Way Fence	$16.00	$89,600
4	EA	20-ft Double Drive Gates	$2,000.00	$8,000
			Subtotal	**$297,600**
Subtotal Direct Construction Cost				$5,361,500
Misc. (30% of Subtotal Direct Construction Cost)				$1,608,450
Total Direct Construction cost				$6,969,950
20 % Contingency				$1,393,990
15% Construction Management				$1,254,591
			Total Construction Cost	**$9,618,531**
		Right-Of-Way Acquisition		
1	LS	Permanent Channel Right-Of-Way	$1,470,000.00	$1,470,000
1	LS	Temporary Right of Way	$65,000.00	$65,000
0	SF		$1.00	$0
0	SF		$1.00	$0
0	SF		$1.00	$0
			Project Total Cost for the Downstream Reach	**$11,153,531**
			SAY,	**$11,200,000**

Alternative Plan 1 - Temporary Area of Potential Effect Upstream of the Existing Concrete Channel (Estimated at 15 feet on both sides of permanent right of way)

Parcel Number	Owner	Area in Square Feet	Estimated Cost in $
047315112	SAN BERNARDINO CO FLOOD CONTROL DIST	4,506	4,506
047315113	ABDRISM KIYUS & FROSO REVOCABLE LIN	178	178
047315218	CHOUIHNI, HASSAN A	4,414	4,414
047315217	SAN BERNARDINO CO FLOOD CONTROL DIST	601	0
047315215	SAN BERNARDINO CO FLOOD CONTROL DIST	1,596	0
047315216	CONE, ARTHUR W TR	2,778	2,778
047315221	CHOUIHNI, HASSAN	5,048	5,048
047315220	SAN BERNARDINO CO FLOOD CONTROL DIST	0	0
047315208	S & M ANGELLO LIVING TRUST 08-20-199	4,948	4,948
047315408	AVP HOLDINGS INC	3,035	3,035
047315407	COOK, WILLIAM T TR	3,004	3,004
047311104	OLMS DESIGN COMPANY INC	2,998	2,998
047311105	HDPE ACTION FOURTEEN LLC	2,998	2,998
047311206	FANCY, BRYAN J TR	2,999	2,999
047311205	PON YOU FUNG CALIFORNIA, INC	2,999	2,999
047311213	RAMOS, WILLIE	3,218	3,218
047311214	DOMENIGONI, ROBERT & EVELYN B TR	2,781	2,781
047311315	PIPPIN PROPERTIES, INC	65	65
047311318	RICHARDSON, MICHAEL A	6,495	6,495
047311316	COUNTY OF SAN BERNARDINO	883	0
047311317	LUNING ASSOCIATES LP	3,455	3,455
047311420	KIM, TAEWOONG MD DEFINED PENS FUND	6,272	6,272
047311419	KONIG, SHMUEL	1,418	1,418
047311418	PENG, JOHN C	915	915
047311417	FREUTEL, TR & PA FAMILY TR (3-31-0)	3,782	3,782
047311416	FREUTEL, TR & PA FAMILY TR (3-31-0)	3,811	3,811
047311415	LII, DER-SHSUAN	3,222	3,222
047311414	JAMMAL, REMY A	3,145	3,145
047311413	GUADALUPE, ROGELIO AND ELIZABETH ET	3,074	3,074
047311412	JORDAN, SANDRA L	3,300	3,300
047311504	VALASKANTJIS, NIKIFOROS	4,184	4,184
047311503	HUANG, GLORIA W	1,265	1,265
047308401	VALASKANTJIS, NIKIFOROS	2,479	2,479
047308402	VALASKANTJIS, NIKIFOROS	1,597	1,597
047308403	VALASKANTJIS, NIKIFOROS	1,793	1,793
047308404	BARKI, HILTON	3,858	3,858
047308208	AVELAR, EVERARDO	2,204	2,204
047308209	COSME, RUBEN I JR	1,483	1,483
047308210	REED, KATHERINE 2004 REVOCABLE LIVIN	1,502	1,502
047308211	DACUMOS, TOLENTINO C	1,778	1,778
047308212	PRAKASH FAMILY TRUST 6/13/1988	1,502	1,502
047308207	SAENZ, EDUARDO	2,337	2,337
047308206	NEUMEYER, PAUL L	2,088	2,088
047308213	AGOPIAN, SERGE	1,502	1,502
047308214	ENG, SAM	1,502	1,502
047308205	AVENI, A J & J C FAMILY TRUST (05-2-	2,088	2,088
047308215	AUSTIN, DANIEL C	1,503	1,503
047308204	QUICK, IRLINE TR	2,088	2,088
047308216	AUSTIN, DANIEL C	1,674	1,674
047308203	LAGER, DONALD D	1,536	1,536
047308217	SO, WILSON F	2,443	2,443
047308202	CONCHA, RUDY	1,180	1,180
047308218	DODGEN, NANCY L	3,163	3,163
047308230	COUNTY OF SAN BERNARDINO	1,683	0
047308232	21ST CENTURY CAR WASH, LLC	4,747	4,747
047308233	AVM PROPERTIES LLC	5,131	5,131
047308220	HONG, YIE-MING	10,028	10,028
047307106	GORMAN, PATRICK	1,131	1,131
047308228	GONZALEZ FAMILY TRUST	3,618	3,618
047307105	BEREZNAK, ROBERT	2,227	2,227
047308229	FULLER, CAROLINE	1,349	1,349
047307104	GALLARDO, DAVID	2,166	2,166
047308222	BURDEN, DAN	1,484	1,484
047307103	MOCK, LYDIA R	2,141	2,141
047308223	VANBURGER, CARL F	1,480	1,480
047307102	MC CABE, MARTIN G	2,288	2,288
047308224	FLAIEH, MAHER	1,190	1,190
047307101	TAYLOR, DAVID M	3,386	3,386
047308227	APPLE VALLEY FIRE DIST OF S B COUNTY	799	0
047304101	BAILEY, CLAUDE A	2,704	2,704

Alternative Plan 1 - Permanent Area of Project Effect within Right of Way (Upstream of Existing Concrete Channel)

Parcel Number	Owner	Area in Square Feet	Estimated Cost in $
047315112	SAN BERNARDINO CO FLOOD CONTROL DIST	8,264	57,849
047315113	ABDRISM KIYUS & FROSO REVOCABLE LIN	0	0
047315218	CHOUIHNI, HASSAN A	2,268	15,879
047315217	SAN BERNARDINO CO FLOOD CONTROL DIST	11,390	0
047315215	SAN BERNARDINO CO FLOOD CONTROL DIST	2,578	0
047315216	CONE, ARTHUR W TR	0	0
047315221	CHOUIHNI, HASSAN	6,648	46,537
047315220	SAN BERNARDINO CO FLOOD CONTROL DIST	12,522	0
047315208	S & M ANGELLO LIVING TRUST 08-20-199	14,777	103,441
047315408	AVP HOLDINGS INC	13,347	93,428
047315407	COOK, WILLIAM T TR	4,549	31,840
047311104	OLMS DESIGN COMPANY INC	10,582	74,071
047311105	HDPE ACTION FOURTEEN LLC	7,215	50,506
047311206	FANCY, BRYAN J TR	9,413	65,888
047311205	PON YOU FUNG CALIFORNIA, INC	8,367	58,566
047311213	RAMOS, WILLIE	15,908	111,356
047311214	DOMENIGONI, ROBERT & EVELYN B TR	1,872	13,105
047311315	PIPPIN PROPERTIES, INC	0	0
047311318	RICHARDSON, MICHAEL A	14,661	102,626
047311316	COUNTY OF SAN BERNARDINO	7,143	0
047311317	LUNING ASSOCIATES LP	18,718	131,023
047311420	KIM, TAEWOONG MD DEFINED PENS FUND	20,253	141,768
047311419	KONIG, SHMUEL	0	0
047311418	PENG, JOHN C	0	0
047311417	FREUTEL, TR & PA FAMILY TR (3-31-0)	8,306	58,142
047311416	FREUTEL, TR & PA FAMILY TR (3-31-0)	7,862	55,035
047311415	LII, DER-SHSUAN	10,144	71,010
047311414	JAMMAL, REMY A	10,695	74,867
047311413	GUADALUPE, ROGELIO AND ELIZABETH ET	10,349	72,445
047311412	JORDAN, SANDRA L	10,436	73,049
047311504	VALASKANTJIS, NIKIFOROS	11,750	82,253
047311503	HUANG, GLORIA W	0	0
047308401	VALASKANTJIS, NIKIFOROS	8,957	62,698
047308402	VALASKANTJIS, NIKIFOROS	8,240	57,680
047308403	VALASKANTJIS, NIKIFOROS	3,434	24,035
047308404	BARKI, HILTON	9,075	63,524
047308208	AVELAR, EVERARDO	5,711	39,979
047308209	COSME, RUBEN I JR	1,043	7,299
047308210	REED, KATHERINE 2004 REVOCABLE LIVIN	1,042	7,293
047308211	DACUMOS, TOLENTINO C	3,899	27,296
047308212	PRAKASH FAMILY TRUST 6/13/1988	6,215	43,504
047308207	SAENZ, EDUARDO	4,316	30,214
047308206	NEUMEYER, PAUL L	3,634	25,439
047308213	AGOPIAN, SERGE	6,815	47,705
047308214	ENG, SAM	7,421	51,945
047308205	AVENI, A J & J C FAMILY TRUST (05-2-	2,431	17,016
047308215	AUSTIN, DANIEL C	8,108	56,758
047308204	QUICK, IRLINE TR	1,211	8,480
047308216	AUSTIN, DANIEL C	8,828	61,795
047308203	LAGER, DONALD D	0	0
047308217	SO, WILSON F	8,920	62,438
047308202	CONCHA, RUDY	0	0
047308218	DODGEN, NANCY L	12,148	85,036
047308230	COUNTY OF SAN BERNARDINO	3,590	0
047308232	21ST CENTURY CAR WASH, LLC	3,612	25,286
047308233	AVM PROPERTIES LLC	13,536	94,752
047308220	HONG, YIE-MING	31,710	221,970
047307106	GORMAN, PATRICK	609	4,266
047308228	GONZALEZ FAMILY TRUST	14,381	100,668
047307105	BEREZNAK, ROBERT	4,260	29,818
047308229	FULLER, CAROLINE	5,473	38,313
047307104	GALLARDO, DAVID	4,136	28,954
047308222	BURDEN, DAN	6,081	42,569
047307103	MOCK, LYDIA R	3,958	27,704
047308223	VANBURGER, CARL F	6,072	42,503
047307102	MC CABE, MARTIN G	3,970	27,789
047308224	FLAIEH, MAHER	4,735	33,145
047307101	TAYLOR, DAVID M	15,020	105,143
047308227	APPLE VALLEY FIRE DIST OF S B COUNTY	3,275	0
	Total	**495,884**	**$3,187,701**

Alternative Plan 1 - Temporary Area of Potential Effect Downstream of the Existing Concrete Channel (Estimated at 15 feet on both sides of permanent right of way)

Parcel Number	Owner	Area in Square Feet	Estimated Cost in $
047318322	HIGH DESERT PISHIP IN ACADEMIC EXCEL	5,137	5,137
047318321	HIGH DESERT PISHIP IN ACADEMIC EXCEL	64,289	64,289
047315114	SAN BERNARDINO CO FLOOD CONTROL DIST	1,270	0
047315115	LAI, TSE HUANG	573	573
047315107	SAN BERNARDINO CO FLOOD CONTROL DIST	3,832	0
047315106	SAN BERNARDINO CO FLOOD CONTROL DIST	5,114	0
047315105	SAN BERNARDINO CO FLOOD CONTROL DIST	4,448	0
047315104	SAN BERNARDINO CO FLOOD CONTROL DIST	4,175	0
047315103	SAN BERNARDINO CO FLOOD CONTROL DIST	2,061	0
	Total	**85,763**	**$64,863**

Alternative Plan 1 - Permanent Area of Project Effect within Right of Way (Downstream of Existing Concrete Channel)

Parcel Number	Owner	Area in Square Feet	Estimated Cost in $
47318322	HIGH DESERT PISHIP IN ACADEMIC EXCEL	11,758	82,309
047318321	HIGH DESERT PISHIP IN ACADEMIC EXCEL	197,558	1,382,908
047315114	SAN BERNARDINO CO FLOOD CONTROL DIST	2,840	0
047315115	LAI, TSE HUANG	0	0
047315107	SAN BERNARDINO CO FLOOD CONTROL DIST	13,984	0
047315106	SAN BERNARDINO CO FLOOD CONTROL DIST	15,196	0
047315105	SAN BERNARDINO CO FLOOD CONTROL DIST	13,191	0
047315104	SAN BERNARDINO CO FLOOD CONTROL DIST	12,473	0
047315103	SAN BERNARDINO CO FLOOD CONTROL DIST	920	0
	Total	**267,921**	**$1,465,216**

DESERT KNOLLS WASH CONCEPTUAL ALTERNATIVE PLAN # 2, UPSTREAM OF EXISTING CONCRETE CHANNEL

PRELIMINARY COST ESTIMATE				
QUANTITY	UNITS	ITEM DESCRIPTION CHANNEL AND TRANSITION	UNIT PRICE	ITEM TOTAL
248,600	CY	Excavation	$7.00	$1,740,200
2,400	CY	Upstream riprap transition to planned channel	$15.00	$36,000
6,000	CY	Fill and Compaction	$10.00	$60,000
100	CY	Transition to existing concrete incl. reinforcement	$525.00	$52,500
			Subtotal	**$1,888,700**
RCBs and Energy Dissipaters at Quantico, Tuscola, Kasota, Olalee, Mondamon, Pohez and Private Rd.				
8,000	CY	Excavation	$7.00	$56,000
4,200	CY	Structural backfill	$14.00	$58,800
1,100	CY	Culvert concrete incl. reinforcement	$625.00	$687,500
840	CY	Concrete energy dissipaters inc. reinforcement downstream of culverts	$625.00	$525,000
			Subtotal	**$1,327,300**
Gabion Grade Control Structures, Access Road and Sewer Pipe Relocation.				
1	LS	Stabilizer No 1 (Drop = 5.8 Feet)	$60,000.00	$60,000
1	LS	Stabilizer No 2 (Drop = 8.9 Feet)	$89,000.00	$89,000
1	LS	Stabilizer No 3 (Drop = 9.3 Feet)	$92,000.00	$92,000
1	LS	Stabilizer No 4 (Drop = 7.9 Feet)	$79,000.00	$79,000
6,600	TON	Main Channel Access Road	$300.00	$1,980,000
7,200	LF	Relocate the Sewer Pipe	$400.00	$2,880,000
			Subtotal	**$5,180,000**
Additional Impacts				
1	LS	Mobilization (field office & etc)	$200,000.00	$200,000
11000	LF	6-ft Chain Link Right of Way Fence	$16.00	$176,000
8	EA	20-ft Double Drive Gates	$2,000.00	$16,000
			Subtotal	**$392,000**
Subtotal Direct Construction Cost				**$8,788,000**
Misc. (30% of Subtotal Direct Construction Cost)				$2,636,400
Total Direct Construction cost				$11,424,400
20 % Contingency				$2,284,880
15% Construction Management				$2,056,392
Total Construction cost				**$15,765,672**
Right-Of-Way Acquisition				
1	LS	Permanent Channel Right-Of-Way	$3,311,000.00	$3,311,000
1	LS	Temporary Right of Way	$186,400.00	$186,400
0	SF		$1.00	$0
0	SF		$1.00	$0
0	SF		$1.00	$0
Project Total Cost for the Upstream Reach				**$19,263,072**
			SAY,	**$19,300,000**
Project Total Cost for the Downstream Reach				**$7,400,000**
Project Total Cost for the Downstream and Upstream Reaches				**$26,700,000**

DESERT KNOLLS WASH CONCEPTUAL ALTERNATIVE PLAN # 2, DOWNSTREAM OF EXISTING CONCRETE CHANNEL

PRELIMINARY COST ESTIMATE				
QUANTITY	UNITS	ITEM DESCRIPTION EARTH CHANNEL AND TRANSITION TO EXISTING CONCRETE CHANNEL	UNIT PRICE	ITEM TOTAL
77,700	CY	Excavation	$7.00	$543,900
1,000	CY	Fill and Compaction	$10.00	$10,000
100	CY	Transition to existing concrete channel including reinforcement	$525.00	$52,500
			Subtotal	**$606,400**
		Parkway Crossing Bridge, Access Roads and Sewer Pipe Relocation		
2,600	CY	Excavation	$7.00	$18,200
1,200	CY	Structural Backfill	$14.00	$16,800
1,600	TON	Main Channel Access Road	$300.00	$480,000
400	CY	Concrete incl. reinforcement	$625.00	$250,000
2,800	LF	Relocate the Sewer Pipe	$400.00	$1,120,000
			Subtotal	**$1,885,000**
		Gabion Grade Control Structures		
1	LS	Stabilizer No 1 (Drop = 3.0 Feet)	$33,000.00	$33,000
1	LS	Stabilizer No 2 (Drop = 4.18 Feet)	$44,000.00	$44,000
1	LS	Stabilizer No 3 (Drop = 5.24 Feet)	$54,000.00	$54,000
1	LS	Stabilizer No 4 (Drop = 6.08 Feet)	$62,000.00	$62,000
1	LS	Stabilizer No 5 (Drop = 3.79 Feet)	$41,000.00	$41,000
1	LS	Stabilizer No 6 (Drop = 6.44 Feet)	$66,000.00	$66,000
1	LS	Stabilizer No 7 (Drop = 4.77 Feet)	$50,000.00	$50,000
1	LS	Stabilizer No 8 (Drop = 4.77 Feet)	$50,000.00	$50,000
			Subtotal	**$400,000**
		Additional Impacts		
1	LS	Mobilization (field office & etc)	$200,000.00	$200,000
5600	LF	6-ft Chain Link Right of Way Fence	$16.00	$89,600
4	EA	20-ft Double Drive Gates	$2,000.00	$8,000
			Subtotal	**$297,600**
Subtotal Direct Construction Cost				**$3,189,000**
Misc. (30% of Subtotal Direct Construction Cost)				$956,700
Total Direct Construction cost				$4,145,700
20 % Contingency				$829,140
15% Construction Management				$746,226
Total Construction cost				**$5,721,066**
		Right-Of-Way Acquisition		
1	LS	Permanent Channel Right-Of-Way	$1,621,087.00	$1,621,087
1	LS	Temporary Right of Way	$53,230.00	$53,230
0	SF		$1.00	$0
0	SF		$1.00	$0
0	SF		$1.00	$0
Project Total Cost for the Downstream Reach				**$7,395,383**
			SAY,	**$7,400,000**

Alternative Plan 2 - Temporary Area of Potential Effect Upstream of the Existing Concrete Channel (Estimated at 15 feet on both sides of permanent right of way)

Parcel Number	Owner	Area in Square Feet	Estimated Cost in $
047315212	SAN BERNARDINO CO FLOOD CONTROL DIST	4,496	0
047315113	ANDROS, LOUIS & FROSO REVOCABLE LIV	181	181
047315218	CHOUIHNI, HASSAN A	4,409	4,409
047315217	SAN BERNARDINO CO FLOOD CONTROL DIST	1,397	0
047315215	SAN BERNARDINO CO FLOOD CONTROL DIST	2,799	0
047315221	CHOUIHNI, HASSAN	4,795	4,795
047315220	SAN BERNARDINO CO FLOOD CONTROL DIST	71	0
047315208	S & M ANGELLO LIVING TRUST 08-20-199	5,085	5,085
047315408	AVP HOLDINGS INC	3,051	3,051
047315407	COOK, WILLIAM T TR	2,999	2,999
047311104	OLMS DESIGN COMPANY INC	3,110	3,110
047311105	HDPE ACTION FOURTEEN LLC	3,096	3,096
047311207	D & H BUCKLEY FAMILY LTD PTNRSHP	236	236
047311206	FANCY, BRYAN J TR	2,930	2,930
047311205	PON YOU FUNG CALIFORNIA, INC	1,763	1,763
047311204	BRAEGER, ARTHUR	1,336	1,336
047311212	D & H BUCKLEY FAMILY LTD PTNRSHP	1,397	1,397
047311213	RAMOS, WILLIE	1,614	1,614
047311214	DOMENIGONI, ROBERT & EVELYN B TR	2,952	2,952
047311215	BIOLA UNIVERSITY INC	1,167	1,167
047311318	RICHARDSON, MICHAEL A	5,795	5,795
047311311	DURAN, CELIO	648	648
047311313	RENOVA PROPERTIES, LLC	296	296
047311315	PIPPIN PROPERTIES, INC	752	752
047311316	COUNTY OF SAN BERNARDINO	836	0
047311317	LUNING ASSOCIATES LP	4,005	4,005
047311308	SILVA, ANTONIO	1,692	1,692
047311420	KIM, TAEWOONG MD DEFINED PENS FUND	2,272	2,272
047311419	KONIG, SHMUEL	2,624	2,624
047311418	PENG, JOHN C	2,606	2,606
047311417	FREUTEL, TR & PA FAMILY TR (3-31-0)	2,643	2,643
047311416	FREUTEL, TR & PA FAMILY TR (3-31-0)	2,282	2,282
047311415	LII, DER-SHSUAN	2,338	2,338
047311414	JAMMAL, REMY A	2,193	2,193
047311413	GUADALUPE, ROGELIO AND ELIZABETH ET	2,250	2,250
047311412	JORDAN, SANDRA L	2,600	2,600
047311504	VALASKANTJIS, NIKIFOROS	2,252	2,252
047311503	HUANG, GLORIA W	2,605	2,605
047308401	VALASKANTJIS, NIKIFOROS	1,030	1,030
047308402	VALASKANTJIS, NIKIFOROS	1,030	1,030
047308403	VALASKANTJIS, NIKIFOROS	2,220	2,220
047308404	BARKI, HILTON	4,648	4,648
047308208	AVELAR, EVERARDO	2,492	2,492
047308209	COSME, RUBEN I JR	1,493	1,493
047308210	REED, KATHERINE 2004 REVOCABLE LIVIN	1,499	1,499
047308211	DACUMOS, TOLENTINO C	2,968	2,968
047308212	PRAKASH FAMILY TRUST 6/13/1988	15,972	15,972
047308207	SAENZ, EDUARDO	2,084	2,084
047308206	NEUMEYER, PAUL L	2,275	2,275
047308213	AGOPIAN, SERGE	1,500	1,500
047308214	ENG, SAM	1,500	1,500
047308205	AVENI, A J & J C FAMILY TRUST (05-2-	2,086	2,086
047308215	AUSTIN, DANIEL C	1,859	1,859
047308204	QUICK, IRLINE TR	2,090	2,090
047308216	AUSTIN, DANIEL C	1,522	1,522
047308203	LAGER, DONALD D	2,068	2,068
047308217	SO, WILSON F	1,522	1,522
047308202	CONCHA, RUDY	841	841
047308218	DODGEN, NANCY L	3,742	3,742
047308230	COUNTY OF SAN BERNARDINO	770	0
047308232	21ST CENTURY CAR WASH, LLC	4,783	4,783
047308233	AVM PROPERTIES LLC	4,854	4,854
047308220	HONG, YIE-MING	4,982	4,982
047307106	GORMAN, PATRICK	0	0
047308228	GONZALEZ FAMILY TRUST	4,998	4,998
047307105	BEREZNAK, ROBERT	0	0
047308229	FULLER, CAROLINE	1,351	1,351
047307104	GALLARDO, DAVID	1,762	1,762
047308222	BURDEN, DAN	1,485	1,485
047307103	MOCK, LYDIA R	2,138	2,138

Alternative Plan 2 - Permanent Area of Project Effect within Right of Way (Upstream of Existing Concrete Channel)

Parcel Number	Owner	Area in Square Feet	Estimated Cost in $
047315212	SAN BERNARDINO CO FLOOD CONTROL DIST	5,779	0
047315218	CHOUIHNI, HASSAN A	2,134	14,937
047315217	SAN BERNARDINO CO FLOOD CONTROL DIST	9,993	0
047315215	SAN BERNARDINO CO FLOOD CONTROL DIST	2,803	0
047315221	CHOUIHNI, HASSAN	3,674	25,717
047315220	SAN BERNARDINO CO FLOOD CONTROL DIST	12,450	0
047315208	S & M ANGELLO LIVING TRUST 08-20-199	19,015	133,105
047315408	AVP HOLDINGS INC	16,091	112,639
047315407	COOK, WILLIAM T TR	24,491	171,435
047311104	OLMS DESIGN COMPANY INC	14,735	103,145
047311105	HDPE ACTION FOURTEEN LLC	26,515	185,605
047311206	FANCY, BRYAN J TR	24,726	173,081
047311205	PON YOU FUNG CALIFORNIA, INC	33,692	235,843
047311213	RAMOS, WILLIE	30,388	212,717
047311214	DOMENIGONI, ROBERT & EVELYN B TR	24,078	168,546
047311318	RICHARDSON, MICHAEL A	26,173	183,210
047311311	DURAN, CELIO	0	0
047311316	COUNTY OF SAN BERNARDINO	8,709	0
047311317	LUNING ASSOCIATES LP	25,973	181,808
047311308	SILVA, ANTONIO	0	0
047311420	KIM, TAEWOONG MD DEFINED PENS FUND	36,041	252,290
047311419	KONIG, SHMUEL	13,289	93,026
047311418	PENG, JOHN C	11,746	82,222
047311417	FREUTEL, TR & PA FAMILY TR (3-31-0)	12,560	87,917
047311416	FREUTEL, TR & PA FAMILY TR (3-31-0)	10,071	70,498
047311415	LII, DER-SHSUAN	12,847	89,928
047311414	JAMMAL, REMY A	14,347	100,427
047311413	GUADALUPE, ROGELIO AND ELIZABETH ET	13,816	96,713
047311412	JORDAN, SANDRA L	14,518	101,629
047311504	VALASKANTJIS, NIKIFOROS	18,120	126,838
047311503	HUANG, GLORIA W	1,799	12,595
047308401	VALASKANTJIS, NIKIFOROS	2,256	15,792
047308402	VALASKANTJIS, NIKIFOROS	18,604	130,229
047308403	VALASKANTJIS, NIKIFOROS	9,596	67,169
047308404	BARKI, HILTON	12,190	85,332
047308208	AVELAR, EVERARDO	6,799	47,594
047308209	COSME, RUBEN I JR	1,360	9,521
047308210	REED, KATHERINE 2004 REVOCABLE LIVIN	1,194	8,358
047308211	DACUMOS, TOLENTINO C	8,415	58,902
047308212	PRAKASH FAMILY TRUST 6/13/1988	15,972	111,807
047308207	SAENZ, EDUARDO	6,319	7,534
047308206	NEUMEYER, PAUL L	4,198	29,385
047308213	AGOPIAN, SERGE	16,303	114,124
047308214	ENG, SAM	16,635	116,444
047308205	AVENI, A J & J C FAMILY TRUST (05-2-	3,371	23,600
047308215	AUSTIN, DANIEL C	15,065	105,454
047308204	QUICK, IRLINE TR	2,415	16,906
047308216	AUSTIN, DANIEL C	12,664	88,649
047308203	LAGER, DONALD D	665	4,657
047308217	SO, WILSON F	10,630	74,408
047308202	CONCHA, RUDY	0	0
047308218	DODGEN, NANCY L	11,333	79,330
047308230	COUNTY OF SAN BERNARDINO	3,710	0
047308232	21ST CENTURY CAR WASH, LLC	5,711	39,976
047308233	AVM PROPERTIES LLC	15,129	105,905
047308220	HONG, YIE-MING	43,696	305,874
047307106	GORMAN, PATRICK	0	0
047308228	GONZALEZ FAMILY TRUST	38,533	269,728
047307105	BEREZNAK, ROBERT	0	0
047308229	FULLER, CAROLINE	5,414	37,896
047307104	GALLARDO, DAVID	1,301	9,109
047308222	BURDEN, DAN	5,980	41,862
047307103	MOCK, LYDIA R	4,117	28,821
047308223	VANBURGER, CARL F	6,000	42,003
047307102	MC CABE, MARTIN G	4,597	32,181
047308224	FLAIEH, MAHER	4,720	33,038
047307101	TAYLOR, DAVID M	16,117	112,818
047308227	APPLE VALLEY FIRE DIST OF S B COUNTY	3,286	0
047304101	BAILEY, CLAUDE A	0	0
	Total	**799,091**	**$5,270,276**

Alternative Plan 2 - Temporary Area of Potential Effect Downstream of the Existing Concrete Channel (Estimated at 15 feet on both sides of permanent right of way)

Parcel Number	Owner	Area in Square Feet	Estimated Cost in $
47318322		465.30	
047318321	HIGH DESERT PISHIP IN ACADEMIC EXCEL	66,754	66,754
047315114	SAN BERNARDINO CO FLOOD CONTROL DIST	637	0
047315115	LAI, TSE HUANG	1,368	1,368
047315107	SAN BERNARDINO CO FLOOD CONTROL DIST	2,952	0
047315106	SAN BERNARDINO CO FLOOD CONTROL DIST	5,188	0
047315105	SAN BERNARDINO CO FLOOD CONTROL DIST	4,481	0
047315104	SAN BERNARDINO CO FLOOD CONTROL DIST	5,129	0
047315103	SAN BERNARDINO CO FLOOD CONTROL DIST	52	0
	UNKNOWN	819	819
	Total	**87,379**	**$68,940**

Alternative Plan 2 - Permanent Area of Project Effect within Right of Way (Downstream of Existing Concrete Channel)

Parcel Number	Owner	Area in Square Feet	Estimated Cost in $
47318322	HIGH DESERT PISHIP IN ACADEMIC EXCEL	465	3,257
047318321	HIGH DESERT PISHIP IN ACADEMIC EXCEL	306,620	2,146,343
047315114	SAN BERNARDINO CO FLOOD CONTROL DIST	3,471	0
047315115	LAI, TSE HUANG	0	0
047315107	SAN BERNARDINO CO FLOOD CONTROL DIST	17,256	0
047315106	SAN BERNARDINO CO FLOOD CONTROL DIST	21,609	0
047315105	SAN BERNARDINO CO FLOOD CONTROL DIST	18,668	0
047315104	SAN BERNARDINO CO FLOOD CONTROL DIST	15,239	0
047315103	SAN BERNARDINO CO FLOOD CONTROL DIST	0	0
	Total	**382,863**	**$2,146,343**

DESERT KNOLLS WASH CONCEPTUAL ALTERNATIVE PLAN # 3, UPSTREAM OF EXISTING CONCRETE CHANNEL

PRELIMINARY COST ESTIMATE				
QUANTITY	UNITS	ITEM DESCRIPTION CHANNEL AND TRANSITION	UNIT PRICE	ITEM TOTAL
168,000	CY	Excavation	$7.00	$1,176,000
2,400	CY	Upstream riprap transition to planned channel	$15.00	$36,000
6,300	CY	Fill and Compaction	$10.00	$63,000
100	CY	Transition to existing concrete incl. reinforcement	$525.00	$52,500
			Subtotal	**$1,327,500**
RCBs and Energy Dissipaters at Quantico, Tuscola, Kasota, Olalee, Mondamon, Pohez and Private Rd.				
10,400	CY	Excavation	$7.00	$72,800
5,500	CY	Structural backfill	$14.00	$77,000
980	CY	Culvert concrete incl. reinforcement	$625.00	$612,500
600	CY	Concrete energy dissipators inc. reinforcement downstream of culverts	$625.00	$375,000
			Subtotal	**$1,137,300**
Boulder Grade Control Stabilizers				
3	EA	Boulder Grade Control Stabilizers	$221,580	$664,740
1	LS	Gabion Grade Control Stabilizer #4 of Alternative Plan #2	$79,000.00	$79,000
			Subtotal	**$743,740**
Additional Impacts, Access Roads and Sewer Pipe Relocation.				
1	LS	Mobilization (field office & etc)	$200,000.00	$200,000
6,600	TON	Main Channel Access Road	$300.00	$1,980,000
6,300	LF	Relocate the Sewer Pipe	$400.00	$2,520,000
9,800	SY	Topsoil, Hydromulch and Seeding	$0.40	$3,920
11000	LF	6-ft Chain Link Right of Way Fence	$16.00	$176,000
8	EA	20-ft Double Drive Gates	$2,000.00	$16,000
			Subtotal	**$4,895,920**
Subtotal Direct Construction Cost				**$8,104,460**
Misc. (30% of Subtotal Direct Construction Cost)				$2,431,338
Total Direct Construction cost				$10,535,798
20 % Contingency				$2,107,160
15% Construction Management				$1,896,444
Total Construction cost				**$14,539,401**
Right-Of-Way Acquisition				
1	LS	Permanent Channel Right-Of-Way	$4,045,694.00	$4,045,694
1	LS	Temporary Right of Way	$183,794.00	$183,794
0	SF		$1.00	$0
0	SF		$1.00	$0
0	SF		$1.00	$0
Project Total Cost for the Upstream Reach				**$18,768,889**
			SAY,	**$18,800,000**
Project Total Cost for the Downstream Reach				**$10,800,000**
Project Total Cost for the Downstream and Upstream Reaches				**$29,600,000**

DESERT KNOLLS WASH CONCEPTUAL ALTERNATIVE PLAN # 3, DOWNSTREAM OF EXISTING CONCRETE CHANNEL

PRELIMINARY COST ESTIMATE				
QUANTITY	UNITS	ITEM DESCRIPTION EARTH CHANNEL AND TRANSITION TO EXISTING CONCRETE CHANNEL	UNIT PRICE	ITEM TOTAL
80,900	CY	Excavation	$7.00	$566,300
1,500	CY	Fill and Compaction	$10.00	$15,000
100	CY	Transition to existing concrete channel including reinforcement	$525.00	$52,500
			Subtotal	**$633,800**
		Parkway Crossing Bridge		
2,600	CY	Excavation	$7.00	$18,200
1,000	CY	Structural Backfill	$14.00	$14,000
400	CY	Concrete incl. reinforcement	$625.00	$250,000
			Subtotal	**$282,200**
		Boulder Grade Control Stabilizers		
700	SY	Geotextile Filter	$2.00	$1,400
400	CY	Boulders	$400.00	$160,000
300	CY	Gravel and Cobles	$200.00	$60,000
3	CY	1/2 Ton rock for bank sill	$60.00	$180
1	LS	**Total cost for one boulder stabilizer**		**$221,580**
9	EA	**Boulder Grade Control Stabilizers**	**$221,580**	**$1,994,220**
			Subtotal	**$1,994,220**
Additional Impacts, Access Roads and Sewer Pipe Relocation.				
1	LS	Mobilization (field office & etc)	$200,000.00	$200,000
3,200	TON	Main Channel Access Road	$300.00	$960,000
2,800	LF	Relocate the Sewer Pipe	$400.00	$1,120,000
4,860	SY	Topsoil, Hydromulch and Seeding	$0.40	$1,944
5600	LF	6-ft Chain Link Right of Way Fence	$16.00	$89,600
4	EA	20-ft Double Drive Gates	$2,000.00	$8,000
			Subtotal	**$2,379,544**
Subtotal Direct Construction Cost				**$5,289,764**
Misc. (30% of Subtotal Direct Construction Cost)				$1,586,929
Total Direct Construction cost				$6,876,693
20 % Contingency				$1,375,339
15% Construction Management				$1,237,805
Total Construction cost				**$9,489,837**
		Right-Of-Way Acquisition		
1	LS	Permanent Channel Right-Of-Way	$1,304,076.00	$1,304,076
1	LS	Temporary Right of Way	$50,478.00	$50,478
0	SF		$1.00	$0
0	SF		$1.00	$0
0	SF		$1.00	$0
Project Total Cost for the Downstream Reach				**$10,844,391**
			SAY,	**$10,800,000**

Alternative Plan 3 - Temporary Area of Potential Effect Upstream of the Existing Concrete Channel (Estimated at 15 feet on both sides of permanent right of way)

Parcel Number	Owner	Area in Square Feet	Estimated Cost in $
047315218	CHOUIHNI, HASSAN A	4,416	4,416
047315217	SAN BERNARDINO CO FLOOD CONTROL DIST	0	0
047315215	SAN BERNARDINO CO FLOOD CONTROL DIST	2,613	0
047315216	CONE, ARTHUR W TR	1,588	1,588
047315221	CHOUIHNI, HASSAN	4,799	4,799
047315220	SAN BERNARDINO CO FLOOD CONTROL DIST	0	0
047315208	S & M ANGELLO LIVING TRUST 08-20-199	4,918	4,918
047315408	AVP HOLDINGS INC	3,107	3,107
047315407	COOK, WILLIAM T TR	3,076	3,076
047311104	OLMS DESIGN COMPANY INC	3,122	3,122
047311105	HDPE ACTION FOURTEEN LLC	3,112	3,112
047311206	FANCY, BRYAN J TR	3,013	3,013
047311205	PON YOU FUNG CALIFORNIA, INC	2,999	2,999
047311213	RAMOS, WILLIE	2,999	2,999
047311214	DOMENIGONI, ROBERT & EVELYN B TR	2,985	2,985
047311313	RENOVA PROPERTIES, LLC	1,634	1,634
047311318	RICHARDSON, MICHAEL A	2,019	2,019
	UNKNOWN	2,897	2,897
047311311	DURAN, CELIO	0	0
047311315	PIPPIN PROPERTIES, INC	1,857	1,857
047311316	COUNTY OF SAN BERNARDINO	736	0
047311317	LUNING ASSOCIATES LP	3,003	3,003
047311308	SILVA, ANTONIO	1,250	1,250
047311420	KIM, TAEWOONG MD DEFINED PENS FUND	3,763	3,763
047311419	KONIG, SHMUEL	2,534	2,534
047311418	PENG, JOHN C	2,238	2,238
047311417	FREUTEL, TR & PA FAMILY TR (3-31-0)	2,914	2,914
047311416	FREUTEL, TR & PA FAMILY TR (3-31-0)	4,315	4,315
047311415	LII, DER-SHSUAN	4,812	4,812
047311414	JAMMAL, REMY A	4,034	4,034
047311413	GUADALUPE, ROGELIO AND ELIZABETH ET	2,424	2,424
047311412	JORDAN, SANDRA L	3,547	3,547
047311504	VALASKANTJIS, NIKIFOROS	4,356	4,356
047311503	HUANG, GLORIA W	692	692
047308401	VALASKANTJIS, NIKIFOROS	2,926	2,926
047308402	VALASKANTJIS, NIKIFOROS	2,734	2,734
047308403	VALASKANTJIS, NIKIFOROS	2,436	2,436
047308404	BARKI, HILTON	1,415	1,415
047308208	AVELAR, EVERARDO	6,581	6,581
047308209	COSME, RUBEN I JR	1,488	1,488
047308210	REED, KATHERINE 2004 REVOCABLE LIVIN	1,510	1,510
047308211	DACUMOS, TOLENTINO C	2,703	2,703
047308212	PRAKASH FAMILY TRUST 6/13/1988	1,505	1,505
047308207	SAENZ, EDUARDO	2,142	2,142
047308206	NEUMEYER, PAUL L	2,095	2,095
047308213	AGOPIAN, SERGE	1,505	1,505
047308214	ENG, SAM	1,753	1,753
047308205	AVENI, A J & J C FAMILY TRUST (05-2-	2,057	2,057
047308215	AUSTIN, DANIEL C	2,442	2,442
047308204	QUICK, IRLINE TR	1,289	1,289
047308216	AUSTIN, DANIEL C	2,981	2,981
047308203	LAGER, DONALD D	264	264
047308217	SO, WILSON F	1,586	1,586
047308202	CONCHA, RUDY	2,158	2,158
047308218	DODGEN, NANCY L	2,926	2,926
047308230	COUNTY OF SAN BERNARDINO	1,622	0
047308232	21ST CENTURY CAR WASH, LLC	4,900	4,900
047308233	AVM PROPERTIES LLC	5,390	5,390
047308220	HONG, YIE-MING	11,080	11,080
047307107	HUANG ERIC P JR	0	0
047307106	GORMAN, PATRICK	0	0
047308228	GONZALEZ FAMILY TRUST	6,046	6,046
047307105	BEREZNAK, ROBERT	94	94
047308229	FULLER, CAROLINE	1,826	1,826
047307104	GALLARDO, DAVID	2,062	2,062
047308222	BURDEN, DAN	1,486	1,486
047307103	MOCK, LYDIA R	2,140	2,140
047308223	VANBURGER, CARL F	1,483	1,483
047307102	MC CABE, MARTIN G	2,274	2,274
047308224	FLAIEH, MAHER	1,292	1,292

Alternative Plan 3 - Permanent Area of Project Effect within Right of Way (Upstream of Existing Concrete Channel)

Parcel Number	Owner	Area in Square Feet	Estimated Cost in $
047315218	CHOUIHNI, HASSAN A	5,367	37,566
047315217	SAN BERNARDINO CO FLOOD CONTROL DIST	11,390	0
047315215	SAN BERNARDINO CO FLOOD CONTROL DIST	1,561	0
047315216	CONE, ARTHUR W TR	0	0
047315221	CHOUIHNI, HASSAN	7,596	53,175
047315220	SAN BERNARDINO CO FLOOD CONTROL DIST	12,522	0
047315208	S & M ANGELLO LIVING TRUST 08-20-199	18,708	130,957
047315408	AVP HOLDINGS INC	16,793	117,552
047315407	COOK, WILLIAM T TR	16,374	114,617
047311104	OLMS DESIGN COMPANY INC	19,233	134,634
047311105	HDPE ACTION FOURTEEN LLC	14,626	102,380
047311206	FANCY, BRYAN J TR	16,781	117,466
047311205	PON YOU FUNG CALIFORNIA, INC	9,441	66,088
047311213	RAMOS, WILLIE	23,440	164,083
047311214	DOMENIGONI, ROBERT & EVELYN B TR	2,870	20,091
047311318	RICHARDSON, MICHAEL A	24,573	172,011
047311311	DURAN, CELIO	0	0
047311316	COUNTY OF SAN BERNARDINO	9,815	0
047311317	LUNING ASSOCIATES LP	26,129	182,904
047311308	SILVA, ANTONIO	288	2,017
047311420	KIM, TAEWOONG MD DEFINED PENS FUND	27,120	189,843
047311419	KONIG, SHMUEL	6,217	43,520
047311418	PENG, JOHN C	4,090	28,633
047311417	FREUTEL, TR & PA FAMILY TR (3-31-0)	10,850	75,949
047311416	FREUTEL, TR & PA FAMILY TR (3-31-0)	7,807	54,651
047311415	LII, DER-SHSUAN	21,211	148,476
047311414	JAMMAL, REMY A	13,972	97,807
047311413	GUADALUPE, ROGELIO AND ELIZABETH ET	29,318	205,224
047311412	JORDAN, SANDRA L	28,767	201,367
047311504	VALASKANTJIS, NIKIFOROS	21,288	149,015
13010.5290	VALASKANTJIS, NIKIFOROS	13,011	91,074
047308402	VALASKANTJIS, NIKIFOROS	13,373	93,614
047308403	VALASKANTJIS, NIKIFOROS	13,178	92,249
047308404	BARKI, HILTON	25	172
047308208	AVELAR, EVERARDO	6,581	46,070
047308209	COSME, RUBEN I JR	1,530	10,712
047308210	REED, KATHERINE 2004 REVOCABLE LIVIN	1,370	9,590
047308211	DACUMOS, TOLENTINO C	9,609	67,265
047308212	PRAKASH FAMILY TRUST 6/13/1988	14,119	98,833
047308207	SAENZ, EDUARDO	5,405	37,836
047308206	NEUMEYER, PAUL L	2,046	14,322
047308213	AGOPIAN, SERGE	15,030	105,213
047308214	ENG, SAM	16,787	117,506
047308205	AVENI, A J & J C FAMILY TRUST (05-2-	410	2,871
047308215	AUSTIN, DANIEL C	16,055	112,383
047308204	QUICK, IRLINE TR	149	1,045
047308216	AUSTIN, DANIEL C	15,741	110,188
047308203	LAGER, DONALD D	0	0
047308217	SO, WILSON F	14,074	98,520
047308202	CONCHA, RUDY	0	0
047308218	DODGEN, NANCY L	12,721	89,049
047308230	COUNTY OF SAN BERNARDINO	3,213	0
047308232	21ST CENTURY CAR WASH, LLC	6,007	42,046
047308233	AVM PROPERTIES LLC	15,881	111,168
047308220	HONG, YIE-MING	53,162	372,137
047307107	HUANG ERIC P JR	0	0
047307106	GORMAN, PATRICK	0	0
047308228	GONZALEZ FAMILY TRUST	30,514	213,598
047307105	BEREZNAK, ROBERT	0	0
047308229	FULLER, CAROLINE	5,003	35,020
047307104	GALLARDO, DAVID	2,287	16,006
047308222	BURDEN, DAN	5,424	37,970
047307103	MOCK, LYDIA R	4,050	28,351
047308223	VANBURGER, CARL F	5,376	37,633
047307102	MC CABE, MARTIN G	4,112	28,787
047308224	FLAIEH, MAHER	4,623	32,362
047307101	TAYLOR, DAVID M	14,538	101,768
047308227	APPLE VALLEY FIRE DIST OF S B COUNTY	3,280	0
047304101	BAILEY, CLAUDE A	453	3,173
	Total	**737,290**	**$4,868,557**

Alternative Plan 3 - Temporary Area of Potential Effect Downstream of the Existing Concrete Channel (Estimated at 15 feet on both sides of permanent right of way)

Parcel Number	Owner	Area in Square Feet	Estimated Cost in $
47318322	HIGH DESERT PISHIP IN ACADEMIC EXCEL	6,321	6,321
047318321	HIGH DESERT PISHIP IN ACADEMIC EXCEL	70,731	70,731
047315114	SAN BERNARDINO CO FLOOD CONTROL DIST	927	0
047315115	LAI, TSE HUANG	1,006	1,006
047315107	SAN BERNARDINO CO FLOOD CONTROL DIST	3,227	0
047315106	SAN BERNARDINO CO FLOOD CONTROL DIST	5,871	0
047315105	SAN BERNARDINO CO FLOOD CONTROL DIST	5,100	0
047315104	SAN BERNARDINO CO FLOOD CONTROL DIST	4,774	0
047315103	SAN BERNARDINO CO FLOOD CONTROL DIST	150	0
UNKNOWN	UNKNOWN	1,280	0
	Total	**93,065**	**$78,057**

Alternative Plan 3 - Permanent Area of Project Effect within Right of Way (Downstream of Existing Concrete Channel)

Parcel Number	Owner	Area in Square Feet	Estimated Cost in $
047318321	HIGH DESERT PISHIP IN ACADEMIC EXCEL	314,198	2,199,388
047315114	SAN BERNARDINO CO FLOOD CONTROL DIST	3,190	0
047315115	LAI, TSE HUANG	0	0
047315107	SAN BERNARDINO CO FLOOD CONTROL DIST	18,155	0
047315106	SAN BERNARDINO CO FLOOD CONTROL DIST	24,902	0
047315105	SAN BERNARDINO CO FLOOD CONTROL DIST	21,260	0
047315104	SAN BERNARDINO CO FLOOD CONTROL DIST	16,095	0
047315103	SAN BERNARDINO CO FLOOD CONTROL DIST	294	2,060
	Total	**398,095**	**$2,201,448**

F. 1. June 2009 California Rapid Assessment Method (CRAM) Report

Desert Knolls Wash California

Rapid Assessment Method Report

Prepared by:

Environmental Management Division
San Bernardino County Department of Public Works
825 E. Third Street, Room 201
San Bernardino, CA 92415
Contacts: Kim Romich and Brandy Ulrich, EMD Ecologists

June 13, 2010

1.1 Project Location

The Desert Knolls Wash Improvement Project (Project) area is located in the community of Apple Valley (Exhibit 1). Specifically, it is located south of State Route 18, between Hesperia Road and Apple Valley Road. It is within the Victorville U.S. Geological Survey 7.5-minute topographic quadrangle, in Section 10, Township 5 North, Range 4 West.

1.2 Project

Approximately 9,100 linear feet of flood control improvements are proposed within Desert Knolls Wash in Apple Valley, CA, from the confluence of the Mojave River and Desert Knolls Wash to the west, upstream to Tao Road to the east. The 9,100 figure does not include any potential basin construction upstream. The County is currently entering into a contract with Rivertech, Inc. to prepare an alternatives design analyses so that the County can decide on a preferred alternative design. There will be an environmental component to the alternative analyses to ensure that any preferred design will not adversely impact the riparian and wetland areas downstream of the project. The purpose of this California Rapid Assessment Method (CRAM) is to determine the health of the wetland/riparian areas downstream so that the consultant can use the results to identify a threshold of significance for environmental adverse effect and use that knowledge in evaluating each alternative analysis design.

1.3 Existing Conditions

The primary geographic and hydrologic feature of the watershed is the Mojave River. The Mojave River originates in the San Bernardino Mountains, which annually receives greater than 40 inches of precipitation at its highest elevations, while the lower reach receives less than 4 inches. Additionally, much of the winter precipitation falls in the form of snow within the San Bernardino Mountains that provides spring recharge to the Mojave River system. The Mojave River channel, through both surface and subsurface flow, transects the watershed a linear distance of approximately 120 miles to its terminus at Silver Dry Lake near the Community of Baker.

The U. S. Army Corps of Engineers completed the Mojave Forks Dam in 1971. The West Fork of the Mojave flows into Silverwood Lake, formed by Cedar Springs Dam, which overflows in the Mojave River Forks Reserve area. Downstream, Deep Creek meets the West Fork, forming the Mojave River immediately upstream of the Mojave River Dam, which is operated for flood control.The operation of Mojave Forks as a single purpose flood control dam with an ungated outlet has not significantly altered the mean monthly stream flow of the Mojave River. Peak stream discharges that were common during the desert wet season are now reduced by storage behind the dam for gradual release (California Water Case Study Report #83). Aside from intense storm events, the Mojave River channel is typically dry downstream of the Mojave Forks Dam, except in select locations where ground water is forced to the surface by geologic structures. One such area is the Mojave River Upper Narrows, located where the Desert Knolls Wash and the Mojave River merge.

The alluvial aquifer of the Mojave River is the primary source of water for domestic supplies and irrigation in the western Mojave Desert. The river also supports riparian communities unique to the Mojave Desert ecosystem. Ground water supplies both domestic and irrigation to water users in the basin, particularly upstream from Upper Narrows and to a lesser extent between Barstow and Camp Cady. A model of the ground-water flow system (Stamos et al., 2001), confirms that ground-water levels in the basin have been declining steadily in the latter part of the 20th century as previously known from water-level measurements. Ground-water changes are of concern to land management agencies because they have led to decimation or elimination of riparian vegetation in some reaches (Lines, 1999). Although some water is imported into the basin to artificially recharge the alluvial aquifer which benefits riparian ecosystems, changes in riparian communities along the Mojave River are highly variable, ranging from large increases in biomass of cottonwood trees to complete elimination of riparian species. Most of the decreases are likely the result of local ground-water pumping; the headwater dams have not had a significant impact on flow in the Mojave River other than to attenuate flood peaks (Lines, 1996).

Desert Knolls Wash flows in a southwesterly direction, through a heavily urbanized area of Apple Valley, into the Mojave River. The wash is mostly natural, with approximately 1500 linear feet of concrete-lined channel and box culvert at Apple Valley Road and downstream of Apple Valley Road. Within the lower portion of the wash east of the confluence with the Mojave River, the substrate consists of sandy silt with little to no vegetation within the channel, while the adjacent habitat on either side is composed primarily of desert creosote scrub (Exhibit 1).

Where Desert Knolls Wash flows into the Mojave River, bedrock constriction causes water to rise to the surface of the Mojave River, resulting in a southern cottonwood - willow riparian forest (CNDBB Code 61.130.02) dominate overstory, with the understory structure primarily composed of alkali bulrush – cattail (CNDDB Code 52.112.02), narrowleaf willow (*Salix exigua*) (CNDDB 63.110.00), and mulefat scrub (*Baccharis salicifolia*).

Exhibit 1. The Mojave River and Desert Knolls Wash confluence, located just south of where the Mojave River narrows (referred as the upper narrows) between Apple Valley and Victorville at State Route 18.

1.4 California Rapid Assessment Method (CRAM)

There is ample scientific research indicating that indirect impacts, such as impacts associated with upland landscape alteration, can degrade certain wetland functions and values. Both the federal Clean Water Act and the National Environmental Policy Act require analyses of indirect

effects, and a number of regulations and guidance documents have been issued by various federal and state agencies. For instance, a formal analysis of indirect impacts is already required for all projects with a federal component or that trigger the jurisdiction of the Clean Water Act. Although indirect affects to wetlands have been recognized for some time, qualitatively analyzing the change to the alluvial and hydrologic processes can be difficult.

The California Rapid Assessment Method (CRAM) was designed to cost-effectively assess the performance of wetland and riparian restoration projects, mitigation projects, and the status and trends of ambient conditions within California watersheds. The use of CRAM will, over time, help determine the type of anthropogenic stress, management actions, and natural disturbance on the spatial and temporal variability in reference conditions.

1.5 CRAM Methodology

CRAM is a diagnostic tool used to assess the condition of a wetland or riparian site using visual indicators in the field. A CRAM score is generated which summarizes the health of a wetland or riparian area, relative to its maximum achievable condition. Scores range from 30 to 100 points, with higher scores indicating healthier systems. For riverine and estuarine wetlands, calibration data is available based on data collected by the Southern California Coastal Water Research Project (SCCWRP) and posted to the CRAM website (www.cramwetlands.org). The calibration data represents an average score for that type of data.

As defined by CRAM, a riverine is a channel and its active floodplain, plus any portions of the adjacent riparian areas that are likely to be strongly linked to the channel or floodplain through bank stabilization and allochthanous inputs. Riverine wetlands are further classified as confined or non-confined, based on the ratio of valley width to channel width. Once an area is defined, an assessment area (AA) is delineated, with the goal being to assess the average condition of the wetlands within the study area. Based on the CRAM criteria, for a riverine wetland, the AA should begin at a hydrological or geomorphic break in structure that corresponds to a significant change in flow regime or sediment regime and should be at least 100 meters in length, but not exceed 200 meters.

Multiple AAs might be required to assess the average condition of a wetland project that is many times larger than one AA. If the wetland is nearly twice as large as the preferred size, and if the purpose is to assess the average condition of the wetland, then both AAs should be recorded. The proposed project has the potential to impact habitat at the confluence of Desert Knolls Wash and the Mojave River, and also downstream of the project, in the Mojave River. Therefore, two AAs were created and analyzed for this project: 1) the Desert Knolls Wash-Mojave River AA (at the confluence) and 2) the Mojave River AA (immediately downstream of the project).

In general, the CRAM should be performed within the growing season for the characteristic plant community of the wetland type to be assessed. For wetlands that are not subject to snowfall and that are non-tidal, the main growing season usually extends from March through September. Also, riverine wetlands should not be assessed during high water, since some important indicators of channel conditions might be concealed.

The Desert Knolls Wash/Mojave River AA and Mojave River AA were assessed on December 1, 2008 and January 5, 2009. Data was collected in the field using CRAM datasheets and the methodology in the CRAM manual (Collins et al 2007). The data for riverine wetlands was uploaded to the CRAM website and a CRAM score obtained. For reporting consistency, all data taken in the field was transposed to a spreadsheet and the score calculated based on instructions in the CRAM manual. Graphs summarizing the results were created. A summary of the assessment is provided below. Data sheets, scores, and photographs are also provided in the attached appendices. In addition, a CRAM assessment was performed in June 2005 by the Lewis Center for Educational Research, with a portion of the assessment area overlapping with the 2008/2009 CRAM analysis that was performed by the District. The location (Exhibit 2) and score are included for reference.

1.5.1 Desert Knolls Wash / Mojave River Assessment Area

Desert Knolls Wash contains portions that are open, sparsely vegetated; however, at the confluence of the Mojave River where the assessment area is located, the habitat is diverse in structure and plant species composition. Thus, the length of the AA was defined by the natural break between the creosote scrub of the Desert Knolls Wash and the riparian habitat within the Mojave River being the upstream boundary (northeast), while the downstream boundary (southwest) occurs where the Mojave River becomes constricted and narrow (Exhibit 2). This portion of the River was determined to be a riverine non-confined wetland. At the time of the assessment, the AA was dry.

1.5.2 Mojave River Assessment Area

The Mojave River AA is approximately 200 meters in length, with the upper boundary of the AA defined as where the Desert Knolls Wash project area terminates, or where the hydrology changes due the convergence of the Mojave River and Desert Knolls Wash. The lower boundary of the AA was depicted using the geomorphic break in structure of the Mojave River Upper Narrows (Exhibit 2). Due to the constriction of the River, the AA was determined to be a riverine confined wetland. The water depth was taken at three locations, or cross sections, within the AA, with the deepest part of the River at the time of the assessment ranging between 0.45 and 0.75 meters.

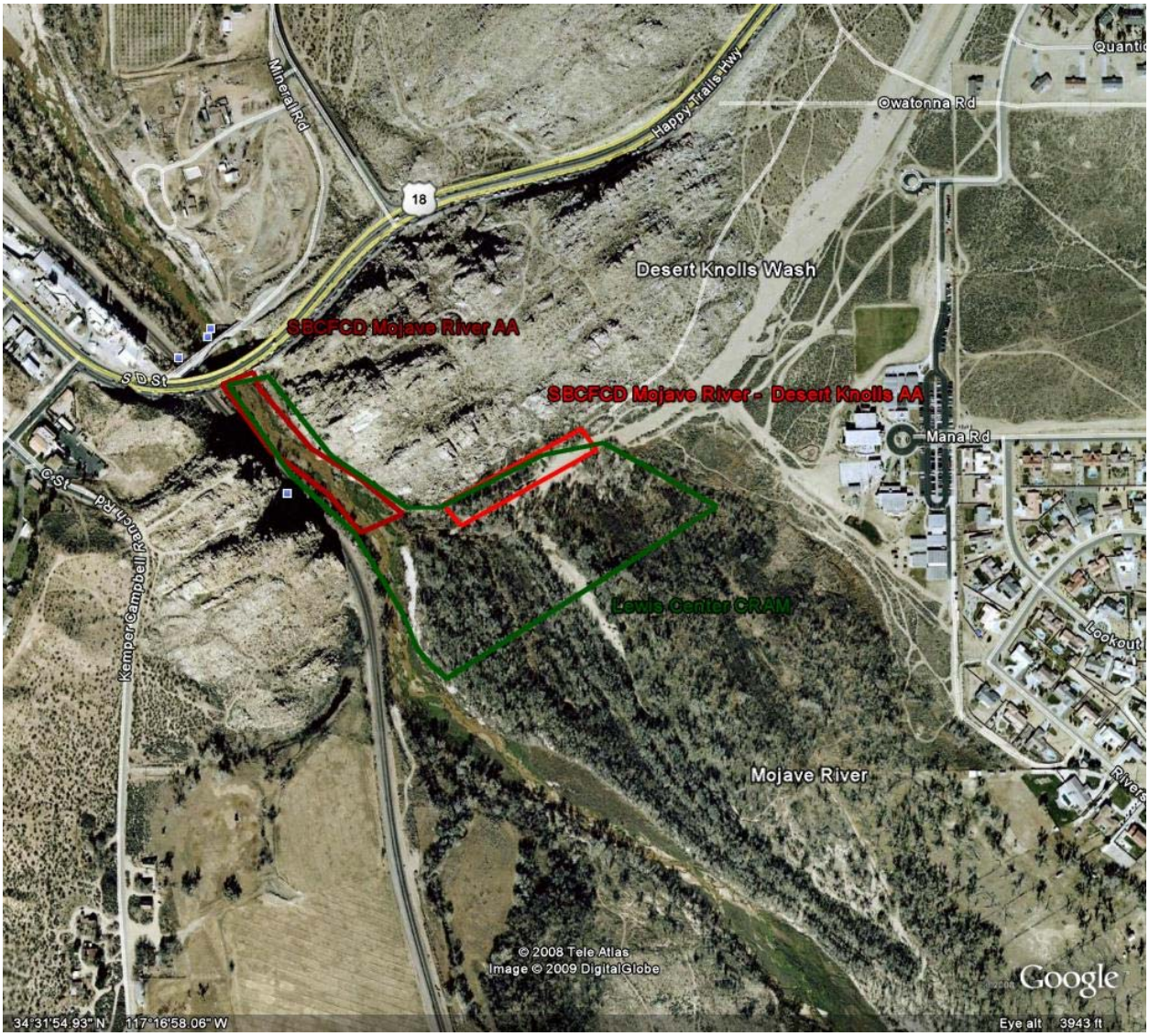

Exhibit 2. The California Rapid Assessment Method (CRAM) assessment area boundaries for the Mojave River performed by the Lewis Center (green) in 2005 and the San Bernardino County Flood Control District (red) in 2008/2009 located in the City of Apple Valley, San Bernardino County, California

2.0 RESULTS

CRAM was developed specifically as a tool to assess the status of the condition of wetlands throughout the state; thus, calibration data has been provided as a reference tool. The CRAM score for each AA performed is generally averaged for the entire area that is being analyzed. Thus, the Desert Knolls Wash project overall CRAM calibration score (77) is equal to other California riverine systems. The Mojave River Lewis Center CRAM calibration score was higher (85) relative to other wetlands throughout the state (77). Finally, both of the Mojave River assessment areas were individually analyzed and discussed for clarity. While the Desert Knolls

Wash at the Mojave River CRAM score was higher (81) than other non-confined riverine systems throughout California; the Mojave River assessment area downstream from the project area scored slightly lower with a measurement of 74. Figure 1 depicts the overall CRAM scores for each AA performed within the Mojave River, as well as, the Desert Knolls Wash project calibration score relative to other California riverine systems.

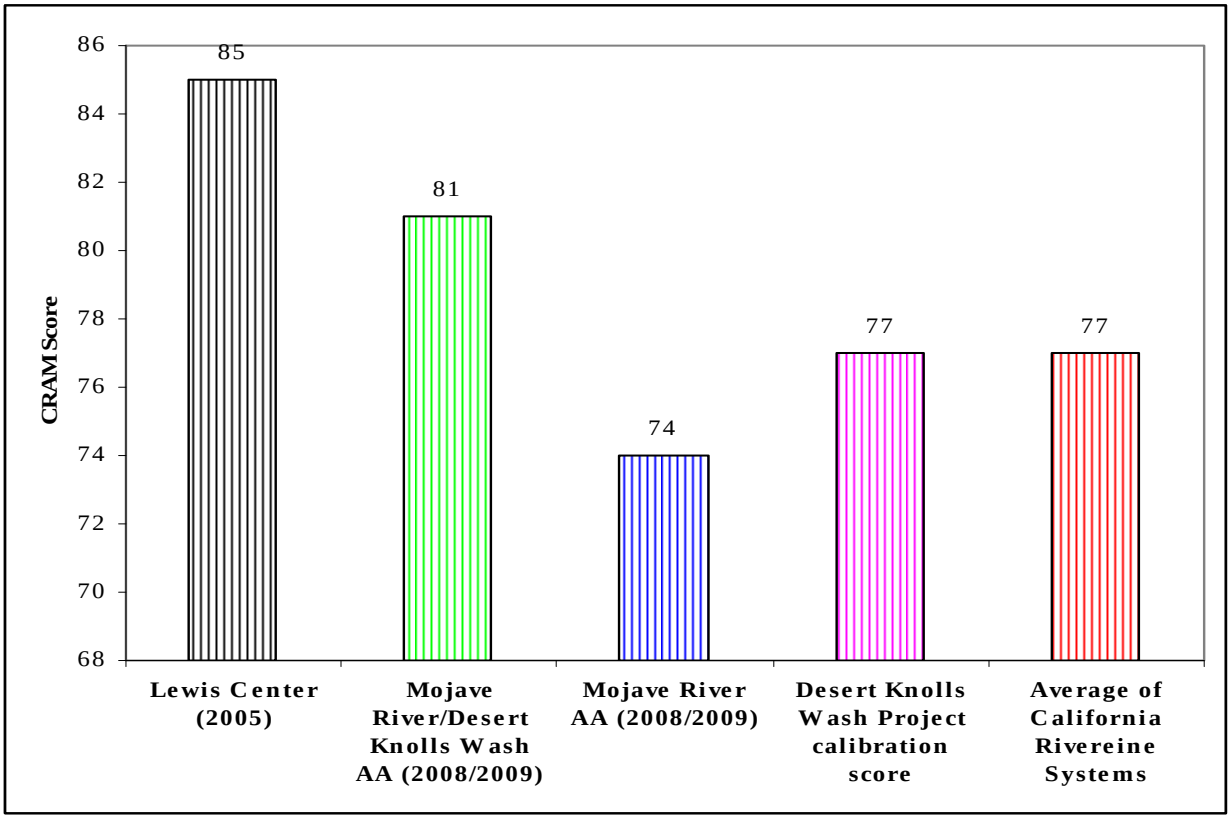

Figure 1. A comparison of CRAM scores analyzed within the Mojave River with other riverine systems (confined and non-confined) throughout California

More specifically, the overall CRAM score is a compilation of four attributes: landscape, hydrology, biotic structure, and physical structure. When each attribute was compared to other riverine systems, the Mojave River/Desert Knolls Wash AA had a lower biotic structure score, while the Mojave River AA had a lower score for the biotic structure and hydrology component. Figure 2 depicts the different categories within the Desert Knolls Wash CRAM analysis relative to other similar California riverine systems.

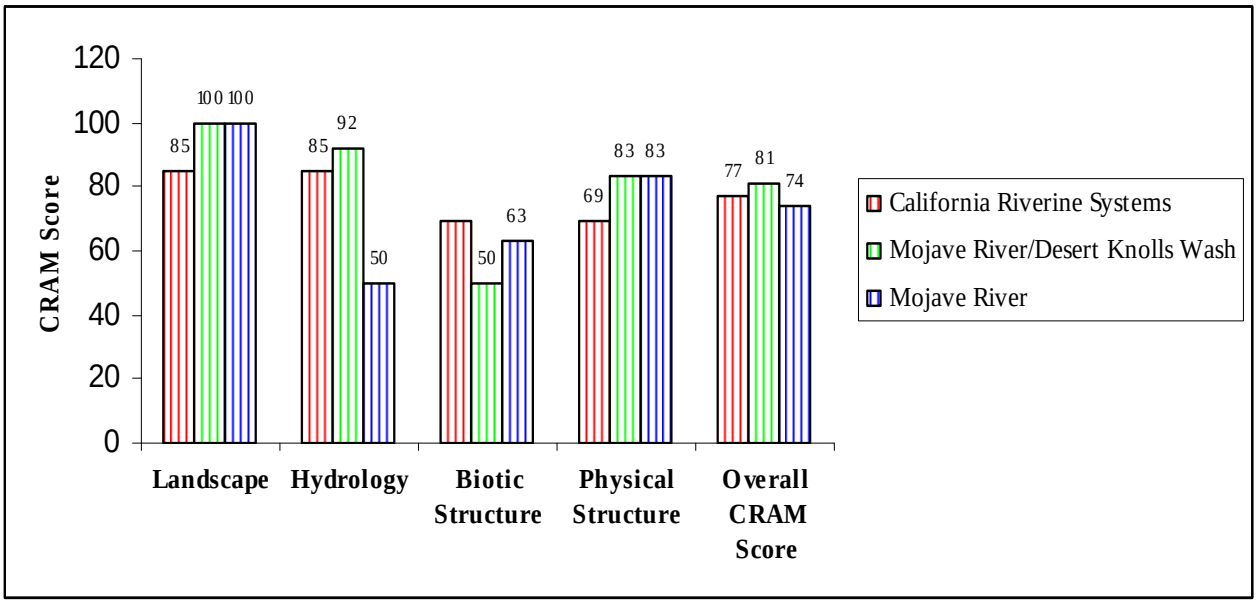

Figure 2. A comparison of the different categories within the CRAM that were analyzed within the Mojave River with other riverine systems (confined and non-confined) throughout California.

3.0 DISCUSSION

For CRAM scores to be comparable, they must be standardized in terms of time (i.e., scores should represent comparable amounts of assessment effort during comparable years and times of year), and in terms of space (i.e., for any given wetland type, the scores should represent comparable amounts of wetlands, and these should have hydrological and ecological integrity). For a variety of reasons, scores that do not meet these standards cannot be compared and be combined into datasets. For example, assessments that take longer or that involve larger areas are likely to encounter more structural complexity and therefore yield higher scores. The use of assessment windows, fixed assessment times (i.e., no assessment should take longer than one half day in the field), recommended AA sizes, and guidelines for assembling data of varying vintage will achieve more consistent assessment results.

According to CRAM guidelines, in order to help standardize the assessment of riverine wetlands, they should be restricted to the dry season. This is partly because vegetated wetlands often develop along the channel bottoms of intermittent and ephemeral streams during the dry season. Moreover, only wadeable channel beds, which are more likely to occur in the dry season, can be included in CRAM assessments. Both the Desert Knolls Wash/Mojave River and the Mojave River CRAM analyses were performed in winter; however accessibility was not a factor. Although the Desert Knolls Wash/Mojave River AA was dry at the time of the assessment, much of the precipitation occurs along the Mojave River in winter, with snow run off providing water recharge in the spring. Due to the geomorphology of the area, water is present year round within the Mojave River AA; however, the water depth may fluctuate seasonally.

The great flood of 1938 destroyed the United States Geological Survey (USGS) gage at the Upper Narrows of the Mojave River. Using the USGS gage located at the Lower Narrows of the Mojave River (USGS 10261500 Mojave R A Lower Narrows near Victorville), approximately 1.9 miles downstream from the Mojave River AA, the surface-water monthly statistics was reviewed (http://waterdata.usgs.gov). Flow data was averaged from flow data compiled between March 1899 and October 2008. The lowest average monthly flow rate occurred in summer, which included July (11cfs), August (9 cfs), and September (11 cfs). This was than compared to the daily water flow rate for January 1, 2009, when the Mojave River CRAM was performed. The water flow at the Mojave River Lower Narrows gage had a water flow rate of 11.5 cfs when the CRAM was performed, which is similar to the average water flow rate that occurs in summer months. Furthermore, according to the National Weather Service, the precipitation was lower in the Mojave Desert (Lucerne) from July 1, 2008 to January 22, 2009 (2.92 inches) than normal (3.32 inches). Thus, although the Mojave River CRAM was performed in winter, the Mojave River AA was wadeable. In addition, many channel indicators and physical structural patch indicators that may not have been discernible during a normal winter (e.g. pools, in-channel bars, debris jams, etc.), were visible.

3.1 Desert Knolls Wash / Mojave River Assessment Area

While the overall CRAM score for Mojave River/Desert Knolls Wash AA is higher when compared to other riverine systems, it did not score as high as other riverine systems in terms of biotic structure (Figure 2). According to CRAM, the biotic structure includes three components: the plant community, the horizontal interspersion and zonation, and the vertical biotic structure.

The plant community metric is further composed of three submetrics: number of co-dominant plants, percent of nonnative invasion, and the number of plant layers as defined for CRAM. The plant community metric was high due to the large degree of species diversity with little to no nonnative vegetation.

The horizontal biotic structure refers to the variety and interspersion of plant “zones.” Interspersion is essentially a measure of the number of distinct plant zones and the amount of edge between them. Within the AA, a moderate (>50%) overlap of horizontal layers and interspersion existed, which reflected in a slightly lower score.

The vertical component of biotic structure consists of the interspersion and complexity of plant layers. The vertical component of biotic structure is commonly recognized as the overall number of plant layers, their spatial extent, and their vertical overlap relative to the expected conditions. Within the AA, a moderate (> 50%) overlap of vertical plant layers existed, resulting in the creation of a modest score.

3.2 Mojave River Assessment Area

The Mojave River AA had a slightly lower biotic structure score (63) compared to other California riverine systems (70). While two of the biotic structure metrics, including plant community and horizontal interdispersion and zonation, scored relatively high, the vertical overlap was assigned a slightly lower score due to the fact that 25-50 % of the AA had only

moderate vertical overlap of plant layers. There are only two main vegetation layers within the Mojave River AA with very little overlap. Tall riparian trees (black willow, *Salix gooddingii* and cottonwood *Populus fremontii*) grow along the outer edge of the floodplain and a low layer of successional emergent wetland vegetation, composed of cattails, bulrush and other herbaceous wetland vegetation grows within the planar flow of the channel. It is possible that the low amount of overlap within the vegetation community of the AA is due to the natural geological constriction of the narrows, which creates a backflow of water, creating an area that is relatively unstable, and experiences frequent scouring events.

The hydrology attribute consists of three components: the water source, hydroperiod or channel stability, and hydrological connectivity. The hydrology attribute score (50) was lower when compared to the Desert Knolls Wash/Mojave River AA (92) and other California riverines (85).

Water sources directly affect the extent, duration, and frequency of saturated or ponded conditions within an assessment area. Water sources include the kinds of direct inputs of water into the AA as well as any diversions of water from the AA. For the Mojave River, freshwater sources that affect the dry season conditions of the AA are primarily urban runoff, direct irrigation, pumped water, artificially impounded water, water remaining after diversions, regulated releases of water through a dam, or other artificial hydrology. Thus, because there is an indication that the AA is controlled by artificial means, the water source submetric attribute was assigned a lower score.

Hydroperiod is defined as the degree of channel aggradation (i.e., net accumulation of sediment on the channel bed causing it to rise over time), or degradation (i.e., net loss of sediment from the bed causing it to be lower over time). The hydroperiod of a riverine wetland can be evaluated based on a variety of statistical parameters, including the frequency and duration of flooding (as indicated by the local relationship between stream depth and time spent at depth over a prescribed period), and flood frequency (i.e., how often a flood of a certain height is likely to occur). Based on field indicators, most of the channel through the AA was characterized by some aggradation or degradation, none of which was severe, and the channel seemed to be approaching an equilibrium form. Thus, the attribute score assigned reflected this slight deviation from equilibrium.

Hydrologic connectivity describes the ability of water to flow into or out of the wetland, or to inundate the adjacent uplands. For riverine wetlands, hydrologic connectivity is assessed based on the degree of channel entrenchment. Entrenchment is a field measurement calculated as the flood-prone width divided by the bankfull width. To have a high entrenchment score, the flood-prone width to bankful width ratio needs to be greater than 2.0, or the flood-prone width is twice as great as the maximum bankful width. According to the CRAM analysis, a lower score correlates to the degree to which the lateral movement of flood waters or the associated upland transition zone of the AA and/or its encompassing wetland is restricted by unnatural features such as levees, sea walls, or road grades. Within the Mojave River AA, the hydrological connectivity entrenchment ratio was lower (< 1.2) due not to anthropogenic causes, but to the natural geological constriction of the Mojave River.

4.0 CONCLUSION

The western Mojave has experienced tremendous growth. Development increases pressure to overdraw groundwater. Groundwater levels began dropping as a result of overdrafting in the 1950s, drying up riverbeds, springs, and seeps and diminishing riparian ecosystems that depend on flowing water and saturated soils. Since 1992, the USGS, in cooperation with the Mojave Water Agency, has constructed a series of regional water-table maps for intermittent years in a continuing effort to monitor ground-water conditions in the Mojave River and Morongo ground-water basins (Stamos et al. 2007). In addition, historical water-level data were used in conjunction with data collected for each map since 1994 to determine long-term (as early as 1930) water-level changes in the Mojave River basin. Long-term water-level changes were collected from 20 wells, or groups of wells. One of the wells, located just upstream of the project area, indicated that the water level altitude dropped from 0.5 to 5 feet in depth (http://maps.ca.water.usgs.gov/Mojave).

Continued withdrawal from an aquifer can directly result in the decline of wetland habitat (Stromberg et al. 1996). Wetlands have multiple benefits, including improved water quality, flood control, groundwater recharge, and wildlife habitat. Water from frequent out-of-bank flows settles in the wetlands, where water-borne sediments can drop out, nutrients can be used by the wetland plants, and nuisance flooding can be abated. Water in the wetlands gradually filters through the ground, recharging groundwater systems. Well-vegetated wetlands are prime habitat for a wide variety of aquatic and terrestrial wildlife.

Although it is important to create, maintain, and restore wetland habitat, most have not been evaluated and/or monitored. The goal of performing CRAM on the wetland habitat immediately adjacent and downstream of the project area is to not only provide consistent, scientifically defensible information about the condition of the wetlands and riparian habitats compared to other systems throughout California, but to provide baseline data of its condition for future reference. Thus, the initial CRAM analysis for San Bernardino County Flood Control Desert Knolls Wash project revealed:

- The overall Desert Knolls Wash project CRAM calibration score (77) was the same as other California riverine systems (77);
- The Desert Knolls Wash/Mojave River AA overall CRAM score was slightly higher (81) than other California riverine systems (77);
- The Desert Knolls Wash/Mojave River AA scored equal or higher on four (4) out of five (5) attributes, with the biotic structure being lower due to moderate overlap of horizontal and vertical plant layers;
- The Mojave River AA overall CRAM score was slightly lower (74) than other California riverine systems (77); and
- The Mojave River AA scored equal or higher on three (3) out of five (5) attributes, with the biotic structure being lower due to moderate overlap of vertical plant layers and the water hydrology being lower mainly due to the natural constriction of the Upper Narrows.

The primary reasons for the Desert Knolls Wash project having a CRAM score of 77 are:

- The Desert Knolls Wash/Mojave River AA had a low physical structure score (patch richness and topographic complexity) due to the typical characteristics of a dry desert wash; uniform, planar sandy bed, with little physical structure heterogeneity;

- The Mojave River AA had low vertical biotic structure or very little overlapping of vegetation possibly due to frequent scouring and backflow events created by the natural constriction of the Upper Narrows, which has resulted in only two main plant layers, tall riparian trees along the bank edge and emergent successional wetland vegetation within the main flow of the river;
- The Mojave River AA had a lower hydrologic connectivity due to the natural geological constriction of the Upper Narrows, which prevents a wide floodplain from occurring; and

- For the Mojave River AA, freshwater sources that affect the dry season conditions are primarily urban runoff, direct irrigation, pumped water, artificially impounded water, and/or other artificial hydrology.

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APPENDIX A

The California Rapid Assessment Method (CRAM) data sheet for the Desert Knolls Wash – Mojave River assessment area located in the City of Apple Valley, Sam Bernardino California.

Scoring Sheet: Riverine (CON) Wetlands				
AA Name: Desert Knolls Wash/Mojave River				**Date: December 1, 2008**
Attributes and Metrics		**Scores**		**Comments**
Buffer and Landscape				
Landscape Connectivity (D)	A	12		
Buffer Submetric A: Percent of AA with buffer	A	12		
Buffer Submetric B: Average Buffer Width	A	12		
Buffer Submetric C: Buffer Condition	A	12		
		RAW	**FINAL**	
Attribute Score		24.00	**100.00**	
Hydrology				
Water Source	A	12		
Hydroperiod or Channel Stability	B	9		
Hydrologic Connectivity	A	12		
		RAW	**FINAL**	
Attribute Score		33	**91.67**	
Physical Structure				
Structural Patch Richness	C	6		
Topographic Complexity	C	6		
		RAW	**FINAL**	
Attribute Score		12	**50.00**	
Biotic Structure				
Plant Community Submetric A: Number of Plant Layers		12		
Plant Community Submetric B: Number of Co-dominant Species		12		
Plant Community Submetric C: Percent Invasion		12		
Plant Community Metric (average of submetrics A-C)		12		
Horizontal Interspersion and Zonation	B	9		
Vertical Biotic Structure	B	9		
Attribute Score		RAW	**FINAL**	
		30	**83.33**	
Final Score (Final Attribute Average)				**81.0**

The California Rapid Assessment Method (CRAM) data sheet for the Mojave River assessment area located in the City of Apple Valley, Sam Bernardino California.

Scoring Sheet: Riverine (CON) Wetlands				
AA Name: Mojave River				**Date: January 6, 2008**
Attributes and Metrics		**Scores**		**Comments**
Buffer and Landscape				
Landscape Connectivity (D)	A	12		
Buffer Submetric A: Percent of AA with buffer	A	12		
Buffer Submetric B: Average Buffer Width	A	12		
Buffer Submetric C: Buffer Condition	A	12		
		RAW	**FINAL**	
Attribute Score		24.00	**100.00**	
Hydrology				
Water Source	C	6		
Hydroperiod or Channel Stability	B	9		
Hydrologic Connectivity	D	3		
		RAW	**FINAL**	
Attribute Score		**18**	**50**	
Physical Structure				
Structural Patch Richness	B	9		
Topographic Complexity	C	6		
		RAW	**FINAL**	
Attribute Score		15	**62.5**	
Biotic Structure				
Plant Community Submetric A: Number of Plant Layers		12		
Plant Community Submetric B: Number of Co-dominant Species		12		
Plant Community Submetric C: Percent Invasion		12		
Plant Community Metric (average of submetrics A-C)		12		
Horizontal Interspersion and Zonation	A	12		
Vertical Biotic Structure	C	6		
Attribute Score		RAW	**FINAL**	
		30	**83.33**	
Final Score (Final Attribute Average)				**74.0**

APPENDIX B

Photograph taken at the upstream boundary of the Desert Knolls Wash and Mojave River confluence CRAM assessment area for the San Bernardino County Desert Knolls Project. The view is in a southwesterly direction. The open sand is the Desert Knolls Wash, while the surrounding riparian vegetation is contained within the Mojave River.

Photograph taken midway within the Desert Knolls Wash and Mojave River confluence CRAM assessment area for the San Bernardino County Desert Knolls Project. The view is in a southwesterly direction. The open sand is the Desert Knolls Wash, while the surrounding riparian vegetation is contained within the Mojave River.

Photograph taken at the downstream boundary of the Desert Knolls Wash and Mojave River confluence CRAM assessment area for the San Bernardino County Desert Knolls Project. The view is in a southwesterly direction. The open sand is the Desert Knolls Wash, while the surrounding riparian vegetation is contained within the Mojave River.

Photograph taken at the upstream boundary of the Mojave River CRAM assessment area for the San Bernardino County Desert Knolls Project. The view is from the northern bank of the Mojave River in a southwesterly direction.

Photograph taken at the midway point within the Mojave River CRAM assessment area for the San Bernardino County Desert Knolls Project. The view is from a rock outcropping looking down onto the Mojave River in a northwesterly direction.

F.2. County EMD Biological Report, September 2008

BIOLOGICAL RESOURCES REPORT
FLOOD CONTROL IMPROVEMENTS
DESERT KNOLLS WASH, APPLE VALLEY, CA
COUNTY OF SAN BERNARDINO

Prepared by: Kim Romich, Ecological Resource Specialist, (909) 387-7971
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San Bernardino County
Department of Public Works
Environmental Management Division

Date: September 24, 2008

USGS Quad: Victorville
Thomas Guide: 2004, p 4296, G-5
DPW WO#: F01582

Environmental Setting

The Mojave River arises on the northern slope of the San Bernardino Mountains at the confluence of Deep Creek and the West Fork. Headwater portions of the river reach altitudes of 2600 m and mean annual precipitation of 107 cm. In contrast, the altitude of the Mojave River channel within the City of Apple Valley is 820 m with a mean annual precipitation of 15 cm (James, 1992). Stream flow within this portion of the Mojave River is strongly influenced by precipitation in the headwaters, which is characterized by distinct wet and dry periods. Two headwater dams, the Cedar Springs Dam and the Mojave River Forks Dam, completed in 1971 and 1972 respectively, are likely to attenuate flood peaks on the Mojave River, but have little influence on overall flow volume except when water is released from Cedar Springs Dam into the West Fork of the Mojave to compensate for excessive inflow upstream of the dam.

The alluvial aquifer beneath the Mojave River flood plain consists of unconsolidated gravel, sand, and silt. Strong hydraulic connection exists between the river and the flood plain aquifer, with infiltration of river water being the largest source of recharge. Ground water pumping, which began in the early 1900s, as well as, evapotranspiration has contributed to seasonal and long-term depletions of stream flow. For instance, annual base flow at the Lower Narrows declined an average of 58% during the period of 1940-1994, with approximately 75% of the decline contributed to ground water pumping (Lines, 1996).

In the early 1900s, the Mojave River had extensive stands of healthy cottonwood trees, *Populus fremontii* (Scott et al., 1999). Willow trees were also in abundance. Much of the riparian forest along the Mojave River has been cleared for agricultural and residential development, with the remaining stands being threatened by ground-water pumping and other consumptive water uses. The cottonwood-willow forest experienced flood event cycles and ecological succession. The Mojave River is a dynamic, coarse river system. Its characteristics can change with nearly every storm event. Flows can vary between 0 and 23,000 cfs almost instantaneously, scour and sediment deposition can locally alter the riverbed by as much as 15 feet, often removing large stands of vegetation and sand bars. An example of this dramatic event was documented in 1938 when a 100-year storm event eliminated the existing riparian environment at the confluence of the Mojave River and Desert Knolls Wash (Mojave River Floodplain Maintenance Plan, 1997). Records from 1917 indicate the riparian environment was different than it is today. There were less woody plants, and the area was dominated by Goodding willow (Webb et al, 2005). Refer to attached pictures and images for further information.

The existing cottonwood-willow forest is approximately 70 years old and is in good health. Older cottonwood and willow galleries are entering a senescent stage of their life cycle, dying of old age or fire rather than as a result of flood-based succession. Arizona Ash is becoming more common, an indicator species of climax succession in southwestern riparian forest. Field surveys show sediment is being deposited in a southwesterly direction within the riparian habitat at the confluence of the Desert Knolls Wash with the Mojave River just above the Upper Narrows. Over the last five years, sedimentation at the confluence has occurred at a rate of approximately 1 foot/ year where the Desert Knolls wash enters riparian fringe along the Mojave River's eastern shore just south (upstream) of the Upper Narrows.

There are very few invasive species observed. Salt Cedar was observed, but thanks to the efforts of the Mojave Weed Management Area, the amount of the plant has been significantly reduced by efforts beginning in 2003 to the present.

Location

The Desert Knolls Wash Flood Channel Improvements Project (project) site is located within the City of Apple Valley, San Bernardino County. The project includes the construction of energy dissipation improvements between the confluence of Desert Knolls Wash and the Mojave River upstream to the existing concrete-lined channel and construction of improvements in the existing wash from Apple Valley Road east to Tao Road, a distance of approximately 1.7 miles. Two project design alternatives also included construction of at least one basin from two possible basin sites north of Desert Knolls Wash and State Highway 18. The project is within Sections 10, 11, and 12, Township 5 North, Range 4 West, San Bernardino Base Meridian. Alternate Basin 1 lies along the western edge of Palmero Road and the southern edge of Siskiyou Road, in the northeast quarter of Section 11. Alternate Basin 2 is 200-500 ft north of State Highway 18 between Malahat Road and Tao Road, in the north half of the southeast quarter of Section 12.

Biological Resources

Fauna

The Desert Knolls Wash flows through a natural wetland and riparian habitat into the Mojave River. A review of the California Natural Diversity Database (Victorville Quad, 2008) reveals that the project and the immediate surrounding area supports, or has the potential to support, over 43 protected or endangered species/habitat. Federally and state listed endangered or threatened species include: the southwestern willow flycatcher (*Empidonax traillii extimus*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*), least bell's vireo (*Vireo bellii pusillus*), Mohave ground squirrel (*Spermophilus mohavensis*), California red-legged frog (*Rana aurora draytonii*), the Sierra Madre yellow-legged frog (*Rana muscosa*), and the desert tortoise (*Gopherus agassizii*). Additionally, two federally and state listed sensitive species, the burrowing owl (*Athene cunicularia*) and the Mojave River vole (*Microtus californicus mohavensis)*, occur, or have the potential to occur, within the project and surrounding buffer.The Victorville Shoulderbanded snail (*Helminthoglypta mohaveena*, Berry, 1927) is also located in the rocks of the Upper Narrows bordering northern bank of the Desert Knolls wash.

Flora

Several systems have been developed recently for classifying the diverse natural vegetation of California including the Holland system (Holland 1986), Sawyer and Keeler-Wolf system (Sawyer and Keeler-Wolf 1995), and the California Wildlife Habitat Relationships (CWHR). The Department of Fish and Game classification system, titled Preliminary Descriptions of the Terrestrial Natural Communities of California (Holland 1986), is widely used; thus, Holland will be used within this report.

Four dominant vegetation/habitat types occurred within, or immediately adjacent to, the project are listed, with the appropriate Holland (1986) element codes, below.

<u>Southern Cottonwood - Willow Riparian (Holland Code 61.130.02)</u>

Where the Desert Knolls Wash and the Mojave River converge, is in one of the rare locations where the Mojave River flows above ground level. Thus, although the habitat within the project area at, and immediately upstream from, the Mojave River and Desert Knolls wash confluence is devoid of vegetation, the immediate surrounding area is dominated by mixed stands of Goodding willow (*Salix goodingii*) and Fremont's cottonwood (*Populus fremoni*i) providing the over story, while narrow-leaf willow (*Salix exigua*), arroyo willow (*Salix lasiolepi*s), red willow (*Salix laevigata*), and mulefat (*Baccharis salicifolia*), providing most of the understory structure.

<u>Alkali Bulrush – Cattail Marsh (Holland Code 52.112.02)</u>

Although the habitat within the project area at, and immediately upstream from, the Mojave River and Desert Knolls wash confluence is devoid of vegetation, the immediate surrounding area contains patches of alkali bulrush (*Scirpus* spp.) – cattail (*Typha latifoli)* marsh vegetation often making up the understory of the southern cottonwood-willow riparian stands.

Saltbush - Creosote Bush (Holland Code 33.010.05) and Joshua tree Woodland (Holland Code 33.170.01)

The project supports a mixture of creosote bush scrub and Joshua tree woodland elements within the alternative basin sites, as well as, the eastern and middle portion of Desert Knolls Wash. Desert Saltbush Scrub occurs on the upland portion of the western basin.

Biological Survey Results

Burrowing Owl

A burrowing owl survey following the guidelines established by the burrowing owl consortium was performed in April and May of 2008. Although California ground squirrel burrows were observed, no owls or their sign (e.g. pellets, white wash, and feathers) were found. Please see attachment at the end of this report for the complete biological assessment.

Desert Tortoise

A United States Fish and Wildlife Service protocol survey for the desert tortoise was conducted by Michael Luhrs Consulting in April and May of 2008. No tortoise or their sign (e.g. scat, burrows, pallets, tracks, and egg shells) was observed within the survey area. Please see attachment at the end of this report for the complete biological assessment.

Least Bell's vireo and southwestern willow flycatcher

In 2002, the San Bernardino County Museum performed least Bell's vireo and southwestern willow flycatcher surveys within suitable, or potentially suitable, riparian habitat at the Upper Narrows of the Mojave River. Three least Bell's vireos were recorded, all of which were within a 1 km of the current project area (Kindt and Romich, 2003). In 2008, the San Bernardino County Flood Control District performed protocol surveys within the project area, as well as, approximately 1000 feet of the adjacent riparian habitat. No least Bell's vireos or southwestern willow flycatchers were observed (Romich and Sims, 2008). Please see attachment at the end of this report for the complete 2008 biological assessment.

Mojave ground squirrel

EREMICO Biological Services performed a site assessment for the Mojave ground squirrel in May 2008. It was determined that the only potential Mohave ground squirrel habitat on the project site occurs at the Upper Narrows Basin and along a 500 ft stretch of

Desert Knolls Wash immediately upstream from this basin. Furthermore, due to habitat destruction, degradation, and fragmentation, it is unlikely that Mohave ground squirrels inhabit the remaining portion of Desert Knolls Wash and the two alternate basins. Please see attachment at the end of this report for the complete biological assessment.

Mojave vole

In October 2002, the San Bernardino County Museum conducted a Mojave vole relocation study. As part of the study, the wetland habitat at the Mojave River and Desert Knolls wash confluence was trapped (Kindt and Romich 2003). A relatively high density of voles was present within the wetland habitat immediately adjacent to the proposed project.

Wetlands/Riparian Habitat Health Assessment

With less frequent scour events occurring within the Mojave River, mature cottonwood-willow forest stands, which have out competed other riparian obligates, are developing into climax communities among many portions of the river. Because in arid environments riparian cottonwood trees are typically restricted to alluvial soils with shallow ground-water and are sensitive to depletions of ground-water resulting from pumping, surface-water diversions, and droughts, a study was conducted observing the patterns of cottonwood tree stress and mortality at ten study sites along the Mojave River within the Victorville area (Scott et al., 1999). Low frequency, high magnitude floods and periods of above average rainfall were shown to initiate channel incision and migration (scour and sedimentation); which in turn lowers the water table beneath adjacent flood plains (Scott et al. 1999). Furthermore, it was demonstrated that riparian cottonwood forests along the Mojave River are vulnerable to water table declines associated with channel incision, and that water table declines of > 1.5 meters may be expected to produce mortality and loss of forest area in existing stands (Scott et al, 1999). Although riparian habitat has decreased in many portions of the Mojave River, other locations, such as in the southern portion of the basin of the Mojave River at the Upper and Lower Narrows, contain bedrock constrictions which causes water to rise to the surface (Lines 1996; Stamos and others 2001). Thus, while other locations along the Mojave River have declined in quality and quantity, the habitat upstream from the Upper Narrows where the Desert Knolls Wash and the Mojave River converge, continues to sustain healthy stands of mature riparian forests and wetland vegetation.

Conclusion

Flood control improvement projects effectively reduce natural channel widths and increase storm water velocities within the channel, leading to increased scouring and sediment transport downstream. Concrete-lined channels also result in the concentration of pollutants downstream. The County Flood Control District is in the process of procuring the services of a consultant to assess the scour and sediment transport impacts downstream and prepare a project design alternative analyses with environmental component. The majority of the scouring and sediment transport appears to be occurring just upstream of the confluence of Desert Knolls Wash and the Mojave River and

downstream of the existing concrete-lined flood control channel at Apple Valley Road. Therefore, the challenge will be to incorporate a design that reduces water velocity entering at the confluence of Desert Knolls Wash and the Mojave River, that reduces the scouring occurring upstream of the confluence, does not cause stress to the existing wetland and riparian habitat downstream and does not result in a concentration of pollutants downstream. Further, aesthetic improvements such as the planting of native vegetation as much as possible are encouraged. An assessment of project environmental impacts is directly linked to the state of health of the wetland and riparian habitat. While it is the opinion of Flood Control District environmental personnel and Lewis Center for Educational Research staff that the wetland is healthy despite the existing scour and sediment transport occurring, a California Rapid Assessment Analysis (CRAM) analysis will be prepared by District Flood Control ecological staff to provide a more comprehensive assessment of the health of the wetland and riparian habitat downstream of the project. CRAM analysis is an EPA-funded and approved method for assessing the condition of a wetland and riparian areas.

Ultimately, the project must be designed to reduce point and nonpoint sources of pollution (including sediment) to minimize adverse impacts and protect water quality and beneficial uses of the Mojave River.

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Downstream of Desert Knolls Wash - Cattails, Saturated Weltand Area created by Beaver Dam

Downstream of Desert Knolls Wash - Cattails and BullRushes

Downstream facing east and upstream, at the confluence of Desert Knolls Wash and the Mojave River.

Cottonwood Willow Riparian Forest

Upstream and east of the confluence of Desert Knolls Wash and the Mojave River

Desert Knolls Wash upstream

DEPARTMENT OF PUBLIC WORKS
FLOOD CONTROL ● SOLID WASTE MGMT ● SURVEYOR ● TRANSPORTATION

COUNTY OF SAN BERNARDINO
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VANA R. OLSON
Director of Public Works

Subject: Results of a Focused Survey for Southwestern Willow Flycatcher and Least Bell's Vireo at Desert Knolls Wash, San Bernardino County, California

Michele Kim:

This letter report contains the results of a focused southwestern willow flycatcher (*Empidonax traillii extimus*), SWF, and least Bell's vireo, (*Vireo bellii pusillus*), LBV, survey conducted by Kim Romich and Theresa Sims (TE permit # TE 083348-0) within the riparian habitat adjacent to Desert Knolls Wash between the confluence of the Mojave River to approximately 1000 feet upstream in the City of Apple Valley, San Bernardino County, California.

Project Location

The project site is located in the community of Apple Valley (Exhibit 1). Specifically, it is located south of State Route 18, between Hesperia Road and Apple Valley Road. It is within the Victorville U.S. Geological Survey 7.5-minute topographic quadrangle, in Section 10, Township 5 North, Range 4 West (Exhibit 2).

Methods

The United States Fish and Wildlife Service protocol revision (2000) requires a total of five southwestern willow flycatcher (SWF) surveys to be conducted between May 15 and July 17. One survey is to be completed from May 15 to May 31; the second survey should be conducted from June 1 to June 21; while the final three surveys are to be performed between June 22 and July 17. Under normal circumstances, eight (8) surveys within all suitable habitat for the least Bell's vireo (LBV) should occur between April 10 and July 31. Thus, eight surveys for least Bell's vireo presence, with five of those surveys overlapping with southwestern willow flycatcher surveys (May 15 – July 11) were conducted within suitable, or potentially suitable, riparian habitat within the project area, as well as, approximately 1000 feet of adjacent riparian habitat. A taped recording of SWF was played approximately every 50 feet to elicit responses. Surveys were conducted early in the morning and lasted until approximately 10 or 11am. Table 1 summarizes the dates, times, and weather conditions of all SWF/LBV surveys.

Table 1: Summary of the San Bernardino County Public Works 2008 least Bell's vireo and southwestern willow flycatcher surveys along the Desert Knolls Wash in Apple Valley, San Bernardino County, including dates, time, and weather conditions.

Survey Date	Time	Temperature, wind	Weather
April 23	6:15-10:30	47 F, calm	clear
May 8	5:45-11:00	51 F, calm	clear
May 15	5:45-10:00	65 F,< 10 mph	clear
May 21	6:00-11:00	57 F, < 5 mph	clear
June 19	5:30-8:45	69 F, <10mph	clear
July 2	5:30-9:15	70 F, calm	clear
July 9	5:40-10:00	70 F, < 5mph	clear
July 17	5:40-9:00	74 F, <5 mph	clear

Project Description

The proposed improvements within Desert Knolls Wash include the construction of:

- 556 lineal feet of open channel from the existing Apple Valley Road reinforced concrete box culvert to upstream of Tuscola Road;
- A reinforced concrete box culvert (66 lineal feet) at the Quantico road crossing;
- 389 lineal feet of open channel from upstream of Quantico Road to downstream of Tuscola Road;
- A reinforced box culvert (66 lineal feet) at the Tuscola Road; and
- An interim pilot channel to direct the water flow into the reinforced concrete box culvert at Tuscola Road.

Existing Conditions

Although the proposed project is devoid of vegetation, the habitat immediately adjacent is primarily dominated by Southern Cottonwood-Willow Riparian Forest (CNDBB Code 61.130.02) with an over story of black willow (*Salix goodingii*) and Fremont's cottonwood (*Populus fremontii*), while the under story structure is primarily Alkali Bulrush – Cattail (CNDDB Code 52.112.02), Narrowleaf Willow (*Salix exigua*) (CNDDB 63.110.00), and mulefat scrub (*Baccharis salicifolia*).

A number of bird species were observed during the focused survey including: mallard (*Anas platyrhynchos*), downy woodpecker (*Picoides pubescens*), Nuttall's woodpecker (*Picoides nuttallii*), black phoebe (*Sayornis nigricans*), western wood peewee (*Contopus sordidulus*), white-throated swift (*Aeronautes saxatalis*), western bluebird (*Sialia mexicana*), American crow (*Corvus brachyrhynchos*), common raven (*Corvus corax*), , mourning dove (*Zenaida macroura*), Costa's hummingbird (*Calypte costae*), Allen's hummingbird (*Selasphorus sasin*), Bewick's wren (*Thryomanes bewickii*), house wren (*Troglodytes aedon*), rock wren (*Salpinctes obsoletus*), yellow warbler (*Dendroica petechia*), black-headed grosbeak (*Pheucticus melanocephalus*), California towhee (*Pipilo crissalis*), spotted towhee (*Pipilo maculates*), song sparrow (*Melospiza melodia*), western tanager (*Piranga ludoviciana*), brown-headed

cowbird (*Molothrus ater*), lesser goldfinch (*Carduelis psaltria*), and house finch (*Carpodacus mexicanus*). Appendix 1 contains a complete bird species list observed.

Results/Conclusion

The San Bernardino County Museum surveyed the Mojave River, including the project area for LBV and SWF in 2002 (Kindt and Romich 2002). One nesting pair of LBV was observed within the riparian habitat adjacent to the proposed project area. In 2008, no detections of SWF or LBV occurred within the project area and the surrounding buffer. Because no SWF or LBV were detected during focused surveys, no direct or indirect impacts would occur to the species as a result of the proposed project.

Appendix 1: A bird species list for the San Bernardino County Public Works 2008 least Bell's vireo and southwestern willow flycatcher surveys along the Desert Knolls Wash in Apple Valley, San Bernardino County.

Family/Species Name	Common Name
Podicipedidae	**Grebes**
Podilymbus podiceps	pie-billed grebe
Podiceps nigricollis	eared-grebe
Ardeidae	**Egrets, Herons & Bitterns**
Butorides virescens	green heron
Casmerodius albus	great egret
Anatidae	**Swans, Geese & Ducks**
Anas platyrhynchos	mallard
Rallidae	**Rails and Coots**
Fulica americana	American Coot
Accipitridae	**Kites, Hawks, Eagles & Vultures**
Accipiter cooperii	Cooper's hawk
Buteo jamaicensis	red-tailed hawk
Buteo lineatus	red-shouldered hawk
Phasianidae	**Pheasants, Partridges & Quail**
Callipepla californica	California quail
Charadriidae	**Plovers**
Charadrius vociferus	killdeer
Columbidae	**Pigeons & Doves**
Zenaida macroura	mourning dove
Cuculidae	**Cuckoos and their Allies**
Geococcyx californianus	greater roadrunner
Trochilidae	**Hummingbirds**
Archilochus alexandri	black-chinned hummingbird
Calypte anna	Anna's hummingbird
Calypte costae	Costa's hummingbird
Picidae	**Woodpeckers**
Picoides pubescens	downy woodpecker
Colaptes auratus	northern flicker
Picoides nuttallii	Nuttall's woodpecker
Tyrannidae	**Tyrant Flycatchers**
Contopus sordidulus	western wood-peewee
Tyrannus verticalis	western kingbird
Myiarchus cinerascens	ash-throated flycatcher
Sayornis nigricans	black phoebe

Family/Species Name	Common Name
Apodidae	**Swifts**
Aeronautes saxatalis	white-throated swift
Hirundinidae	**Swallows**
Hirundo pyrrhonota	cliff swallow
Hirundo rustica	barn swallow
Stelgidopteryx serripennis	northern rough-winged swallow
Corvidae	**Crows, Jays**
Corvus corax	common raven
Paridae	**Titmice**
Poecile gambeli	mountain chickadee
Aegithalidae	**Bushtit**
Psaltriparus minimus	common bushtit
Sittidae	**Nuthatches**
Sitta carolinensis	white-breasted nuthatch
Troglodytidae	**Wrens**
Troglodytes aedon	house wren
Thryomanes bewickii	Bewick's wren
Salpinctes obsoletus	rock wren
Cistothorus palustris	marsh wren
Sylviidae	**Gnatcatchers**
Polioptila caerulea	blue-gray gnatcatcher
Remizidae	**Verdins**
Auriparus flaviceps	verdin
Sialia mexicana	western bluebird
Mimidae	**Mockingbirds & Thrashers**
Mimus polyglottos	northern mockingbird
Toxostoma crissale	California thrasher
Sturnidae	**Starlings**
**Sturnus vulgaris*	European starling
Vireonidae	**Vireos**
Vireo gilvus	warbling vireo
Parulidae	**Wood Warblers**
Dendroica coronata	yellow-rumped warbler
Dendroica nigrescens	black-throated gray warbler
Dendroica petechia	yellow warbler
Dendroica townsendi	Townsend's warbler
Geothlypis trichas	common yellowthroat
Wilsonia pusilla	Wilson's warbler
Vermivora celata	orange-crowned warbler

Family/Species Name	Common Name
Icteria virens	yellow-breasted chat
Thraupidae	**Tanagers**
Piranga rubra	summer tanager
Piranga ludoviciana	western tanager
Cardinalidae	**Cardinals, Grosbeaks & Allies**
Pheucticus melanocephalus	black-headed grosbeak
Emberizidae	**Towhees, Sparrows & Longspurs**
Melospiza melodia	song sparrow
Pipilo erythrophthalmus	spotted towhee
Pipilo crissalis	California towhee
Icteridae	**Blackbirds & Orioles**
Molothrus ater	brown headed cowbird
Agelaius phoeniceus	red-winged blackbird
Fringillidae	**Old World Finches**
Carpodacus mexicanus	house finch
Carduelis psaltria	lesser goldfinch
Carduelis tristis	American goldfinch

MOHAVE GROUND SQUIRREL HABITAT ASSESSMENT

AT THE DESERT KNOLLS WASH FLOOD CHANNEL

IMPROVEMENTS PROJECT SITE,

APPLE VALLEY, SAN BERNARDINO COUNTY, CALIFORNIA

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INTRODUCTION

PROJECT DESCRIPTION

The San Bernardino County Flood Control District proposes to implement the Desert Knolls Wash Flood Channel Improvements Project in the Town of Apple Valley, San Bernardino County, California. The project would include construction of a basin near the Upper Narrows of the Mojave River; improvements of the existing wash from Apple Valley Road east to Tao Road, a distance of approximately 1.25 miles; and construction of 2 alternate basins north of Desert Knolls Wash and State Highway 18.

The California Department of Fish and Game (CDFG) has determined that the Mohave ground squirrel (*Spermophilus mohavensis*), a State listed threatened species (CDFG 2007), may occur on the project site. The entire project site lies within the known range of the species (Gustafson 1993). Since the project may negatively impact Mohave ground squirrels, a habitat assessment was performed to help determine the status of Mohave ground squirrels in the proposed project area.

PROJECT LOCATION

The Desert Knolls Wash Flood Channel Improvements Project site is located approximately 500 ft south of State Route 18, from the Upper Narrows of the Mojave River east to Tao Road, in Sections 10, 11, and 12, Township 5 North, Range 4 West, San Bernardino Base Meridian. Alternate Basin 1 lies along the western edge of Palmero Road and the southern edge of Siskiyou Road, in the northeast quarter of the northeast quarter of the northeast quarter of Section 11. Alternate Basin 2 is 200-500 ft north of State Highway 18 between Malahat Road and Tao Road, in the north half of the southeast quarter of the northwest quarter of Section 12. The elevation of the project site is approximately 2,740 ft to 2,900 ft above sea level.

METHODS

Denise LaBerteaux, a biologist with over 25 years of experience with Mohave ground squirrels, surveyed the project site by walking parallel, 100-ft wide transects throughout the area, evaluating the habitat for its potential in supporting Mohave ground squirrels. Criteria used to evaluate the habitat included presence of native habitats, the type and extent of human impacts on the project site, proximity to known Mohave ground squirrel locations, and the surrounding land uses. Ms LaBerteaux also reviewed aerial photographs of the project site and surrounding parcels to determine habitat connectivity.

RESULTS AND DISCUSSION

PROXIMITY TO KNOWN MOHAVE GROUND SQUIRREL LOCATIONS

A search of the California Natural Diversity Database (CNDDB) (CDFG 2008) revealed that Mohave ground squirrels have been observed or trapped within the vicinity of the project site. The records are summarized below:

CNDDB OCCURRENCE NUMBER	LOCATION	YEAR OF RECORD	DISTANCE AND DIRECTION FROM PROJECT SITE
47	T5N, R4W, Sec. 9	1919	< 1 mile, west. across river
12	T6N, R4W, Sec. 27, SW1/4	1977	2.5 miles, north
283	T6N, R4W, Sec. 31	1980	3.5 miles, northwest, across river
22	T6N, R4W, Sec. 18, SE1/4	1920	5 miles, northwest
329	T6N, R5W, Sec. 11, E1/2	2007	7.5 miles, northwest across river
33	T5N, R2W, Sec. 31, SE1/4	1955	8 miles, east-southeast

The record nearest the project site is from 1919 when one Mohave ground squirrel was trapped from an unknown location directly across the Mojave River from the project site. The latest record, from 2007, indicate that Mohave ground squirrel populations still exist in the northern portion of Adelanto, west of the Mojave River. The status of Mohave ground squirrels at the other locations is not known. In this region there have been no observations of Mohave ground squirrels east of the Mojave River since 1977 (CNDDB Occurrence No. 12). The records indicate the project site is, at a minimum, within the historic range of the Mohave ground squirrel.

HABITAT ASSESSMENT

The Mohave ground squirrel habitat assessment on the project site was completed on May 10 and May 23, 2008. The basin near the Upper Narrows of the Mojave River and Desert Knolls Wash were surveyed on May 10, 2008 between 0900 and 1200 hours. Prevailing weather conditions consisted of clear skies, an air temperature of 20-25°C, and a 1.5-4.2 km/h wind from the southwest. The two alternate basins were surveyed on May 23, 2008 between 0910 and 1200 hours. Prevailing weather conditions consisted of cloudy skies, an air temperature of 10-11°C, a 5.0-7.2 km/h wind from the south, and light, periodic rain.

Upper Narrows Basin. The Upper Narrows Basin incorporates the lower end of Desert Knolls Wash and the adjacent alluvial plain. Soils at the site consist of sand and gravel. The

alluvial plain supports disturbed saltbush scrub with allscale (*Atriplex polycarpa*) dominating (Photo 1, Appendix). Other perennial plants include cheesebush (*Hymenoclea salsola*), rubber rabbitbrush (*Chrysothamnus nauseosus*), matchweed (*Gutierrezia microcephala*), four-winged saltbush (*Atriplex canescens*), milk-vetch (*Astragalus lentiginosus*), and desert saltgrass (*Distichlis spicata*). A few Joshua trees (*Yucca brevifolia*) and one desert willow (*Chilopsis linearis* ssp. *arcuata*) are also present. Common annual plants that were present during the survey include tansy mustard (*Descurainia pinnata*), flixweed (*Descurainia sophia*), blazing star (*Mentzelia* sp.), ripgut grass (*Bromus diandrus*), red brome (*Bromus madritensis* ssp. *rubens*), and wild barley (*Hordeum* sp.). Habitat at the toe of the steep, rocky slope (Photo 2, Appendix) is a mixed woody scrub with Nevada ephedra (*Ephedra nevadensis*), green ephedra (*Ephedra viridis*), green rabbitbrush (*Chrysothamnus teretifolius*), bush sunflower (*Encelia actoni*), Cooper goldenbush (*Ericameria cooperi*), desert milk-aster (*Stephanomeria pauciflora*), spiny hop-sage (*Grayia spinosa*), bladder sage (*Salazaria mexicana*), wishbone bush (*Mirabilis laevis*), California buckwheat (*Eriogonum fasciculatum* var. *polifolium*), peach-thorn (*Lycium cooperi*), creosote bush (*Larrea tridentata*), Joshua tree, Mojave yucca (*Yucca schidigera*), and needlegrass (*Achnatherum speciosum*).

Disturbances on the site include dirt roads, off-highway vehicle trails and tracks, foot trails and tracks, wind-blown trash, a utility pole line, and one recently bladed area. One domestic (or feral) cat was observed hunting on the site during the survey.

Parcels adjacent to the basin show varying degrees of disturbance. The site is bordered on the northwest by additional alluvial plain, on the southwest by riparian vegetation along the Mojave River, on the northwest by a steep, rocky hillside, and on the southeast by an elementary school. Except for approximately 60 acres towards the east-northeast, there are no large parcels of native habitat connected to the basin site in the easterly directions. Mohave ground squirrels are not known to use riparian corridors (Gustafson 1993); therefore the Mojave River is an unlikely movement corridor towards the north-northwest and southeast. The Mojave River may also block movement towards the west. The only possible connection to large parcels of native habitat occurs along the rocky hills north of the basin. State Highway 18 bisects these hills, however, and may hinder movement of Mohave ground squirrels.

Desert Knolls Wash. Two sections of Desert Knolls Wash within the project area have been improved for flood control, to some degree. One improved section is between Apple Valley Road and Quantico Road, measuring approximately 600 ft in length (Photo 3, Appendix). Improvements along this section include grading and the installation of riprap. The other section is approximately 1,000 ft west of Tao Road and measures 400 ft in length. This section has been channelized in a culvert. The remainder of the wash is unimproved. Soils consist of sand and gravel. Habitat along the unimproved sections is heavily disturbed desert wash scrub (Photos 4-7, Appendix). A section between the Upper Narrows Basin and the concrete channel west of Apple Valley Road is devoid of vegetation (Photo 8, Appendix). Common shrubs along other portions of the wash include cheesebush, rubber rabbitbrush, desert milk-aster, desert willow, and four-winged saltbush. Several elm trees (*Ulmus* sp.) and a few cottonwood trees (*Populus* sp.) and willows (*Salix laevigata* and *Salix exigua*) also are present. Annual vegetation in the area consists mainly of exotic, weedy species including Russian thistle (*Salsola tragus*), red

brome, ripgut grass, cheatgrass (*Bromus tectorum*), and red-stemmed filaree (*Erodium cicutarium*).

Human disturbances in the wash include windblown and dumped trash; foot traffic; dog tracks and scats; off-highway vehicle tracks; and piles of riprap. A large population of California ground squirrels (*Spermophilus beecheyi*) occupies the wash areas (> 50 individuals were observed during the survey) and is another source of disturbance. Their burrow systems denude native habitat. In addition, California ground squirrels may exclude, directly or indirectly, Mohave ground squirrels from a given area. Mohave ground squirrels are not known to occur in areas occupied by large numbers of California ground squirrels (Leitner 2007).

Adjacent parcels consist of a patchwork of residences and businesses, and their associated paved and dirt roads and utility corridors; and small parcels (from < 1 acre to about 3 acres) of fragmented, disturbed creosote bush scrub habitat. The degree of disturbance in the adjacent desert habitat varies from moderate, with foot traffic, trash, and evidence of off-highway vehicle activities, to heavy, with crushed shrubs and large denuded areas.

Because of disturbances and adjacent land uses, it is unlikely that Desert Knolls Wash from Apple Valley Road to Tao Road supports Mohave ground squirrels. In addition, the area is essentially isolated from large parcels of native habitat that may support Mohave ground squirrels, so movement from an occupied area to this portion of the project site to establish a new colony is not possible.

The only portion of the project site along Desert Knolls Wash that may support Mohave ground squirrels occurs within 500 ft of the Upper Narrows Basin. The remaining portion of the wash between the Upper Narrows Basin and the concrete channel west of Apple Valley Road is devoid of vegetation and is not considered Mohave ground squirrel habitat. Surrounding land uses and habitat connectivity of the vegetated portion of the wash are identical to the Upper Narrows Basin, described above.

Alternate Basin 1. Alternate Basin 1 site lies on an alluvial fan, draining towards the southwest. Soils consist of coarse sand and gravel. The site is partially denuded, having been previously cleared of vegetation and graded (Photos 9-10, Appendix). Shrubs that occur on the site appear to be secondary growth. Habitat on the site is a highly disturbed creosote bush scrub. Other perennial species occurring on the site include Nevada ephedra, cheesebush, rubber rabbitbrush, allscale, rattlesnake weed (*Chamaesyce albomarginata*), indigo bush (*Psorothamnus arborescens* var. *minutifolius*), desert trumpet (*Eriogonum inflatum* ssp. *inflatum*), jimson-weed (*Datura wrightii*), desert tomato (*Lycium andersonii*), and peach-thorn. Common annual plants that were present during the survey include sand-bur (*Ambrosia acanthicarpa*), tumble mustard (*Sisymbrium altissimum*), Russian thistle, red-stemmed filaree, woolly star (*Eriastrum* sp.), and schismus (*Schismus* sp.).

In addition to clearing and grading, other disturbances at the site include some dumped and wind-blown trash and off-highway vehicle tracks and trails. A concrete channel and a paved road bisect the site. Adjacent parcels towards the north, east, and south are developed. Similar,

partially denuded habitat occurs on about 15 acres towards the west. Farther west is more development.

Because this site was once cleared and because it is isolated from large parcels of native habitat, Alternate Basin 1 no longer supports habitat for Mohave ground squirrels.

Alternate Basin 2. Alternate Basin 2 lies on an alluvial fan that drains towards the southwest. Soils consist of sand and gravel. The western third of the site is heavily disturbed, having been previously cleared (Photo 11, Appendix). The only shrubs that are recovering in this area are creosote bush and rubber rabbitbrush. The remaining portion of the site supports a dense and diverse creosote bush scrub (Photo 12, Appendix). Other perennial species that were found during the survey include Nevada ephedra, Mojave parsley (*Lomatium mohavense*), goldenhead (*Acamptopappus sphaerocephalus*), Cooper adenophyllum (*Adenophyllum cooperi*), burro-bush (*Ambrosia dumosa*), cheesebush, cotton-thorn (*Tetradymia axillaris*), string plant (*Tiquilia plicata*), silver cholla (*Cylindropuntia echinocarpa*), pencil cholla (*Cylindropuntia ramosissima*), four-winged saltbush, allscale, winter-fat (*Krascheninnekovia lanata*), rattlesnake weed, California croton (*Croton californicus*), milk-vetch, indigo bush, bladder sage, wishbone bush, California buckwheat, turpentine broom (*Thamnosma montana*), jimson-weed, desert tomato, peach-thorn, Joshua tree, and needlegrass. Annual plant species include sand-bur, vinegar-weed (*Lessingia lemmonii*), tansy mustard, flixweed, Mediterranean mustard (*Hirschfeldia incana*), Russian thistle, red-stemmed filaree, desert sand verbena (*Abronia villosa*), woolly star, red triangles (*Centrostegia thurberi*), rose and white buckwheat (*Eriogonum gracillimum*), bird's-nest buckwheat (*Eriogonum nidularium*), red brome, cheatgrass, and schismus.

Additional disturbances at Alternate Basin 2 include dumped trash, an abundance of wind-blown trash, a utility pole line, a small off-road course, and other off-highway vehicle trails and tracks. Single-family residences occur on adjacent parcels towards the north and east; commercial development occurs on adjacent parcels towards the south and west. Therefore, the site is not connected to other parcels of native habitat.

Even though the Alternate Basin 2 site supports native habitat, its isolation precludes it from harboring a viable population of Mohave ground squirrels.

CONCLUSION

A Mohave ground squirrel habitat assessment was completed on May 10 and 23, 2008 on the Desert Knolls Wash Flood Channel Improvements Project site, Apple Valley, San Bernardino County, California. The assessment area included the basin near the Upper Narrows of the Mojave River, Desert Knolls Wash, and 2 alternate basins.

The only potential Mohave ground squirrel habitat on the project site occurs at the Upper Narrows Basin and along a 500 ft stretch of Desert Knolls Wash immediately upstream from this basin. Due to habitat destruction, degradation, and fragmentation, it is unlikely that Mohave ground squirrels inhabit the remaining portion of Desert Knolls Wash and the two alternate basins.

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APPENDIX

PHOTOGRAPHS OF THE PROJECT SITE

Draft Text

A DESERT TORTOISE AND BURROWING OWL SURVEY FOR THE PROPOSED DESERT KNOLLS WASH FLOOD CONTROL CHANNEL IMPROVEMENTS AND ALTERNATIVE BASIN SITES IN THE TOWN OF APPLE VALLEY, SAN BERNARDINO COUNTY, CALIFORNIA

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SUMMARY

A desert tortoise (*Gopherus agassizii*), and burrowing owl (*Athene cunicularia*), survey was conducted on the proposed Desert Knolls Wash Flood Control Channel improvements and alternative basin sites in the Town of Apple Valley, San Bernardino County, California. The biological study area is located in the southwest quarter of San Bernardino County, approximately 500 feet south of the State Highway 18 (CA-18) alignment. The survey area starts in the channel at Tao Road and continues west approximately 1.25 miles through the recent channel improvements at Apple Valley Road and west and south to the Upper Narrows of the Mojave River. A basin will be constructed just west of the Lewis Center for Educational Research on Mana Road upstream from the Narrows and one of two potential alternate basins will also be constructed north of Desert Knolls Wash and State Highway 18. The biological study area is specifically located in Section 12 and continues west through Section 11 into the middle of Section 10, Township 5 South, Range 4 West, San Bernardino Baseline Meridian, as shown on the Victorville, California, U.S.G.S. 7.5 Minute Quadrangle map, San Bernardino County, California.

The channel slopes from east to southwest with the elevation of the survey area ranging from approximately 2,860 feet (880 meters) at the Tao Road end to approximately 2,730 feet (840 meters) in the narrows at the southwest end of the project, above mean sea level (MSL). The site has various levels of disturbance from a narrow channel with scattered trash at the east end to the new concrete channel at Apple Valley Road and the open sand bottom channel that flows into the Mojave Riparian Forest on the west end. Surrounding land uses consists of commercial development and undeveloped lots fronting on the Outer Highway south of CA-18 north of the project site to Apple Valley Road. There is housing with scattered undeveloped lots south of the project site with apartments just west of Apple Valley Road, on the west end is a rocky hillside above the drainage and on the east side of the channel as stated above, is the Lewis Center for Educational Research, and the Upper Narrows area of the Mojave River and the County Regional park to the southwest.

The on-site vegetation consists of a mixture of ruderal weedy vegetation, Creosote Bush Scrub and Joshua Tree Woodland elements (at the basin sites and much of the eastern and middle channel areas) and scattered Mojave Riparian Forest elements, with Desert Saltbush Scrub (on the uplands of the west basin area) and outstanding Mojave Riparian Forest (at the west end of the survey area). Seventy-five (75) plant species and twenty (20) vertebrates including four reptiles, thirteen birds, and three mammal species were identified as occurring on or flying over the project area.

The Mojave Riparian Forest on the western end of the site is one of the most sensitive habitats in dry southern California. Riparian habitats have been greatly impacted by water, agricultural, and flood control developments over the last century, if not before, and provide habitats for a number of sensitive animal species (see below). The mixture of Mojavean Creosote Bush Scrub and Joshua Tree Woodland elements and the Desert Saltbush Scrub are generally common in the surrounding county lands and the greater Mojave Desert, if not in the Town of Apple Valley. As such, these vegetation

communities do not represent restricted or sensitive communities by comparison to the Mojave Riparian Forest.

No federally or state listed endangered or threatened plant species were observed on the site. No sensitive plant species designated by the California Native Plant Society (CNPS) (CNPS, 2008), were observed on the site.

No desert tortoise or burrowing owls were identified on site; no impacts to these sensitive species are expected. It is expected that the project could impact the suite of riparian bird species depending on the time of the year and extent of the actual impact into the riparian forest area of the projects western end. The level of ground disturbing activities in this area could also impact the Mohave river vole.

The construction of the proposed project would remove a limited amount of disturbed vegetation, except for the proposed western basin site which would impact approximately five acres of upland Desert Saltbush Scrub and potentially a limited number of individual riparian trees and shrubs at the very western edge of the project. The loss of the vegetation is not expected to be significant because the mixture of Mojavean Creosote Bush Scrub and Joshua Tree Woodland elements, and the Desert Saltbush Scrub are generally common in the surrounding county lands and the greater Mojave Desert, if not in the Town of Apple Valley. Although, the loss will contribute to the cumulative impacts to these communities occurring as development continues in these areas.

The majority of wildlife species currently utilizing the site will be impacted by the development of the site. While some of the species could move into adjacent areas, construction of the project would result in direct impacts to the existing wildlife through the clearing and grading operations.

The channel of the wash could and probably does function as a wildlife corridor, but because there are large barren areas with limited natural vegetation, the function could have been or was likely disrupted in the past. To function as a corridor wildlife species would have to be able to move from one area to another through this site, the development north, east, and south of the site may have disrupted this function on a regional level. While parcels of vacant land are present around the site, the level of development has probably disrupted this function as a regional corridor if not as a local wildlife corridor. The further development of the channel would limit this continuing function for the site.

A pre-construction survey should be conducted if ground disturbing activities are to start within the nesting period of the burrowing owl (February to August). Any riparian trees or shrubs should be replaced if their removal occurs after the annual rainy season, but if it occurs in the summer or fall before the offset of the winter rains it should documented and the site should be evaluated after the rainy season to decide whether any revegetation of the site is required.

1.0 INTRODUCTION

A desert tortoise (*Gopherus agassizii*), and burrowing owl (*Athene cunicularia*), survey was conducted on the proposed Desert Knolls Wash Flood Control Channel improvements and alternative basin sites in the Town of Apple Valley, San Bernardino County, California. The biological study area is located in the southwest quarter of San Bernardino County (Figure 1, *Regional Location Map*), approximately 500 feet south of the State Highway 18 (CA-18) alignment The survey area starts in the channel at Tao Road and continues west approximately 1.25 miles through the recent channel improvements at Apple Valley Road and west and south to the Upper Narrows of the Mojave River. A basin will be constructed just west of the Lewis Center for Educational Research on Mana Road upstream from the Narrows; and one of two potential alternate basins will be constructed north of Desert Knolls Wash and State Highway 18. The biological study area is specifically located in the Section 12 and continues west through Section 11 into the middle of Section 10, Township 5 South, Range 4 West, San Bernardino Baseline Meridian, as shown on the Victorville, California, U.S.G.S. 7.5 Minute Quadrangle map, San Bernardino County, California (Figure 2, *Biological Survey Area Map*).

The channel slopes from east to southwest with the elevation of the survey area ranging from approximately 2,860 feet (880 meters) at the Tao Road end to approximately 2,730 feet (840 meters) in the narrows at the southwest end of the project, above mean sea level (MSL). The site has various levels of disturbance from a narrow channel with scattered trash at the east end to the new concrete channel at Apple Valley Road and the open sand bottom channel that flows into the Mojave Riparian Forest on the west end. Surrounding land uses consists of commercial development and undeveloped lots fronting on the Outer Highway south of CA-18 north of the project site to Apple Valley Road. There is housing with scattered undeveloped lots south of the project site with apartments just west of Apple Valley Road, on the west end is a rocky hillside above the drainage and on the east side of the channel as stated above, is the Lewis Center for Educational Research and the Upper Narrows area of the Mojave River and the County Regional park to the southwest.

The on-site vegetation consists of a mixture of ruderal weedy vegetation, Creosote Bush Scrub and Joshua Tree Woodland elements (at the basin sites and much of the eastern and middle channel areas) and scattered Mojave Riparian Forest elements, with Desert Saltbush Scrub (on the uplands of the west basin area) and outstanding Mojave Riparian Forest (at the west end of the survey area). The climate of the general area is typical of the western Mojave Desert demonstrating a pattern of hot, dry summers with infrequent showers, and cool, dry winters with occasional precipitation, usually falling as snow.

Limitations

Limitations of this survey were a function of the brief duration of the survey and an early drying of the 2008 annual crop. Some annual plant species may have been missed, but most were present as drying specimens. A limited number of vertebrates were directly

Figure 1: Regional Location Map

Figure 2: Biological Survey Area

observed during the survey effort. It is expected that more vertebrate species (particularly reptiles and nocturnal mammals) utilize the site than those actually encountered.

2.0 METHODOLOGY

A search of the California Department of Fish and Game Natural Diversity Database (CNDDB) for the project's Victorville Quadrangle and the adjacent Apple Valley North Quadrangle was conducted and in additional to the CNDDB, a search of the California Native Plant Society's Inventory of Rare and Endangered Plants of California was also conducted to produce a list of potential species for the project site. The survey area was walked using standard thirty-foot wide desert tortoise transects over the entire site with limited buffers (for burrowing owl sites) where possible. The reduced buffers were walked around the site because of the level of development in the vicinity of the channel. All plant and vertebrate species observed were recorded. Field observations were aided by binoculars (7 x 35 power). Unobserved species were identified through indirect signs (e.g., scat, tracks, calls, nests, burrows, etc.). Scientific nomenclature for this report is from the following standard reference sources: plant communities, Sawyer and Keeler-Wolf (1995) and Holland (1986); flora, Baldwin (2002), Hickman (1993) and Munz (1974); common plant names, Baldwin (2002), and Jaeger (1969); reptiles, Stebbins (2003); and birds and mammals, CDFG (2000). Plant specimens not readily identified were collected and taken to Andrew C. Sanders, Herbarium Scientist of the University of California, Riverside (UCR) Herbarium for identification. Small mammal trapping was not conducted.

The survey of the channel and basin areas was conducted on April 25, 2008 by John F. Wear of Biological Resource Specialists and Michael Luhrs. An additional survey of the two potential alternative basin sites was conducted by Michael Luhrs on May 28, 2008 and by Denise L. LaBerteaux of Eremico Biological Services on May 23, 2008 (see the Mohave Ground Squirrel Habitat Assessment for details). The surveys were conducted under the following weather conditions:

> April 25: Between 0850 and 1200 hours PDT, under a clear sky, with a breeze from the east, with a temperature range of 20° C at 0850 to 23° C at 0955 to 24° C at 1200 PDT.
>
> May 28: Between 1400 and 1500 hours PDT, under a clear sky, with a breeze from the east, and an ambient temperature of 34° C at 1400 PDT.

3.0 RESULTS

3.1 VEGETATION

The project area supports a mixture of ruderal weedy vegetation, and Creosote Bush Scrub and Joshua Tree Woodland elements (at the basin sites and much of the eastern and

middle channel areas) and Desert Saltbush Scrub (on the uplands of the west basin area) and Mojave Riparian Forest (at the west end of the survey area). Photos of the site are included in Appendix A (Site Photos). The vegetation along the channel has been highly disturbed (along various portions of the channel) to somewhat undisturbed considering its proximity to existing development at the western end (Upper Narrows) of the project area.

Seventy-five (75) plant taxa were identified during the field surveys (See Appendix B). These taxa probably represent the majority, if not all the species on the site that germinated this year. The project area as stated above is slightly (the Mojave River riparian forest at the west end of the project) to highly disturbed (at the new road improvements of Apple Valley Road crossing). Representative plant species of the site include: trees; Siberian elms trees (*Ulmus pumila*), Fremont cottonwood trees (*Populus fremontii*), narrow-leaved willow (*Salix exigua*) and red willow (*S. laevigata*), desert willow (*Chilopsis linearis* ssp. *arcuata*), a few Joshua trees (*Yucca brevifolia*); shrubs; Mojave yucca (*Y. schidigera*), common rabbitbrush (*Chrysothamnus nauseosus*), creosote bush (*Larrea tridentata*), Nevada joint fir (*Ephedra nevedensis*) and mountain joint fir (*E. viridis*), four-winged saltbush (*Atriplex canescens*) and allscale (*A. polycarpa*), California buckwheat (*Eriogonum fasciculatum* var. *polifolium*), peach thorn (*Lycium cooperi*) and Anderson's thornbush (*L. andersonii*), matchweed (*Gutierrezia microcephala*) bush sunflower (*Encelia actoni*), Cooper goldenbush (*Ericameria cooperi*), desert milk-aster (*Stephanomeria pauciflora*), spiny hop-sage (*Grayia spinosa*), bladder sage (*Salazaria mexicana*) and wishbone bush (*Mirabilis laevis*),; annuals and grasses; blazing star (*Mentzelia* sp.), wishbone bush (*Mirabilis laevis*), needlegrass (*Achnatherum speciosum*), and desert saltgrass (*Distichlis spicata*).

A number of non-native and early successional species are found on the project site as would be expected by both the natural and man-made disturbances: annual burweed (*Ambrosia acanthicarpa*), cocklebur (*Xanthium strumarium*), Jimson weed (*Datura wrightii*), cheesebush (*Hymenoclea salsola*), rubber rabbitbrush (*Chrysothamnus nauseosus*) and green rabbitbrush (*C. teretifolius*), milk-vetch (*Astragalus lentiginosus*), tansy mustard (*Descurainia pinnata*), flixweed (*Descurainia sophia*), Russian thistle (*Salsola tragus*), ripgut grass (*Bromus diandrus*), red brome (*Bromus madritensis* ssp. *rubens*), wild barley (*Hordeum* sp.), cheatgrass (*Bromus tectorum*), and red-stemmed filaree (*Erodium cicutarium*). See Appendix A, Biological Compendium for a complete species list.

3.2 WILDLIFE

Twenty (20) vertebrates were noted during the limited surveys including: four reptiles, thirteen birds, and three mammal species were identified as occurring on or flying over the project area. These species are listed in Appendix A. Additional vertebrates probably utilize the site, but were not detected due to either their crepuscular or nocturnal habits.

3.3 SENSITIVE BIOLOGICAL RESOURCES

Sensitive Habitats

The Mojave Riparian Forest on the western end of the site is one of the most sensitive habitats in dry southern California. Riparian habitats have been greatly impacted by water, agricultural, and flood control developments over the last century, if not before, and provide habitats for a number of sensitive animal species (see below). The mixture of Mojavean Creosote Bush Scrub and Joshua Tree Woodland elements and the Desert Saltbush Scrub are generally common in the surrounding county lands and the greater Mojave Desert, if not in the Town of Apple Valley. As such, these vegetation communities do not represent a restricted or sensitive communities by comparison to the Mojave Riparian Forest.

Sensitive Plants

No federally or state listed endangered or threatened plant species were observed on site. No sensitive plant species designated by the CNPS (CNPS 2008), or the U.S. Fish and Wildlife Service (USFWS), were identified on the site. A number of sensitive plant species are known to occur on either the Victorville 7.5 Minute U.S.G.S. or Apple Valley North quadrangle. These plants include the following species:

Booth's evening-primrose (*Camissonia boothii* ssp. *boothii*), Evening Primrose Family (Onagraceae), is a CNPS List 2.3 taxon, which has no state or federal status. This small annual, white-flowered primrose grows in open Joshua tree woodland and Pinyon-Juniper Woodland habitats, and at elevations between 900 and 2400 meters (2,925 to 7,800 feet. This species is on the site, but is probably not the sensitive subspecies, it is probably subspecies *desertorum*. The current site is probably near the north edge of the range of this taxon; it is recorded from the Victorville Quadrangle, but probably occurs south of the current City of Victorville.

Pygmy poppy (*Canbya candida*), Poppy Family (Papaveraceae), is a CNPS List 4.2 taxon, which has no state or federal status. The poppy occurs in sandy flats, in Joshua Tree Woodland and Mojave Desert scrubs in the Western Mojave Desert, and at elevations between 600 and 1,460 meters (1,950 to 4,745 feet). This tiny (2 to 3 cm) annual herb blooms in March through June.

Desert cymopterus (*Cymopterus deserticola*), Carrot Family (Apiaceae), is a CNPS List 1B.2 taxon, which has no state or federal status. This species is found in dry sandy areas in Joshua Tree Woodland and Mojave Creosote Bush Scrub, and at elevations between 630 and 1500 meters (2,048 to 4,875 feet). This species is from four to seven inches tall and blooms in March through May. It has been recorded from east of the current site.

Mojave Monkey flower (*Mimulus mohavensis*), Figwort Family (Scrophulariaceae), is a CNPS List 1B.2 taxon, which has no state or federal status. This small annual (2 to 10 centimeters) has a maroon flower with a white border. It grows in gravelly wash banks in

Joshua tree woodland and Mojavean Creosote Bush Scrub, and at elevations between 600 and 1200 meters (1,950 to 3,900 feet). This species is recorded from the Barstow-Victorville Ord Mountains region and has been recorded on the project's quadrangle, but the wash (channel) habit present on the site has been heavily impacted and does not appear to support this taxon.

Table 1
Sensitive Species Listings

Federal Listings

FE = Federally Listed Endangered.
FT = Federally Listed Threatened.
C = A Candidate for Federal listing. Enough data are on file to support a Federal listing.
FSC = Federal Species of Concern
MNBMC = Migratory Nongame Bird of Management Concern

State Listings

SE = State Listed Endangered.
ST = State Listed Threatened.
CSC = California Department of Fish and Game (CDFG) "Species of Special Concern".
CFP = State Fully Protected Species
CP = State Protected
CR = State Rare

CNPS Lists

List 1B: Plants rare, threatened or endangered in California and elsewhere.
List 2: Plants rare, threatened or endangered in California, but more common elsewhere.
List 3: Plants about which we need more information - a review list.
List 4: Plants of limited distribution - a watch list.

CNPS NEW THREAT CODE

.1 - Seriously endangered in California (over 80% of occurrences threatened/ high degree and immediacy of threat).

.2 - Fairly endangered in California (20-80% of occurrences threatened).

.3 - Not very endangered in California (<20% of occurrences threatened or no current threats known).

Sensitive Wildlife

Nine (9) sensitive vertebrate species are recorded on the Victorville and Apple Valley North 7.5 Minute quadrangles in similar habitats, desert tortoise (*Gopherus agassizii*), a state of California listed threatened species (ST) and federally listed threatened species (FT); chuckwalla (*Sauromalus obesus*), coast (San Diego) horned lizard (*Phrynosoma coronatum*) a CSC, prairie falcon (*Falco mexicanus*) a CSC as a nesting species, burrowing owl (*Athene cunicularia*), Le Conte's thrasher (*Toxostoma lecontei*) a CSC,

Townsend's big-eared bat (*Corynorhinus townsendii*) a CSC, Mohave ground squirrel (*Spermophilus mohavensis*) a state of California listed threatened species (ST) and pallid San Diego pocket mouse (*Chaetodipus fallax pallidus*) a CSC.

Four (4) other vertebrate species have been recorded for surrounding quadrangles with similar vegetation types. These include: prairie falcon (*Falco mexicanus*) a CSC as a nesting species, a CSC, Bendire's thrasher (*Toxostoma bendirei*) a CSC, silver-haired bat (*Lasionycteris noctivagans*), and western mastiff bat (*Eumops perotis californicus*) a CSC.

Another eight (8) species are tied to the intact riparian of the Mojave River on the west end of the project including: the southwestern pond turtle (*Clemmys marmorata pallida*) a CSC, Cooper's hawk (*Accipitier cooperii*), western yellow-billed cuckoo (*Coccyzus americanus occidentalis*) a state of California listed endangered species (SE), southwestern willow flycatcher (*Empidonax traillii extimus*) a state of California listed endangered species (SE) and federally listed endangered species (FE); least Bell's vireo (*Vireo bellii pusillus*) a state of California listed endangered species (SE) and federally listed endangered species (FE); yellow-breasted chat (*Icteria virens*), summer tanager (*Piranga rubra*), and Mohave river vole (*Microtis californicus mohavensis*) a CSC.

No tortoise sign (i.e. scats, burrows, pallets, tracks, egg shells or live tortoises) were observed during the survey. No horned lizards or their diagnostic scat were observed during the survey.

No thrashers were observed on the site during the survey. The thrashers appear to be species of open desert that are rapidly lost as areas become developed. The site would function as foraging habitat for prairie falcons, but there are no suitable nesting sites on the project area. No burrowing owls or their burrows were observed on the site during this survey, though California ground squirrels are present and they are common burrowers that provide nest sites for the owls. For the evaluation of the habitat for Mohave ground squirrels see the attached report by Eremico Biological Services.

Small mammal trapping was not conducted, so the presence or absence of either the pallid San Diego pocket mouse or the Mohave river vole can not be confirmed.

Wildlife Corridors

The channel of the wash could and probably does function as a wildlife corridor, but because there are large barren areas with limited natural vegetation, the function could have been disrupted in the past. To function as a corridor wildlife species would have to be able to move from one area to another through this site, the development north, east, and south of the site may have disrupted this function on a regional level. While parcels of vacant land are present around the site, the level of development has probably disrupted this function as a regional corridor if not as a local wildlife corridor.

4.0 PROJECT IMPACTS

4.1 VEGETATION

The construction of the proposed project would remove a limited amount of disturbed vegetation, except for the proposed western basin site which would impact approximately five acres of upland Desert Saltbush Scrub and potentially a limited number of individual riparian trees and shrubs at the very western edge of the project. The loss of the vegetation is not expected to be significant, the mixture of Mojavean Creosote Bush Scrub and Joshua Tree Woodland elements, and the Desert Saltbush Scrub are generally common in the surrounding county lands and the greater Mojave Desert, if not in the Town of Apple Valley. The potential loss will contribute to the cumulative impacts to these communities occurring as development continues in these areas.

4.2 WILDLIFE

The majority of wildlife species currently utilizing the site will be impacted by the development of the site. While some of the species could move into adjacent areas, construction of the project would result in direct impacts to the existing wildlife through the clearing and grading operations.

4.3 SENSITIVE BIOLOGICAL RESOURCES

Sensitive Plants

Since no sensitive plants were identified on site, no impacts to sensitive plants are expected.

Sensitive Wildlife

Since no desert tortoise or burrowing owls were identified on site, no impacts to these sensitive species are expected. It is expected that the project could impact the suite of riparian bird species depending on the time of the year and extent of the actual impact into the riparian forest area of the projects western end. The level of ground disturbing activities in this area could also impact the Mohave river vole.

Wildlife Corridors

As stated above, the channel of the wash could and probably does function as a wildlife corridor, but because there are large barren areas with limited natural vegetation, the function could have been disrupted in the past. To function as a corridor wildlife species would have to be able to move from one area to another through this site, the development north, east, and south of the site may have disrupted this function on a regional level. While parcels of vacant land are present around the site, the level of development has probably disrupted this function as a regional corridor if not as a local wildlife corridor. The further development of the channel would limit this continuing function for the site.

5.0 RECOMMENDATIONS

A pre-construction survey should be conducted if ground disturbing activities are to start within the nesting period of the burrowing owl (February to August). Any riparian trees or shrubs should be replaced if their removal occurs after the annual rainy season, but if it occurs in the summer or fall before the offset of the winter rains it should documented and the site should be evaluated after the rainy season to decide whether any revegetation of the site is required.

John F. Wear Date
Senior Biologist
Biological Resource Specialists

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APPENDIX A

Biological Compendium

Vascular Plant Species Observed
on the Proposed Desert Knolls Wash Flood Control Channel Improvements and Alternative Basin Sites in the Town of Apple Valley,
San Bernardino County, California

Gymnospermae

Ephedraceae	**Ephedra Family**
Ephedra nevedensis	Nevada joint fir
E. viridis	mouitain joint fir

Angiospermae

Dicotyledoneae

Apiaceae	**Carrot Family**
Lomatium mohavense	Mojave parsley
Asteraceae	**Sunflower Family**
Acamptopappus sphaerocephalus	Goldenhead
Adenophyllum cooperi	Cooper adenophyllum
Ambrosia acanthicarpa	annual burweed
A. dumosa	burro-bush
Baccharis salicifolia	mule fat
Chrysothamnus nauseosus	rubber rabbitbrush
C. teretifolius	green rabbitbrush
Encelia actoni	bush sunflower
Ericameria cooperi	Cooper's goldenbush
Hymenoclea salsola	cheese bush
Gutierrezia microcephala	matchweed
Lessingia lemmonii	vinegar-weed
Malacothrix glabrata	desert dandelion
Nicolletia occidentalis	hole-in-the-sand plant
Stephanomeria pauciflora	desert milk-aster
**Taraxacum officinale*	dandelion
Tetradymia axillaris var. *longispina*	cotton-thorn
Xanthium strumarium	cocklebur

Vascular Plant Species Observed
on the Proposed Desert Knolls Wash Flood Control Channel Improvements and Alternative Basin Sites in the Town of Apple Valley,
San Bernardino County, California
(Continued)

Bignoniaceae	**Bignonia Family**
Chilopsis linearis ssp. *arcuata*	desert willow
Boraginaceae	**Borage Family**
Heliotropium curassavicum	wild heliotrope
Tiquilia plicata	plicate coldenia
Brassicaceae	**Mustard Family**
**Brassica rapa*	field mustard
Descurainia pinnata	tansy mustard
**D. sophia*	flixweed
**Hirschfeldia incana*	shortpod mustard
**Sisymbrium altissimum*	tumble mustard
Cactaceae	**Cactus Family**
Echinocactus engelmannii	hedgehog cactus
Opuntia echinocarpa	golden cholla
O. ramosissima	pencil cholla
Chenopodiaceae	**Goosefoot Family**
Atriplex canescens	four-winged saltbush
A. polycarpa	allscale
Grayia spinosa	spiny hop-sage
Krascheninnekovia lanata	winter fat
**Salsola tragus*	Russian thistle
Cucurbitaceae	**Gourd Family**
Cucurbita palmata	coyote melon

on the Proposed Desert Knolls Wash Flood Control Channel Improvements and Alternative Basin Sites in the Town of Apple Valley, San Bernardino County, California (Continued)

Euphorbiaceae	**Spurge Family**
Chamaesyce albomarginata	rattlesnake weed
Croton californicus	California croton
Fabaceae	**Legume Family**
Astragalus lentiginosus	freckled milkvetch
Psorothamnus arborescens var. *minutifolius*	indigo bush
Geraniaceae	**Geranium Family**
**Erodium cicutarium*	red-stem filaree
Lamiaceae	**Mint Family**
Salazaria mexicana	bladder sage
Loasaceae	**Stick-Leaf Family**
Mentzelia sp.	blazing star
Nyctaginaceae	**Four O' Clock Family**
Abronia villosa	desert sand verbena
Mirabilis bigelovii	wishbone bush
Onagraceae	**Evening Primrose Family**
Camissonia boothii	woody bottlewasher
Polemoniaceae	**Phlox Family**
Eriastrum sp.	woolly star
Polygonaceae	**Buckwheat Family**
Centrostegia thurberi	Thurber spiny-herb
Eriogonum deflexum	skeleton weed

Vascular Plant Species Observed

E. fasciculatum var. *polifolium*	California buckwheat
E. gracillimum	rose and white buckwheat
E. inflatum ssp. *inflatum*	desert trumpet
E. nidularium	whisk broom
Rutaceae	**Rue Family**
Thamnosma montana	turpentine broom
Salicaceae	**Willow Family**
Populus fremontii ssp. *fremontii*	Fremont cottonwood
Salix exigua	narrow-leaved willow
S. laevigata	red willow
Solanaceae	**Nightshade Family**
Datura wrightii	Jimson weed
Lycium andersonii	Anderson thornbush
L. cooperi	peach-thorn
**Nicotiana glauca*	tree tobacco
Ulmaceae	**Elm Family**
**Ulmus pumila*	Siberian elm
Zygophyllaceae	**Caltrop Family**
Larrea tridentata	creosote bush
Monocotyledoneae	
Liliaceae	**Lily Family**
Yucca brevifolia	Joshua tree
Y. schidigera	Mojave yucca

Vascular Plant Species Observed

on the Proposed Desert Knolls Wash Flood Control Channel Improvements and Alternative Basin Sites in the Town of Apple Valley, San Bernardino County, California (Continued)

Poaceae	**Grass Family**
Achnatherum speciosum	desert needlegrass
**Avena sativa*	cultivated oat
**Bromus diandrus*	ripgut grass
**B. madritensis* ssp. *rubens*	red brome
**B. tectorum*	cheatgrass
Distichlis spicata	desert saltgrass
**Hordeum murinum*	wild barley
**Schismus barbatus*	abu-mashi

* Denotes non-native species.

Vertebrate Species Observed or Detected
on the Proposed Desert Knolls Wash Flood Control Channel Improvements and
Alternative Basin Sites in the Town of Apple Valley,
San Bernardino County, California

Class: Reptilia	**Reptiles**
Squmata	**Snakes and Lizards**
Iguanidae	**Iguana Family**
chuckwalla	*Sauramalus obesus*
Phrynosomatidae	**Horned Lizard Family**
side-blotched lizard	*Uta stansburiana*
desert spiny lizard	*Sceloporus magister*
Teiidae	**Whiptail Family**
western whiptail	*Cnemidophorus tigris*
Class: Aves	**Birds**
Falconiformes	
Accipitridae	**Hawks, Kites, and Eagles Family**
Sharp-shinned hawk	*Accipiter striatus*
Galliformes	
Odontophoridae	**New World Quail Family**
California quail	*Callipepla californica*
Charadriiformes	
Charadriidae	**Plovers Family**
killdeer	*Charadrius vociferus*
Columbiformes	
Columbidae	**Pigeon Family**
morning dove	*Zenaida macroura*
Apodiformes	
Trochilidae	**Hummingbird Family**
Costa's hummingbird	*Calypte costae*
Passeriformes	
Tyrannidae	**Tyrant Flycatcher Family**
Say's phoebe	*Sayornis saya*

Vertebrate Species Observed or Detected
on the Proposed Desert Knolls Wash Flood Control Channel Improvements and
Alternative Basin Sites in the Town of Apple Valley,
San Bernardino County, California
(Continued)

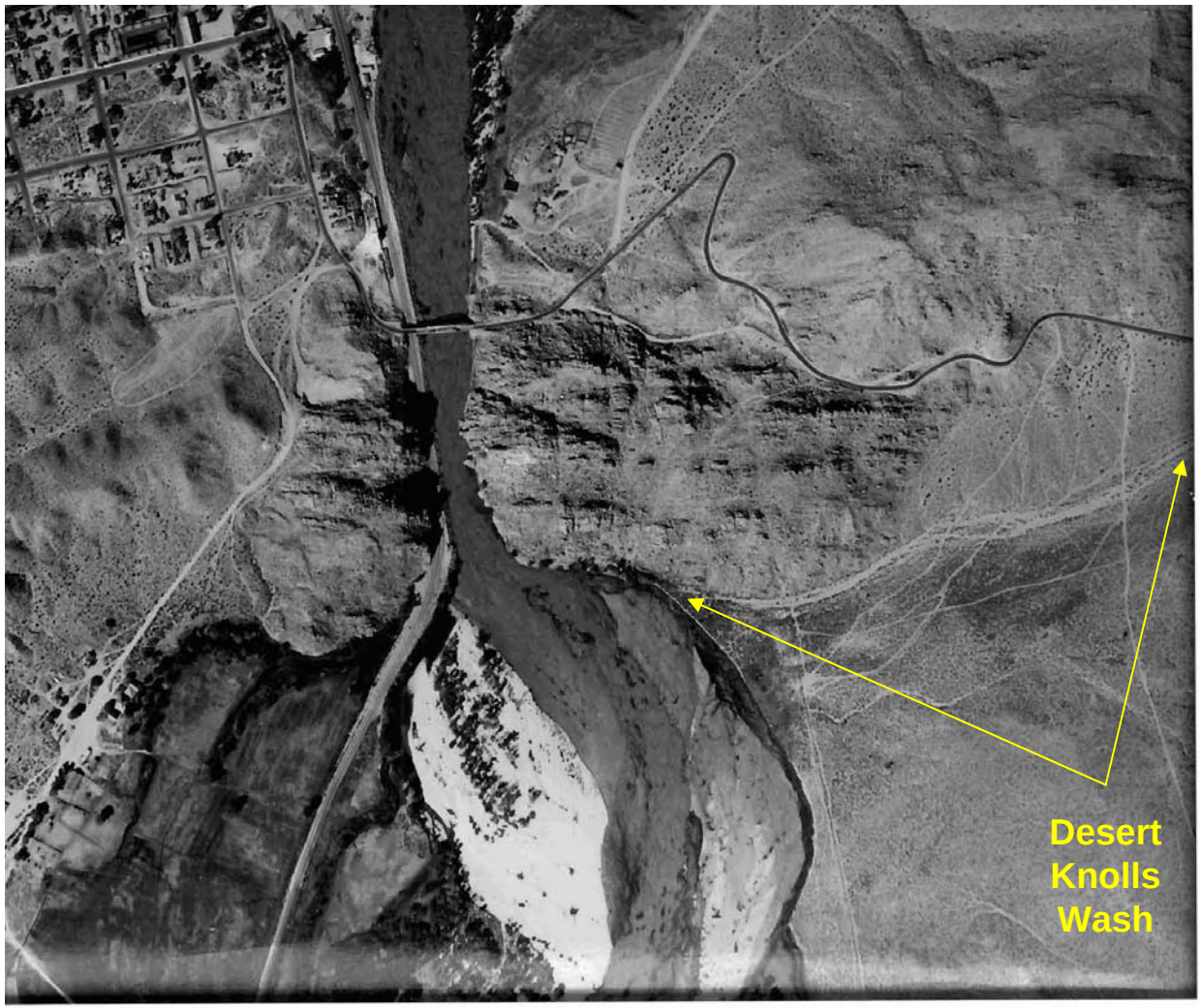
Corvidae	**Jays, Magpies and Crow Family**
common raven	*Corvus corax*
Alaudidae	**Lark Family**
horned lark	*Eremophila alpestris*
Remizidae	**Verdin Family**
verdin	*Auriparus faviceps*
Troglodytidae	**Wren Family**
cactus wren	*Campyorhynchus brunneicapillus*
Sturnidae	**Starling Family**
European starling	*Sturnus vulgaris*
Fringillidae	**Finch Family**
house finch	*Carpodacus mexicanus*
Passeridae	**Old World Sparrow Family**
house sparrow	*Passer domesticus*
Class: Mammalia	**Mammals**
Lagomorpha	
Leporidae	**Rabbit Family**
Audubon cottontail	*Sylvilagus audubonii*
Rodentia	
Sciuridae	**Squirrel Family**
white-tailed antelope squirrel	*Ammospermophilus leucurus*
California ground squirrel	*Spermophilus beecheyi*

APPENDIX B

Site Photos

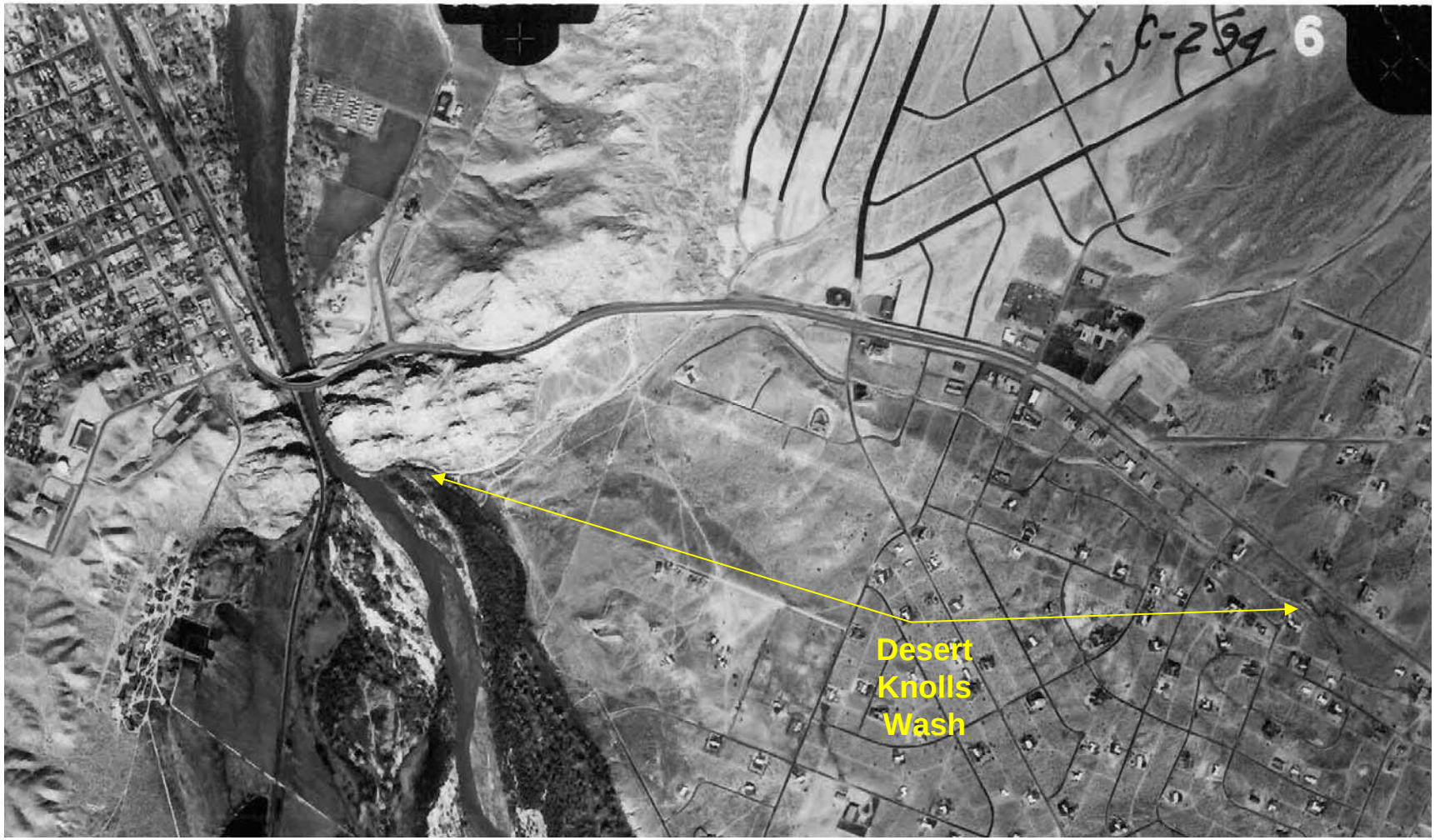
GOODDING WILLOW

Desert Knolls Wash



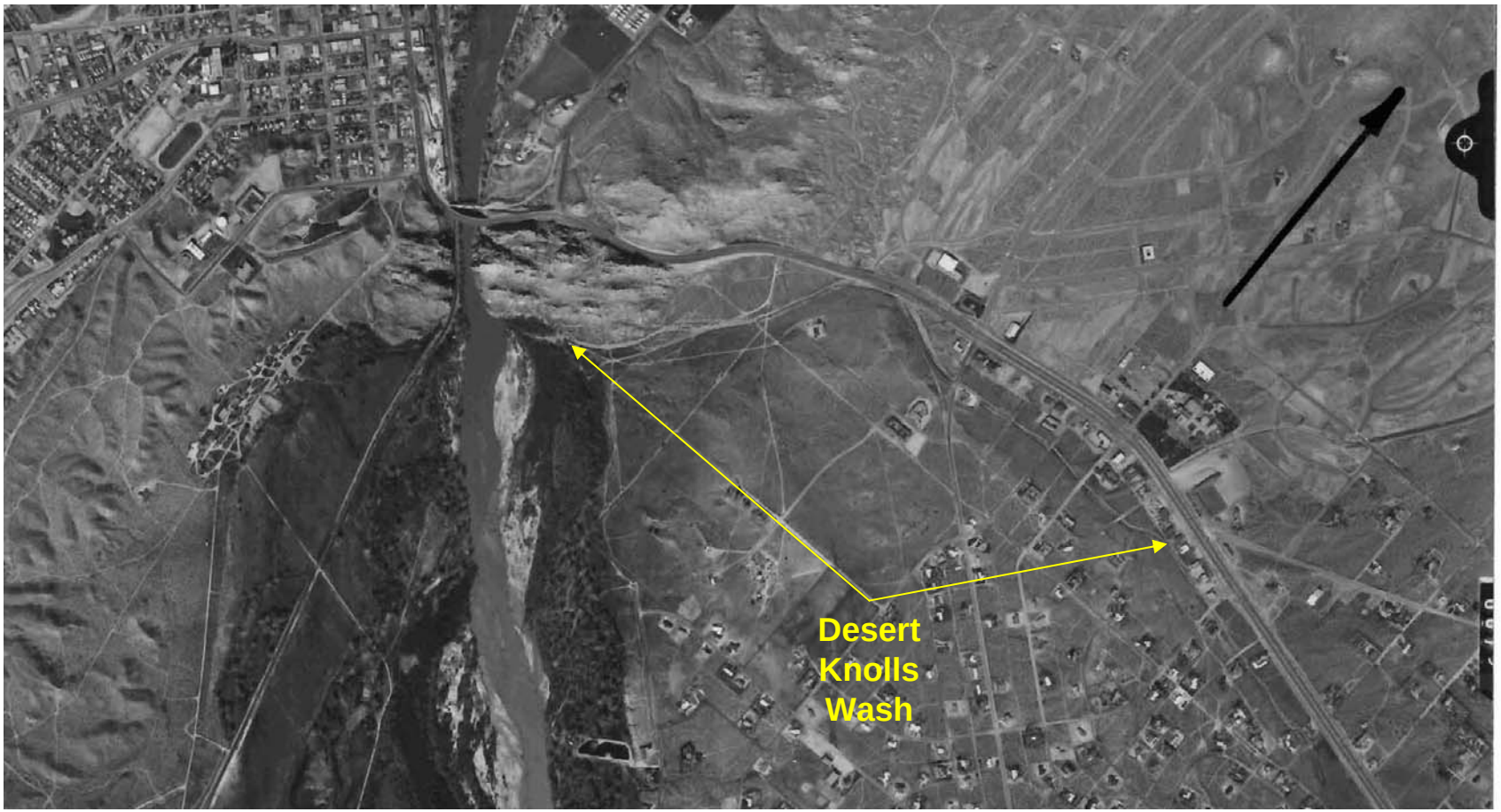
1938 storm

Desert Knolls Wash



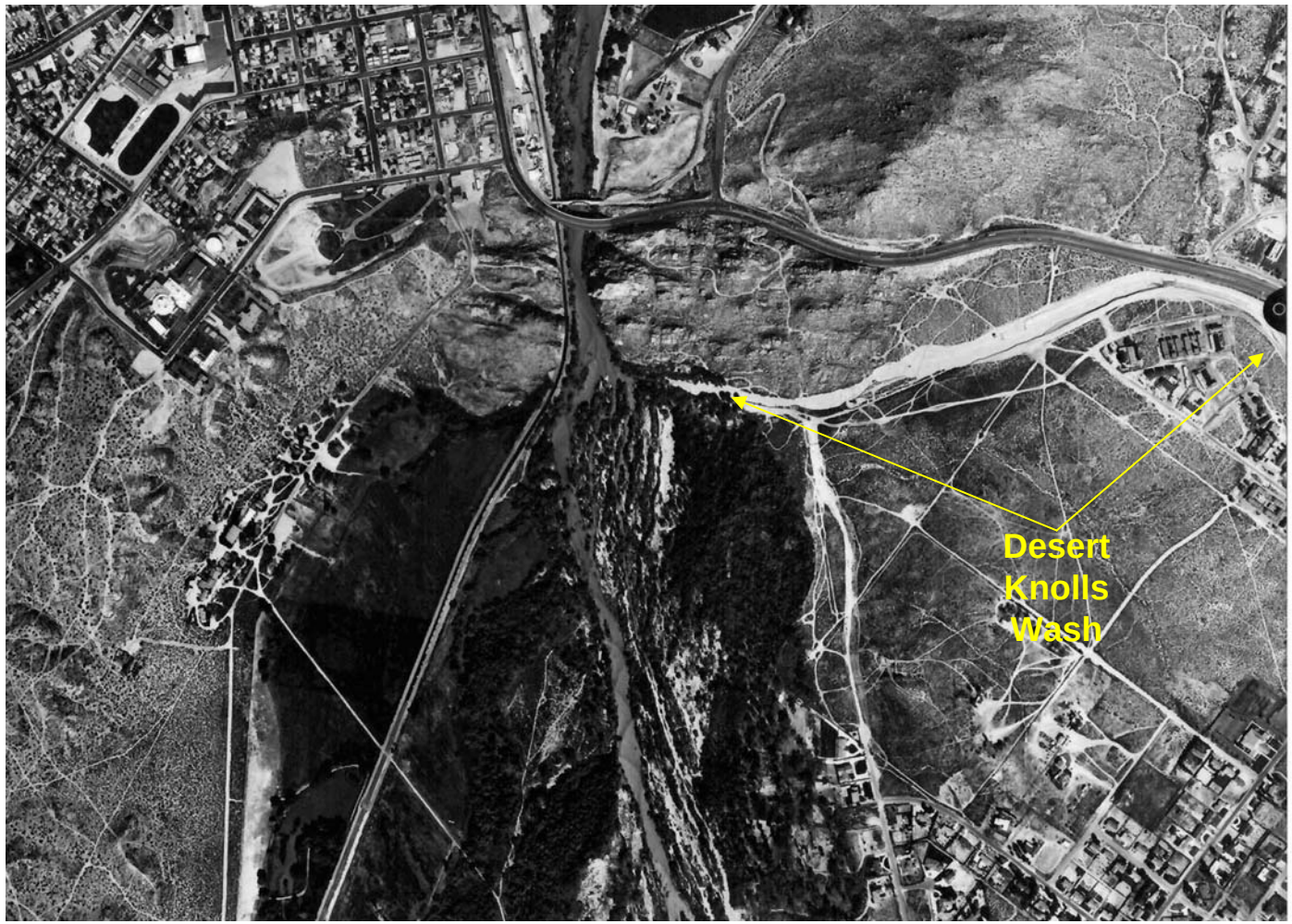
1969 storm

Desert Knolls Wash



1978 storm

Desert Knolls Wash



1993 storm

G. San Francisco Regional Water Quality Control Board Rapid Permit Checklist

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

PROJECT LOCATION: Desert Knolls Wash in the town of Apple Valley, CA, from the confluence with the Mojave River west to Tao Road upstream on the east.

NAME OF SPONSOR: San Bernardino County Flood Control District

ADDRESS: 825 East Third Street
San Bernardino, CA 92415-0835

DATE: April 29, 2011

List watershed partnerships coordinating activities at or near project location

None identified at this time.

IS THIS PROJECT CONTAINED IN A WATERSHED PLAN (IDENTIFY PLAN)?

Mojave River

I. Watershed and Reach Influences

A. Watershed Influences

Location/Function in Watershed **(Indicate All that Apply with an "X")**
(See Reference A: Longitudinal View Along Stream Corridor)

Headwaters	
Supply Reach	
Middle Reach	X
Transport Reach	X
Lower Reach	X
Storage Reach	

Stream Type

Ephemeral (i.e. flow only occurs in response to precipitation)	X
Intermittent (i.e. seasonal flows)	
Perrenial	

Upstream Watershed Land Uses **(Indicate Long-Term or Short-Term)**

Vineyards/Row Crops	
Rangeland/Grazing	
Mining/Quarry	
Forestry/Logging	
Parks/Reserves/Open Space	
Urban	Long-Term
Dams/Reservoirs	
Other (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

I. Watershed and Reach Influences (continued)

A. Watershed Influences (continued)

Natural Influences (Regional) **(Indicate All that Apply with an "X")**

Changes in Land, Waterbody or Sea Level (base level changes)	
Fault Zone/Earth Movement	
Fire-Impacted Areas (within last 5 years)	
Meander or Channel Type Changes	X
Landslides/Mud Slides	
Other (Specify)	

B. Reach Influences

Natural Influences (Local) **(Indicate All that Apply with an "X")**

Local Fault Line	
Fire Zone	
Meander Changes	
Landslides/Mudslides	
Plant Community Evolution	X
Beavers	
Other (Specify)	

Human Influences **(Indicate All that Apply with an "X")**

Stormwater/Site Runoff/Grade Controls	X
Wiers/Check Dams	
Culverts	X
Bridges	X
Channel Straightening	X
Vegetation Removal	
Gravel Removal	
Bank, Channel, and/or Floodplain Encroachments	X
Invasive Plants	X
Bank Protection Works and/or Debris in Channel	
Row Crops, Vineyards, and/or Orchards Adjacent to Reach (Indicate all that occur adjacent to reach)	
Livestock in or near Reach (e.g. free range cattle with riparian corridor/creek access, stables and/or feedlots near or in channel or flood plain area, etc.)	
In Channel Trail or Road Crossings (i.e. Fords)	X
Other (Specify)	

Dominant Stream Processes (Currently Acting on Channel) **(Indicate All that Apply with an "X")**

Excessive Erosion	X
Incising of Channel Bottom	X
Headcutting	X
Meander Development	
Channel Widening	X
Channel Narrowing	
Equilibrium between sediment supply entering and leaving	X
Other (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

I. Watershed and Reach Influences (continued)

B. Reach Influences (continued)

Summary - Describe causes of Instability or Habitat Degradation

San Bernardino County experienced rapid growth and development activity in the past few decades which significantly impacted the water quality of the area and the Mojave River. Beneficial uses of the Mojave River were also impacted as a result of development. Existing land uses in the immediate project area include a mix of vacant parcels, single and multiple-family residential, and a variety of commercial uses including retail, fast food, auto service establishments and professional offices (Final Report, Exhibit C). State Highway 18, a major arterial road, is also located north of, and running parallel with, the project area. These uses and associated activities result in the introduction of various visible and non-visible pollutants into the project area such as general trash and contaminated urban runoff containing waste oil, pesticides and other such pollutants.

C. Status of Channel Evolution

Site Evolution

(indicate the reference diagrams that best describes the status of evolution at your site)

Stream Adjustments to Watershed Conditions (See Reference B: River Processes and Morphology, R.D. Hey)	X
Stream Recovery from Channelization (or Headcutting) (See Reference C: Stream Corridor Restoration Manual)	
Channel Incision Adjustments (See Reference D: Oregon Fish and Wildlife Office)	
Stream Adjustments to In-Stream Modifications (culverts, weirs, bank stabilization projects, vegetation removal, etc.) (See Reference E: Common Channel Destabilizing Practice, Primer on Stream Protection, San Francisco Regional Water Quality Control Board)	

D. Existing Hydrology, Channel Geometry and Hydraulic Conditions

(See Reference F: Regional Curves, Channel Shapes)
(See Reference G: Regional Curves, Bankfull Discharges)
(See Reference H: Computing Flood Frequency)

Drainage Area to Project Location =	8.25	square miles
Mean Annual Precipitation =	5.06	inches per year
Channel Forming Discharge =	na	cubic feet per second
Mean Bankfull Depth for Relevant Stream Types =	var	feet
Bankfull Channel Width for Relevant Stream Types =	var	feet
Discharge for the 2-Year Recurrence Interval, Q_2=	680	cubic feet per second
Discharge for the 5-Year Recurrence Interval, Q_5=	1120	cubic feet per second
Discharge for the 10-Year Recurrence Interval, Q_{10} =	1650	cubic feet per second
Discharge for the 50-Year Recurrence Interval, Q_{50} =	1500	cubic feet per second
Discharge for the 100-Year Recurrence Interval, Q_{100} =	3480	cubic feet per second
Flood Elevation Estimates =	var	feet
Estimated Area of Watershed Impervious/Percent Basin Developed = (Specify in square miles or percent of watershed)	7	percent

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

I. Watershed and Reach Influences (continued)

D. Existing Hydrology, Channel Geometry and Hydraulic Conditions (continued)

Methods Used to Estimate Above Values (Indicate All that Apply)

Field Visual Estimation	
Field Estimation using Regional Curves	
Reference Reaches	
Surveyed Cross-Sections	
Stream Gage Data	
High Water Marks	
Dimensionless Rating Curves	
Computed Effective Discharges	
Regional Regression Analysis, Stormwater or Watershed Models	X
HEC-RAS or Other Hydraulic Models	X
Topographic Maps, Aerial Photography	X

II. Existing Channel Characteristics

A. Landscape Types (Indicate All that Apply with an "X")

(See Reference I: Channels, Floodplains and Terraces in Stream Corridor Restoration Manual for description of Unconfined, Confined by hillslopes with high terrace, and Incised with widening floodplain categories)

Combinations (below indicate all the apply with an "X")	
Unconfined	X
Confined by hillslopes with high terrace	
Incised with widening floodplain	
Alluvial Fan	X
Single Thread Alluvial	
Braided	
Arroyo	
Bedrock	
Meadow	
Tidal	
Other (Specify)	**Concrete channel**

B. Dominant Streambed Materials (Indicate All that Apply with an "X")

Silt/clays	
Sand	X
Gravel	X
Cobbles	
Boulders	
Bedrock	X

C. Floodplain and Channel Conditions

Valley Slope	0-15	Percent
Channel Slope	1.0-2.5	Percent
Channel Sinuosity		
Historic Channel Type and Sinuosity		
Step Pool Spacing		feet

Note: Channel classification systems (Rosgen, Montgomery-Buffington, etc.) can be used to describe channel types.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

II. Existing Channel Characteristics (continued)

D. Vegetation Functions **(Indicate All that Apply with an "X")**

Vegetation Communities	
Pioneer Species (willow/cottonwood/alder/dogwood/ninebark)	X
Mixed Woodland (maple, bay, elderberry, buckeye)	
Mature-Climax Species (oak, redwood, sycamore)	
Channel Shade	X
Bank Stability, Sediment Transport and Deposition	
Live and Dead In-Stream Habitat Structure	
Wildlife Habitat	X
No Functions	
Federal and/or State Special Status Species (List and indicate designation - Federal Threated Species; Federal Endangered Species; State Threatened Species; State Endangered Species; State Rare Species; and California Native Plant Society Lists 1A, 1B, 2, 3, and/or 4 Species)	Potential habitat for *Vireo bellii pusillus* (FE, SE); *Empidonax traillii extimus* (FE, SE); and *Coccyzus americanus occidentalis* (FC, SE) within riparian habitat located near confluence with the Mojave River.

E. Fish Habitat

Are Native Fish Present? (Indicate Present/Not Present)	Not Present
Salmonid Stream (Indicate upstream, in reach and/or downstream)	
Barriers to Fish or Other Aquatic Species (Indicate with an"X")	
Instream Habitat Complexity or Lack of Complexity	Lack of Complexity
Federal and/or State Special Status Species (frogs, snakes, turtles, etc.) (List and indicate designation - Federal Threated Species; Federal Endangered Species; State Threatened; State Endangered; and State Species of Special Concern)	None

III. Future Conditions Proposed by Project

A. Project Design Objectives **(may include multiple objectives, such as flood damage reduction, habitat restoration, stream bank restoration, stormwater management, etc.)**

The project will:

provide flood protection to property adjacent to the wash and maintain, as much as possible, the integrity of the riparian habitat; sensitive wetland downstream; cultural and biological resources as well as maintain high water quality standards in accordance with the Lahontan Regional Water Quality Control Board Basin Plan.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

III. Future Conditions Proposed by Project (continued)

B. Ecological Restoration Objectives (Indicate All that Apply)

Instream Habitat	
Stream Corridor Native Riparian Restoration	
Invasive Plant Removal	
Sediment Reduction or Storage	X
Enhance Floodplain Functions	X
Increase Sediment Supply Available for Transport	
Water Temperature Modification	
Nutrient Uptake	
Other (Specify)	

C. Methods Used to Estimate Future Dynamic Equilibrium Conditions (Indicate All that Apply)

Historic Conditions	X
Reference Reaches (visual or surveyed cross-sections)	
Regional Hydraulic Geometry (regional curves on channel shape and drainage area)	
Stream Gage Data on 1.5 Reccurrence Interval Discharge, $Q_{1.5}$	
Flood Frequency Curves from Stream Gage Data	
Dimensionless Rating Curves to Determine Channel Forming Discharges	
Computed Effective Discharges to Determine Channel Forming Discharges	
Regional Regression Analysis, Stormwater or Watershed Models	X
HEC-RAS or Other Hydraulic Model	X
Sediment Transport Model	X
Other (Specify)	

IV. Describe How the Project Protects or Restores Floodplain

(Indicate All that Apply with an "X")

Existing Channel Cross-Section Protection	X
Remove Levees, Berms or Structures Encroaching on Floodplain	
Existing Levees or Berms Set Back	
Restore Floodplain Vegetation	
Native Vegetated Buffer Added to Landslide of Stream Corridor	
Floodplain Area Excavated to Bankfull Elevation	
Pond and Plug or Other Methods of Re-watering Floodplain	
Livestock Exclusion Fencing	
Stormwater Infiltration Systems (infiltration basins, rain gardens, vegetated swales, porous pavement, etc.)	
Stormwater Detention Systems (extended detention basins, treatment wetlands, retention ponds, etc.)	
Other (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

V. Describe How the Project Protects or Restores Native Streamside Vegetation

A. Current Status of Riparian Vegetation

List all Plant Communities Currently at the Site You may use standard vegetation classification system from the latest edition of *A Manual of California Vegetation* by John Sawyer and Todd Keeler-Wolf. Available on-line at http://www.dfg.ca.gov/biogeodata/vegcamp/veg_publications_protocols.asp	Mojave riparian forest, desert saltbush scrub, and Mojave wash scrub.
Indicate Relative Diversity for Community Type	Medium
Estimate Age of Dominant Tree Species (if applicable)	70 years old
List any Special Vascular Plants, Bryophytes, and Lichens that potentially occur or are known to occur at the site see http://www.dfg.ca.gov/biogeodata/cnddb/plants_and_animals.a	Potenial habitat for: *Camissonia boothii* ssp. *boothii*, *Canbya candida*, *Cymopterus deserticola*, and *Mimulus mohavensis*.

B. Current Status of Invasive Plants at Project Site

(Indicate Not Present, Sparse, Dominant in Riparian Corridor, or Clogging Channel)	Sparse
List Species of Invasive Plants Present (see link to SF Regional Water Quality Control Board list below) http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stream_wetland/app1inclrefs.pdf	*Salsola tragus*, *Bromus diandrus,* and *Bromus madritensis.*

C. Non-native and Invasive Plant Control Methods (Indicate All that Apply with an "X")

Hand Tools	X
Mulch/Geotextile Fabric	
Controlled Burns	
Mowing	
Herbicides	
Managed Grazing (Goats, Cows, etc.)	
Mechanical	
Other (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

V. Describe How the Project Protects or Restores Native Streamside Vegetation (continued)

D. Revegetation Method (Indicate All that Apply with an "X")

Seed	
Hydroseed	
Plugs	
Container Stock/Bare Root	
Soil Bioengineering Systems (proceed to VII)	
Other (Specify)	**natural establishment**

Note: See Reference J: Native Riparian Plants of the San Francisco Bay Area for examples of appropriate species to

VI. Describe How the Project Protects and/or Restores the Stream Channel Slope

A. Existing Slope Retained

1 Percent

B. Proposed Restoration Channel Slope

0-55 Percent

C. Pool Riffle Stream

Informed by Historic Channel Sinuosity		
Informed by Reference Reach Sinuosity		
Proposed Channel Sinuosity		
Check on Design Slope = Valley Slope/Sinuosity	**#VALUE!**	Percent
Channel Lengthened (indicate increase in linear feet)		feet
Channel Shortened (indicate decrease in linear feet)		feet

(see Reference K: Meander and Slope Restoration, Primer on Stream Protection, San Francisco Bay Regional Water Quality Control Board)

D. Step-Pool Stream

Step Pools Design Slope		Percent
Reference Reaches		

(See Reference L: Chin, Papanicolaou equations or other)

Step Height		feet
Channel Slope		Percent
Length Between Steps		feet

E. Other Stream Types

Braided System	
Alluvial Fan	**X**

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

VII. Describe How the Project Restores Stream Banks

A. Fencing and Vegetated Buffers

Livestock Exclusions Fencing	
New Livestock Water Supplies	
Riparian Buffers	
Runoff and Drainage Improvements	X
Stormwater Treatment Landscaping (treatment wetlands, vegetated swales, infiltration galleries , etc.)	X
Other (Specify)	

B. Soil Bioengineering Systems and Permissible Shear Stress/Permissible Velocities

(See Reference M: Permissible Shear Stress for Soil Bioengineering, U.S. Army Corps of Engineers, and National Engineering Handbook, Natural Resources Conservation Service)

Shear Stress Calculation **(Enter Data to Estimate Shear Stress at Site)**

Mean Channel Depth (Hydraulic Radius) =	2.5 (1.5)	feet
Stream Slope (Friction Slope) =	.001-.15	
Specific Weight of Water =	62.4	pounds per square foot
Shear Stress Acting on Channel =	1.5	pounds per square foot

Bioengineering Alternatives **(Indicate All that Apply with an "X")**

Stakes/Cuttings	
Poles	
Posts	
Live Facines	
Brush Layering	
Brush Matting	
Grass	
Tree Plantings	
Geotextile Fabric	
Others (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

VIII. Describe How the Project Protects and/or Restores Aquatic Habitat

A. Habitat Enhancement for Native Wildlife (Special Status Species)

List Habitat Functions Affected or Restored for Each

Invertebrate Habitat	None.
Salmonid Habitat	Not applicable; salmonid habitat is not present within the project area.
Other Native Fish Habitat	Not applicable; native fish habitat is not present within the project area.
Reptile/Amphibian Habitat	None.
Bird Habitat	None.
Mammal Habitat	None.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

VIII. Describe How the Project Protects and/or Restores Aquatic Habitat (continued)

B. Proposed Exotic Wildlife Controls (Invasive Species)

Invertebrates	None.
Fish	None.
Reptiles/Amphibians	*Rana catesbeiana* will be managed.
Birds	The Flood Control District will continue to remove *Molothrus ater* from the Mojave River from the Mojave Narrows Regional Park to the VVWRA.
Mammals	None.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

IX. Project Summary

A. Existing Conditions

Provide cross-sections, profiles and plan views of project reaches **X**

B. Proposed Project Conditions **(Indicate All that Apply with an "X")**

Provide cross-sections, profiles and plan views of proposed project **X**

C. Briefly describe how project will protect or enhance existing ecological resources and respond to the causes of channel instabilities and/or flood damages

Concept 1 is the construction of a concrete flood control channel with a parallel, natural bottom, low-flow side channel which will allow for native vegetation.

Prepared by: Rivertech/URS, consultants to SBFCD Date: 4/29/2011

Note: Projects involving existing or potential future fish habitat should also use the Rapid Permit Checklist for Fish Habitat. Projects affecting other wetland environments, such as marshes, ponds, seasonal wetlands, etc., should use the Rapid Permit Checklist for Wetlands.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

PROJECT LOCATION: Desert Knolls Wash in the town of Apple Valley, CA, from the confluence with the Mojave River west to Tao Road upstream on the east.

NAME OF SPONSOR: San Bernardino County Flood Control District

ADDRESS: 825 East Third Street
San Bernardino, CA 92415-0835

DATE: April 29, 2011

List watershed partnerships coordinating activities at or near project location

None identified at this time.

IS THIS PROJECT CONTAINED IN A WATERSHED PLAN (IDENTIFY PLAN)?

Mojave River

I. Watershed and Reach Influences

A. Watershed Influences

Location/Function in Watershed **(Indicate All that Apply with an "X")**
(See Reference A: Longitudinal View Along Stream Corridor)

Headwaters	
Supply Reach	
Middle Reach	X
Transport Reach	X
Lower Reach	X
Storage Reach	

Stream Type

Ephemeral (i.e. flow only occurs in response to precipitation)	X
Intermittent (i.e. seasonal flows)	
Perrenial	

Upstream Watershed Land Uses **(Indicate Long-Term or Short-Term)**

Vineyards/Row Crops	
Rangeland/Grazing	
Mining/Quarry	
Forestry/Logging	
Parks/Reserves/Open Space	
Urban	Long-Term
Dams/Reservoirs	
Other (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

I. Watershed and Reach Influences (continued)

A. Watershed Influences (continued)

Natural Influences (Regional) (Indicate All that Apply with an "X")

Changes in Land, Waterbody or Sea Level (base level changes)	
Fault Zone/Earth Movement	
Fire-Impacted Areas (within last 5 years)	
Meander or Channel Type Changes	X
Landslides/Mud Slides	
Other (Specify)	

B. Reach Influences

Natural Influences (Local) (Indicate All that Apply with an "X")

Local Fault Line	
Fire Zone	
Meander Changes	
Landslides/Mudslides	
Plant Community Evolution	X
Beavers	
Other (Specify)	

Human Influences (Indicate All that Apply with an "X")

Stormwater/Site Runoff/Grade Controls	X
Wiers/Check Dams	
Culverts	X
Bridges	X
Channel Straightening	X
Vegetation Removal	
Gravel Removal	
Bank, Channel, and/or Floodplain Encroachments	X
Invasive Plants	X
Bank Protection Works and/or Debris in Channel	
Row Crops, Vineyards, and/or Orchards Adjacent to Reach (Indicate all that occur adjacent to reach)	
Livestock in or near Reach (e.g. free range cattle with riparian corridor/creek access, stables and/or feedlots near or in channel or flood plain area, etc.)	
In Channel Trail or Road Crossings (i.e. Fords)	X
Other (Specify)	

Dominant Stream Processes (Currently Acting on Channel) (Indicate All that Apply with an "X")

Excessive Erosion	X
Incising of Channel Bottom	X
Headcutting	X
Meander Development	
Channel Widening	X
Channel Narrowing	
Equilibrium between sediment supply entering and leaving	X
Other (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

I. Watershed and Reach Influences (continued)

B. Reach Influences (continued)

Summary - Describe causes of Instability or Habitat Degradation

San Bernardino County experienced rapid growth and development activity in the past few decades which significantly impacted the water quality of the area and the Mojave River. Beneficial uses of the Mojave River were also impacted as a result of development. Existing land uses in the immediate project area include a mix of vacant parcels, single and multiple-family residential, and a variety of commercial uses including retail, fast food, auto service establishments and professional offices (Final Report, Exhibit C). State Highway 18, a major arterial road, is also located north of, and running parallel with, the project area. These uses and associated activities result in the introduction of various visible and non-visible pollutants into the project area such as general trash and contaminated urban runoff containing waste oil, pesticides and other such pollutants.

C. Status of Channel Evolution

Site Evolution

(indicate the reference diagrams that best describes the status of evolution at your site)

Stream Adjustments to Watershed Conditions (See Reference B: River Processes and Morphology, R.D. Hey)	X
Stream Recovery from Channelization (or Headcutting) (See Reference C: Stream Corridor Restoration Manual)	
Channel Incision Adjustments (See Reference D: Oregon Fish and Wildlife Office)	
Stream Adjustments to In-Stream Modifications (culverts, weirs, bank stabilization projects, vegetation removal, etc.) (See Reference E: Common Channel Destabilizing Practice, Primer on Stream Protection, San Francisco Regional Water Quality Control Board)	

D. Existing Hydrology, Channel Geometry and Hydraulic Conditions

(See Reference F: Regional Curves, Channel Shapes)
(See Reference G: Regional Curves, Bankfull Discharges)
(See Reference H: Computing Flood Frequency)

Drainage Area to Project Location =	8.25	square miles
Mean Annual Precipitation =	5.06	inches per year
Channel Forming Discharge =	na	cubic feet per second
Mean Bankfull Depth for Relevant Stream Types =	varies	feet
Bankfull Channel Width for Relevant Stream Types =	varies	feet
Discharge for the 2-Year Recurrence Interval, Q_2=	680	cubic feet per second
Discharge for the 5-Year Recurrence Interval, Q_5=	1120	cubic feet per second
Discharge for the 10-Year Recurrence Interval, Q_{10} =	1650	cubic feet per second
Discharge for the 50-Year Recurrence Interval, Q_{50} =	1500	cubic feet per second
Discharge for the 100-Year Recurrence Interval, Q_{100} =	3480	cubic feet per second
Flood Elevation Estimates =	varies	feet
Estimated Area of Watershed Impervious/Percent Basin Developed = (Specify in square miles or percent of watershed)	7	percent

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

I. Watershed and Reach Influences (continued)

D. Existing Hydrology, Channel Geometry and Hydraulic Conditions (continued)

Methods Used to Estimate Above Values (Indicate All that Apply)

Field Visual Estimation	
Field Estimation using Regional Curves	
Reference Reaches	
Surveyed Cross-Sections	
Stream Gage Data	
High Water Marks	
Dimensionless Rating Curves	
Computed Effective Discharges	
Regional Regression Analysis, Stormwater or Watershed Models	X
HEC-RAS or Other Hydraulic Models	X
Topographic Maps, Aerial Photography	X

II. Existing Channel Characteristics

A. Landscape Types (Indicate All that Apply with an "X")

(See Reference I: Channels, Floodplains and Terraces in Stream Corridor Restoration Manual for description of Unconfined, Confined by hillslopes with high terrace, and Incised with widening floodplain categories)

Combinations (below indicate all the apply with an "X")	
Unconfined	X
Confined by hillslopes with high terrace	
Incised with widening floodplain	
Alluvial Fan	X
Single Thread Alluvial	
Braided	
Arroyo	
Bedrock	
Meadow	
Tidal	
Other (Specify)	**concrete channel**

B. Dominant Streambed Materials (Indicate All that Apply with an "X")

Silt/clays	
Sand	X
Gravel	X
Cobbles	
Boulders	
Bedrock	X

C. Floodplain and Channel Conditions

Valley Slope	0-15	Percent
Channel Slope	1.0-2.5	Percent
Channel Sinuosity		
Historic Channel Type and Sinuosity		
Step Pool Spacing		feet

Note: Channel classification systems (Rosgen, Montgomery-Buffington, etc.) can be used to describe channel types.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

II. Existing Channel Characteristics (continued)

D. Vegetation Functions **(Indicate All that Apply with an "X")**

Vegetation Communities	
Pioneer Species (willow/cottonwood/alder/dogwood/ninebark)	X
Mixed Woodland (maple, bay, elderberry, buckeye)	
Mature-Climax Species (oak, redwood, sycamore)	
Channel Shade	X
Bank Stability, Sediment Transport and Deposition	
Live and Dead In-Stream Habitat Structure	
Wildlife Habitat	X
No Functions	
Federal and/or State Special Status Species (List and indicate designation - Federal Threated Species; Federal Endangered Species; State Threatened Species; State Endangered Species; State Rare Species; and California Native Plant Society Lists 1A, 1B, 2, 3, and/or 4 Species)	Potential habitat for *Vireo bellii pusillus* (FE, SE); *Empidonax traillii extimus* (FE, SE); and *Coccyzus americanus occidentalis* (FC, SE) within riparian habitat located near confluence with the Mojave River.

E. Fish Habitat

Are Native Fish Present? (Indicate Present/Not Present)	Not Present
Salmonid Stream (Indicate upstream, in reach and/or downstream)	
Barriers to Fish or Other Aquatic Species (Indicate with an"X")	
Instream Habitat Complexity or Lack of Complexity	Lack of Complexity
Federal and/or State Special Status Species (frogs, snakes, turtles, etc.) (List and indicate designation - Federal Threated Species; Federal Endangered Species; State Threatened; State Endangered; and State Species of Special Concern)	None

III. Future Conditions Proposed by Project

A. Project Design Objectives **(may include multiple objectives, such as flood damage reduction, habitat restoration, stream bank restoration, stormwater management, etc.)**

The project will:

provide flood protection to property adjacent to the wash and maintain, as much as possible, the integrity of the riparian habitat; sensitive wetland downstream; cultural and biological resources as well as maintain high water quality standards in accordance with the Lahontan Regional Water Quality Control Board Basin Plan.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

III. Future Conditions Proposed by Project (continued)

B. Ecological Restoration Objectives (Indicate All that Apply)

Instream Habitat	
Stream Corridor Native Riparian Restoration	
Invasive Plant Removal	
Sediment Reduction or Storage	X
Enhance Floodplain Functions	X
Increase Sediment Supply Available for Transport	
Water Temperature Modification	
Nutrient Uptake	
Other (Specify)	

C. Methods Used to Estimate Future Dynamic Equilibrium Conditions (Indicate All that Apply)

Historic Conditions	X
Reference Reaches (visual or surveyed cross-sections)	
Regional Hydraulic Geometry (regional curves on channel shape and drainage area)	
Stream Gage Data on 1.5 Reccurrence Interval Discharge, $Q_{1.5}$	
Flood Frequency Curves from Stream Gage Data	
Dimensionless Rating Curves to Determine Channel Forming Discharges	
Computed Effective Discharges to Determine Channel Forming Discharges	
Regional Regression Analysis, Stormwater or Watershed Models	X
HEC-RAS or Other Hydraulic Model	X
Sediment Transport Model	X
Other (Specify)	

IV. Describe How the Project Protects or Restores Floodplain

(Indicate All that Apply with an "X")

Existing Channel Cross-Section Protection	X
Remove Levees, Berms or Structures Encroaching on Floodplain	
Existing Levees or Berms Set Back	
Restore Floodplain Vegetation	
Native Vegetated Buffer Added to Landslide of Stream Corridor	
Floodplain Area Excavated to Bankfull Elevation	
Pond and Plug or Other Methods of Re-watering Floodplain	
Livestock Exclusion Fencing	
Stormwater Infiltration Systems (infiltration basins, rain gardens, vegetated swales, porous pavement, etc.)	X
Stormwater Detention Systems (extended detention basins, treatment wetlands, retention ponds, etc.)	
Other (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

V. Describe How the Project Protects or Restores Native Streamside Vegetation

A. Current Status of Riparian Vegetation

List all Plant Communities Currently at the Site You may use standard vegetation classification system from the latest edition of *A Manual of California Vegetation* by John Sawyer and Todd Keeler-Wolf. Available on-line at http://www.dfg.ca.gov/biogeodata/vegcamp/veg_publications_protocols.asp	Mojave riparian forest, desert saltbush scrub, and Mojave wash scrub.
Indicate Relative Diversity for Community Type	Medium
Estimate Age of Dominant Tree Species (if applicable)	70 years old
List any Special Vascular Plants, Bryophytes, and Lichens that potentially occur or are known to occur at the site see http://www.dfg.ca.gov/biogeodata/cnddb/plants_and_animals.a	Potenial habitat for: *Camissonia boothii* ssp. *boothii*, *Canbya candida*, *Cymopterus deserticola*, and *Mimulus mohavensis*.

B. Current Status of Invasive Plants at Project Site

(Indicate Not Present, Sparse, Dominant in Riparian Corridor, or Clogging Channel)

Sparse

List Species of Invasive Plants Present (see link to SF Regional Water Quality Control Board list below) http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stream_wetland/app1inclrefs.pdf

Salsola tragus, *Bromus diandrus,* and *Bromus madritensis.*

C. Non-native and Invasive Plant Control Methods **(Indicate All that Apply with an "X")**

Hand Tools	X
Mulch/Geotextile Fabric	
Controlled Burns	
Mowing	
Herbicides	
Managed Grazing (Goats, Cows, etc.)	
Mechanical	
Other (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

V. Describe How the Project Protects or Restores Native Streamside Vegetation (continued)

D. Revegetation Method (Indicate All that Apply with an "X")

Seed	
Hydroseed	
Plugs	
Container Stock/Bare Root	
Soil Bioengineering Systems (proceed to VII)	
Other (Specify)	**natural establishment**

Note: See Reference J: Native Riparian Plants of the San Francisco Bay Area for examples of appropriate species to

VI. Describe How the Project Protects and/or Restores the Stream Channel Slope

A. Existing Slope Retained

1 Percent

B. Proposed Restoration Channel Slope

0-55 Percent

C. Pool Riffle Stream

Informed by Historic Channel Sinuosity		
Informed by Reference Reach Sinuosity		
Proposed Channel Sinuosity		
Check on Design Slope = Valley Slope/Sinuosity	**#VALUE!**	Percent
Channel Lengthened (indicate increase in linear feet)		feet
Channel Shortened (indicate decrease in linear feet)		feet

(see Reference K: Meander and Slope Restoration, Primer on Stream Protection, San Francisco Bay Regional Water Quality Control Board)

D. Step-Pool Stream

Step Pools Design Slope		Percent
Reference Reaches		

(See Reference L: Chin, Papanicolaou equations or other)

Step Height		feet
Channel Slope		Percent
Length Between Steps		feet

E. Other Stream Types

Braided System	
Alluvial Fan	**X**

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

VII. Describe How the Project Restores Stream Banks

A. Fencing and Vegetated Buffers

Livestock Exclusions Fencing	
New Livestock Water Supplies	
Riparian Buffers	
Runoff and Drainage Improvements	X
Stormwater Treatment Landscaping (treatment wetlands, vegetated swales, infiltration galleries , etc.)	X
Other (Specify)	

B. Soil Bioengineering Systems and Permissible Shear Stress/Permissible Velocities

(See Reference M: Permissible Shear Stress for Soil Bioengineering, U.S. Army Corps of Engineers, and National Engineering Handbook, Natural Resources Conservation Service)

Shear Stress Calculation **(Enter Data to Estimate Shear Stress at Site)**

Mean Channel Depth (Hydraulic Radius) =	2.5 (1.5)	feet
Stream Slope (Friction Slope) =	.001-.015	
Specific Weight of Water =	62.4	pounds per square foot
Shear Stress Acting on Channel =	1.5	pounds per square foot

Bioengineering Alternatives **(Indicate All that Apply with an "X")**

Stakes/Cuttings	
Poles	
Posts	
Live Facines	
Brush Layering	
Brush Matting	
Grass	
Tree Plantings	
Geotextile Fabric	
Others (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

VIII. Describe How the Project Protects and/or Restores Aquatic Habitat

A. Habitat Enhancement for Native Wildlife (Special Status Species)

List Habitat Functions Affected or Restored for Each

Invertebrate Habitat	None.
Salmonid Habitat	Not applicable; salmonid habitat is not present within the project area.
Other Native Fish Habitat	Not applicable; native fish habitat is not present within the project area.
Reptile/Amphibian Habitat	None.
Bird Habitat	None.
Mammal Habitat	None.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

VIII. Describe How the Project Protects and/or Restores Aquatic Habitat (continued)

B. Proposed Exotic Wildlife Controls (Invasive Species)

Invertebrates	None.
Fish	None.
Reptiles/Amphibians	*Rana catesbeiana* will be managed.
Birds	The Flood Control District will continue to remove *Molothrus ater* from the Mojave River from the Mojave Narrows Regional Park to the VVWRA.
Mammals	None.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

IX. Project Summary

A. Existing Conditions

Provide cross-sections, profiles and plan views of project reaches **X**

B. Proposed Project Conditions **(Indicate All that Apply with an "X")**

Provide cross-sections, profiles and plan views of proposed project **X**

C. Briefly describe how project will protect or enhance existing ecological resources and respond to the causes of channel instabilities and/or flood damages

Concept 2 represents the natural channel with gabion mattress drop structures incorporated throughout, which function as channel stabilizers. Channel concept plans propose use of natural material that may allow for native vegetation to naturally occur, or will allow for the planting of native vegetation, which will benefit plant and wildlife species within the region.

Prepared by: Rivertech/URS, consultants to SBFCD Date: 4/29/2011

Note: Projects involving existing or potential future fish habitat should also use the Rapid Permit Checklist for Fish Habitat. Projects affecting other wetland environments, such as marshes, ponds, seasonal wetlands, etc., should use the Rapid Permit Checklist for Wetlands.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

PROJECT LOCATION: Desert Knolls Wash in the town of Apple Valley, CA, from the confluence with the Mojave River west to Tao Road upstream on the east.

NAME OF SPONSOR: San Bernardino County Flood Control District

ADDRESS: 825 East Third Street
San Bernardino, CA 92415-0835

DATE: April 29, 2011

List watershed partnerships coordinating activities at or near project location

None identified at this time.

IS THIS PROJECT CONTAINED IN A WATERSHED PLAN (IDENTIFY PLAN)?

Mojave River

I. Watershed and Reach Influences

A. Watershed Influences

Location/Function in Watershed **(Indicate All that Apply with an "X")**
(See Reference A: Longitudinal View Along Stream Corridor)

Headwaters	
Supply Reach	
Middle Reach	X
Transport Reach	X
Lower Reach	X
Storage Reach	

Stream Type

Ephemeral (i.e. flow only occurs in response to precipitation)	X
Intermittent (i.e. seasonal flows)	
Perrenial	

Upstream Watershed Land Uses **(Indicate Long-Term or Short-Term)**

Vineyards/Row Crops	
Rangeland/Grazing	
Mining/Quarry	
Forestry/Logging	
Parks/Reserves/Open Space	
Urban	Long-Term
Dams/Reservoirs	
Other (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

I. Watershed and Reach Influences (continued)

A. Watershed Influences (continued)

Natural Influences (Regional) (Indicate All that Apply with an "X")

Changes in Land, Waterbody or Sea Level (base level changes)	
Fault Zone/Earth Movement	
Fire-Impacted Areas (within last 5 years)	
Meander or Channel Type Changes	X
Landslides/Mud Slides	
Other (Specify)	

B. Reach Influences

Natural Influences (Local) (Indicate All that Apply with an "X")

Local Fault Line	
Fire Zone	
Meander Changes	
Landslides/Mudslides	
Plant Community Evolution	X
Beavers	
Other (Specify)	

Human Influences (Indicate All that Apply with an "X")

Stormwater/Site Runoff/Grade Controls	X
Wiers/Check Dams	
Culverts	X
Bridges	X
Channel Straightening	X
Vegetation Removal	
Gravel Removal	
Bank, Channel, and/or Floodplain Encroachments	X
Invasive Plants	X
Bank Protection Works and/or Debris in Channel	
Row Crops, Vineyards, and/or Orchards Adjacent to Reach (Indicate all that occur adjacent to reach)	
Livestock in or near Reach (e.g. free range cattle with riparian corridor/creek access, stables and/or feedlots near or in channel or flood plain area, etc.)	
In Channel Trail or Road Crossings (i.e. Fords)	X
Other (Specify)	

Dominant Stream Processes (Currently Acting on Channel) (Indicate All that Apply with an "X")

Excessive Erosion	X
Incising of Channel Bottom	X
Headcutting	X
Meander Development	
Channel Widening	X
Channel Narrowing	
Equilibrium between sediment supply entering and leaving	X
Other (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

I. Watershed and Reach Influences (continued)

B. Reach Influences (continued)

Summary - Describe causes of Instability or Habitat Degradation

San Bernardino County experienced rapid growth and development activity in the past few decades which significantly impacted the water quality of the area and the Mojave River. Beneficial uses of the Mojave River were also impacted as a result of development. Existing land uses in the immediate project area include a mix of vacant parcels, single and multiple-family residential, and a variety of commercial uses including retail, fast food, auto service establishments and professional offices (Final Report, Exhibit C). State Highway 18, a major arterial road, is also located north of, and running parallel with, the project area. These uses and associated activities result in the introduction of various visible and non-visible pollutants into the project area such as general trash and contaminated urban runoff containing waste oil, pesticides and other such pollutants.

C. Status of Channel Evolution

Site Evolution

(indicate the reference diagrams that best describes the status of evolution at your site)

Stream Adjustments to Watershed Conditions (See Reference B: River Processes and Morphology, R.D. Hey)	X
Stream Recovery from Channelization (or Headcutting) (See Reference C: Stream Corridor Restoration Manual)	
Channel Incision Adjustments (See Reference D: Oregon Fish and Wildlife Office)	
Stream Adjustments to In-Stream Modifications (culverts, weirs, bank stabilization projects, vegetation removal, etc.) (See Reference E: Common Channel Destabilizing Practice, Primer on Stream Protection, San Francisco Regional Water Quality Control Board)	

D. Existing Hydrology, Channel Geometry and Hydraulic Conditions

(See Reference F: Regional Curves, Channel Shapes)
(See Reference G: Regional Curves, Bankfull Discharges)
(See Reference H: Computing Flood Frequency)

Drainage Area to Project Location =	8.25	square miles
Mean Annual Precipitation =	5.06	inches per year
Channel Forming Discharge =	na	cubic feet per second
Mean Bankfull Depth for Relevant Stream Types =	varies	feet
Bankfull Channel Width for Relevant Stream Types =	varies	feet
Discharge for the 2-Year Recurrence Interval, Q_2=	680	cubic feet per second
Discharge for the 5-Year Recurrence Interval, Q_5=	1120	cubic feet per second
Discharge for the 10-Year Recurrence Interval, Q_{10} =	1650	cubic feet per second
Discharge for the 50-Year Recurrence Interval, Q_{50} =	1500	cubic feet per second
Discharge for the 100-Year Recurrence Interval, Q_{100} =	3480	cubic feet per second
Flood Elevation Estimates =	varies	feet
Estimated Area of Watershed Impervious/Percent Basin Developed = (Specify in square miles or percent of watershed)	7	percent

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

I. Watershed and Reach Influences (continued)

D. Existing Hydrology, Channel Geometry and Hydraulic Conditions (continued)

Methods Used to Estimate Above Values (Indicate All that Apply)

Field Visual Estimation	
Field Estimation using Regional Curves	
Reference Reaches	
Surveyed Cross-Sections	
Stream Gage Data	
High Water Marks	
Dimensionless Rating Curves	
Computed Effective Discharges	
Regional Regression Analysis, Stormwater or Watershed Models	X
HEC-RAS or Other Hydraulic Models	X
Topographic Maps, Aerial Photography	X

II. Existing Channel Characteristics

A. Landscape Types (Indicate All that Apply with an "X")

(See Reference I: Channels, Floodplains and Terraces in Stream Corridor Restoration Manual for description of Unconfined, Confined by hillslopes with high terrace, and Incised with widening floodplain categories)

Combinations (below indicate all the apply with an "X")	
Unconfined	X
Confined by hillslopes with high terrace	
Incised with widening floodplain	
Alluvial Fan	X
Single Thread Alluvial	
Braided	
Arroyo	
Bedrock	
Meadow	
Tidal	
Other (Specify)	**concrete channel**

B. Dominant Streambed Materials (Indicate All that Apply with an "X")

Silt/clays	
Sand	X
Gravel	X
Cobbles	
Boulders	
Bedrock	X

C. Floodplain and Channel Conditions

Valley Slope	0-15	Percent
Channel Slope	1.0-2.5	Percent
Channel Sinuosity		
Historic Channel Type and Sinuosity		
Step Pool Spacing		feet

Note: Channel classification systems (Rosgen, Montgomery-Buffington, etc.) can be used to describe channel types.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

II. Existing Channel Characteristics (continued)

D. Vegetation Functions **(Indicate All that Apply with an "X")**

Vegetation Communities	
Pioneer Species (willow/cottonwood/alder/dogwood/ninebark)	X
Mixed Woodland (maple, bay, elderberry, buckeye)	
Mature-Climax Species (oak, redwood, sycamore)	
Channel Shade	X
Bank Stability, Sediment Transport and Deposition	
Live and Dead In-Stream Habitat Structure	
Wildlife Habitat	X
No Functions	
Federal and/or State Special Status Species (List and indicate designation - Federal Threated Species; Federal Endangered Species; State Threatened Species; State Endangered Species; State Rare Species; and California Native Plant Society Lists 1A, 1B, 2, 3, and/or 4 Species)	Potential habitat for *Vireo bellii pusillus* (FE, SE); *Empidonax traillii extimus* (FE, SE); and *Coccyzus americanus occidentalis* (FC, SE) within riparian habitat located near confluence with the Mojave River.

E. Fish Habitat

Are Native Fish Present? (Indicate Present/Not Present)	Not Present
Salmonid Stream (Indicate upstream, in reach and/or downstream)	
Barriers to Fish or Other Aquatic Species (Indicate with an"X")	
Instream Habitat Complexity or Lack of Complexity	Lack of Complexity
Federal and/or State Special Status Species (frogs, snakes, turtles, etc.) (List and indicate designation - Federal Threated Species; Federal Endangered Species; State Threatened; State Endangered; and State Species of Special Concern)	None

III. Future Conditions Proposed by Project

A. Project Design Objectives **(may include multiple objectives, such as flood damage reduction, habitat restoration, stream bank restoration, stormwater management, etc.)**

The project will:

provide flood protection to property adjacent to the wash and maintain, as much as possible, the integrity of the riparian habitat; sensitive wetland downstream; cultural and biological resources as well as maintain high water quality standards in accordance with the Lahontan Regional Water Quality Control Board Basin Plan.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

III. Future Conditions Proposed by Project (continued)

B. Ecological Restoration Objectives (Indicate All that Apply)

Instream Habitat	
Stream Corridor Native Riparian Restoration	
Invasive Plant Removal	
Sediment Reduction or Storage	X
Enhance Floodplain Functions	X
Increase Sediment Supply Available for Transport	
Water Temperature Modification	
Nutrient Uptake	
Other (Specify)	

C. Methods Used to Estimate Future Dynamic Equilibrium Conditions (Indicate All that Apply)

Historic Conditions	X
Reference Reaches (visual or surveyed cross-sections)	
Regional Hydraulic Geometry (regional curves on channel shape and drainage area)	
Stream Gage Data on 1.5 Reccurrence Interval Discharge, $Q_{1.5}$	
Flood Frequency Curves from Stream Gage Data	
Dimensionless Rating Curves to Determine Channel Forming Discharges	
Computed Effective Discharges to Determine Channel Forming Discharges	
Regional Regression Analysis, Stormwater or Watershed Models	X
HEC-RAS or Other Hydraulic Model	X
Sediment Transport Model	X
Other (Specify)	

IV. Describe How the Project Protects or Restores Floodplain

(Indicate All that Apply with an "X")

Existing Channel Cross-Section Protection	X
Remove Levees, Berms or Structures Encroaching on Floodplain	
Existing Levees or Berms Set Back	
Restore Floodplain Vegetation	
Native Vegetated Buffer Added to Landslide of Stream Corridor	
Floodplain Area Excavated to Bankfull Elevation	
Pond and Plug or Other Methods of Re-watering Floodplain	
Livestock Exclusion Fencing	
Stormwater Infiltration Systems (infiltration basins, rain gardens, vegetated swales, porous pavement, etc.)	X
Stormwater Detention Systems (extended detention basins, treatment wetlands, retention ponds, etc.)	
Other (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

V. Describe How the Project Protects or Restores Native Streamside Vegetation

A. Current Status of Riparian Vegetation

List all Plant Communities Currently at the Site You may use standard vegetation classification system from the latest edition of *A Manual of California Vegetation* by John Sawyer and Todd Keeler-Wolf. Available on-line at http://www.dfg.ca.gov/biogeodata/vegcamp/veg_publications_protocols.asp	Mojave riparian forest, desert saltbush scrub, and Mojave wash scrub.
Indicate Relative Diversity for Community Type	Medium
Estimate Age of Dominant Tree Species (if applicable)	70 years old
List any Special Vascular Plants, Bryophytes, and Lichens that potentially occur or are known to occur at the site see http://www.dfg.ca.gov/biogeodata/cnddb/plants_and_animals.a	Potenial habitat for: *Camissonia boothii* ssp. *boothii*, *Canbya candida*, *Cymopterus deserticola*, and *Mimulus mohavensis*.

B. Current Status of Invasive Plants at Project Site

(Indicate Not Present, Sparse, Dominant in Riparian Corridor, or Clogging Channel)

Sparse

List Species of Invasive Plants Present (see link to SF Regional Water Quality Control Board list below) http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stream_wetland/app1inclrefs.pdf

Salsola tragus, *Bromus diandrus,* and *Bromus madritensis.*

C. Non-native and Invasive Plant Control Methods **(Indicate All that Apply with an "X")**

Hand Tools	X
Mulch/Geotextile Fabric	
Controlled Burns	
Mowing	
Herbicides	
Managed Grazing (Goats, Cows, etc.)	
Mechanical	
Other (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

V. Describe How the Project Protects or Restores Native Streamside Vegetation (continued)

D. Revegetation Method (Indicate All that Apply with an "X")

Seed	
Hydroseed	
Plugs	
Container Stock/Bare Root	
Soil Bioengineering Systems (proceed to VII)	
Other (Specify)	**natural establishment**

Note: See Reference J: Native Riparian Plants of the San Francisco Bay Area for examples of appropriate species to

VI. Describe How the Project Protects and/or Restores the Stream Channel Slope

A. Existing Slope Retained

1 Percent

B. Proposed Restoration Channel Slope

0-55 Percent

C. Pool Riffle Stream

Informed by Historic Channel Sinuosity		
Informed by Reference Reach Sinuosity		
Proposed Channel Sinuosity		
Check on Design Slope = Valley Slope/Sinuosity	**#VALUE!**	Percent
Channel Lengthened (indicate increase in linear feet)		feet
Channel Shortened (indicate decrease in linear feet)		feet

(see Reference K: Meander and Slope Restoration, Primer on Stream Protection, San Francisco Bay Regional Water Quality Control Board)

D. Step-Pool Stream

Step Pools Design Slope		Percent
Reference Reaches		

(See Reference L: Chin, Papanicolaou equations or other)

Step Height		feet
Channel Slope		Percent
Length Between Steps		feet

E. Other Stream Types

Braided System	
Alluvial Fan	**X**

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

VII. Describe How the Project Restores Stream Banks

A. Fencing and Vegetated Buffers

Livestock Exclusions Fencing	
New Livestock Water Supplies	
Riparian Buffers	
Runoff and Drainage Improvements	X
Stormwater Treatment Landscaping (treatment wetlands, vegetated swales, infiltration galleries , etc.)	X
Other (Specify)	

B. Soil Bioengineering Systems and Permissible Shear Stress/Permissible Velocities

(See Reference M: Permissible Shear Stress for Soil Bioengineering, U.S. Army Corps of Engineers, and National Engineering Handbook, Natural Resources Conservation Service)

Shear Stress Calculation **(Enter Data to Estimate Shear Stress at Site)**

Mean Channel Depth (Hydraulic Radius) =	2.5 (1.5)	feet
Stream Slope (Friction Slope) =	.001-.015	
Specific Weight of Water =	62.4	pounds per square foot
Shear Stress Acting on Channel =	1.5	pounds per square foot

Bioengineering Alternatives **(Indicate All that Apply with an "X")**

Stakes/Cuttings	
Poles	
Posts	
Live Facines	
Brush Layering	
Brush Matting	
Grass	
Tree Plantings	
Geotextile Fabric	
Others (Specify)	

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

VIII. Describe How the Project Protects and/or Restores Aquatic Habitat

A. Habitat Enhancement for Native Wildlife (Special Status Species)

List Habitat Functions Affected or Restored for Each

Invertebrate Habitat	None.
Salmonid Habitat	Not applicable; salmonid habitat is not present within the project area.
Other Native Fish Habitat	Not applicable; native fish habitat is not present within the project area.
Reptile/Amphibian Habitat	None.
Bird Habitat	None.
Mammal Habitat	None.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

VIII. Describe How the Project Protects and/or Restores Aquatic Habitat (continued)

B. Proposed Exotic Wildlife Controls (Invasive Species)

Invertebrates	None.
Fish	None.
Reptiles/Amphibians	*Rana catesbeiana* will be managed.
Birds	The Flood Control District will continue to remove *Molothrus ater* from the Mojave River from the Mojave Narrows Regional Park to the VVWRA.
Mammals	None.

Rapid Permit Checklist - Stream Channels and Floodplains (San Francisco Regional Water Quality Control Board)

IX. Project Summary

A. Existing Conditions

Provide cross-sections, profiles and plan views of project reaches **X**

B. Proposed Project Conditions **(Indicate All that Apply with an "X")**

Provide cross-sections, profiles and plan views of proposed project **X**

C. Briefly describe how project will protect or enhance existing ecological resources and respond to the causes of channel instabilities and/or flood damages

Concept 3 represents a proposed natural bottom channel with boulder (riprap) side slopes and stabilizers. Channel concept plans propose use of natural material that may allow for native vegetation to naturally occur, or will allow for the planting of native vegetation, which will benefit plant and wildlife species within the region.

Prepared by: Rivertech/URS, consultants to SBFCD Date: 4/29/2011

Note: Projects involving existing or potential future fish habitat should also use the Rapid Permit Checklist for Fish Habitat. Projects affecting other wetland environments, such as marshes, ponds, seasonal wetlands, etc., should use the Rapid Permit Checklist for Wetlands.

H. Biological Technical Report

BIOLOGICAL TECHNICAL REPORT
DESERT KNOLLS WASH FLOOD CHANNEL IMPROVEMENT PROJECT

March 2011

Prepared by:

URS

DRAFT

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Appendix A – Photo Log

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1.0 Introduction

This report documents the findings of an evaluation of biological resources[1] conducted by URS Corporation (URS) for the proposed Desert Knolls Wash Flood Channel Improvement Project (hereafter referred to as the Project). The Project includes improvements to the existing Desert Knolls Wash (Wash) (i.e., construction of energy dissipation structures and so forth) between the confluence of the Wash and the Mojave River's upstream existing concrete-lined channel (Fig. 1). For the purposes of this report, the "study area" includes the Project's proposed ground disturbance footprint (Project footprint) and a 500-ft buffer – to the maximum extent practical[2]. The ground disturbance footprint is limited to the Wash from Apple Valley Road east to Toa Road, and Apple Valley Road west to the Mojave River - a distance of roughly 3 miles.

The Project is located in the City of Apple Valley, San Bernardino County, California (Fig. 1). The study area is bordered by California Highway 18 to the north, the Mojave River to the west, and Toa Road to the east. The Project is within the U.S. Geologic Service (USGS) Victorville 7.5-Minute Series Quadrangle Map (1978) - Township 5 North, Range 4 West, Sections 10, 11, and 12 at an approximate elevation of 2,740 ft to 2,900 ft above mean sea level (Fig. 2). The intended use of this document is to disclose and evaluate habitat conditions and determine the potential for occurrence of common and special-status species[3], their habitats[4], and special aquatic resource areas[5] within study area limits.

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1 For the purposes of this analysis, "biological resources" refers to the plants, wildlife, and habitats that occur, or have the potential to occur, within the Project's study area.

2 Where 100% pedestrian coverage of the study area was not possible (e.g., fenced areas where access to private property or other physical barriers [topographic relief, vegetative cover, health and safety concerns, etc.] to limited access; field observations were made by URS from the nearest appropriate vantage points via public rights-of-way with binoculars and/or via aerial photographic interpretation.

3 For the purposes of this analysis, "special-status species" refers to any species that has been afforded special protection by federal, state, or local resource agencies (e.g., U.S. Fish and Wildlife Service, California Department of Fish and Game) or resource conservation organizations (e.g., California Native Plant Society). The term "special-status species" excludes those avian species solely identified under Section 10 of the Migratory Bird Treaty Act (MBTA) for federal protection. Nonetheless, MBTA Section 10 protected species are afforded avoidance and minimization measures per state and federal requirements.

4 A "habitat" is defined as the place, or type of locale where a plant or animal naturally or normally lives and grows.

5 For the purposes of this analysis, "special aquatic resource areas" are defined as potential: United States Army Corps of Engineers (USACE) jurisdiction pursuant to Section 404 of the Clean Water Act (CWA); Regional Water Quality Control Board (RWQCB) legal authority in accordance with Section 401 of the CWA and as defined within Section 13050(e) (et seq.) of the California Water Code (CWC) via the Porter-Cologne Water Quality Control Act (Porter-Cologne); and California Department of Fish and Game (CDFG) jurisdiction pursuant to Section 1600 (et seq.) of the California Fish and Game Code (CFG Code).

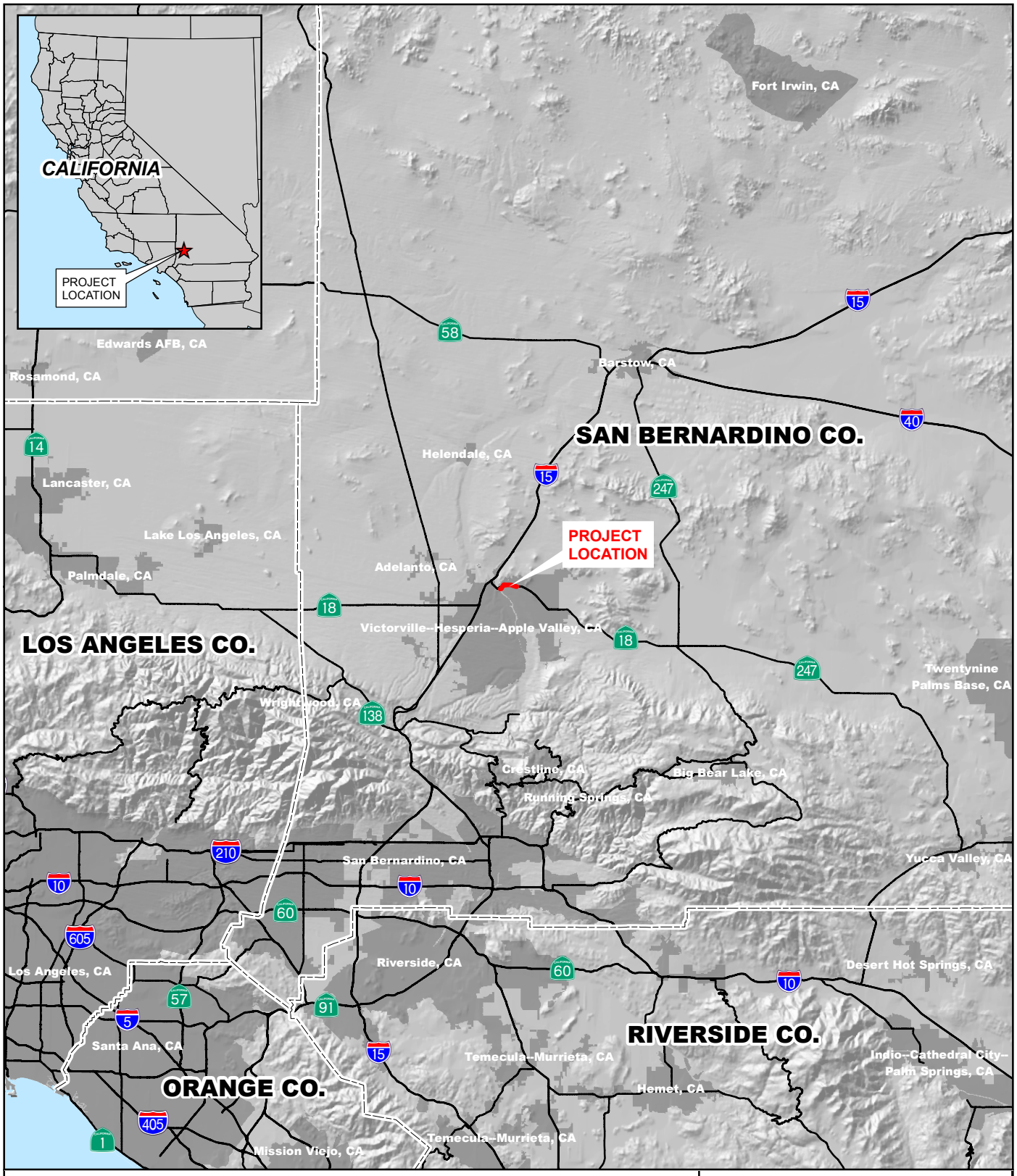


FIGURE 1

REGIONAL LOCATION

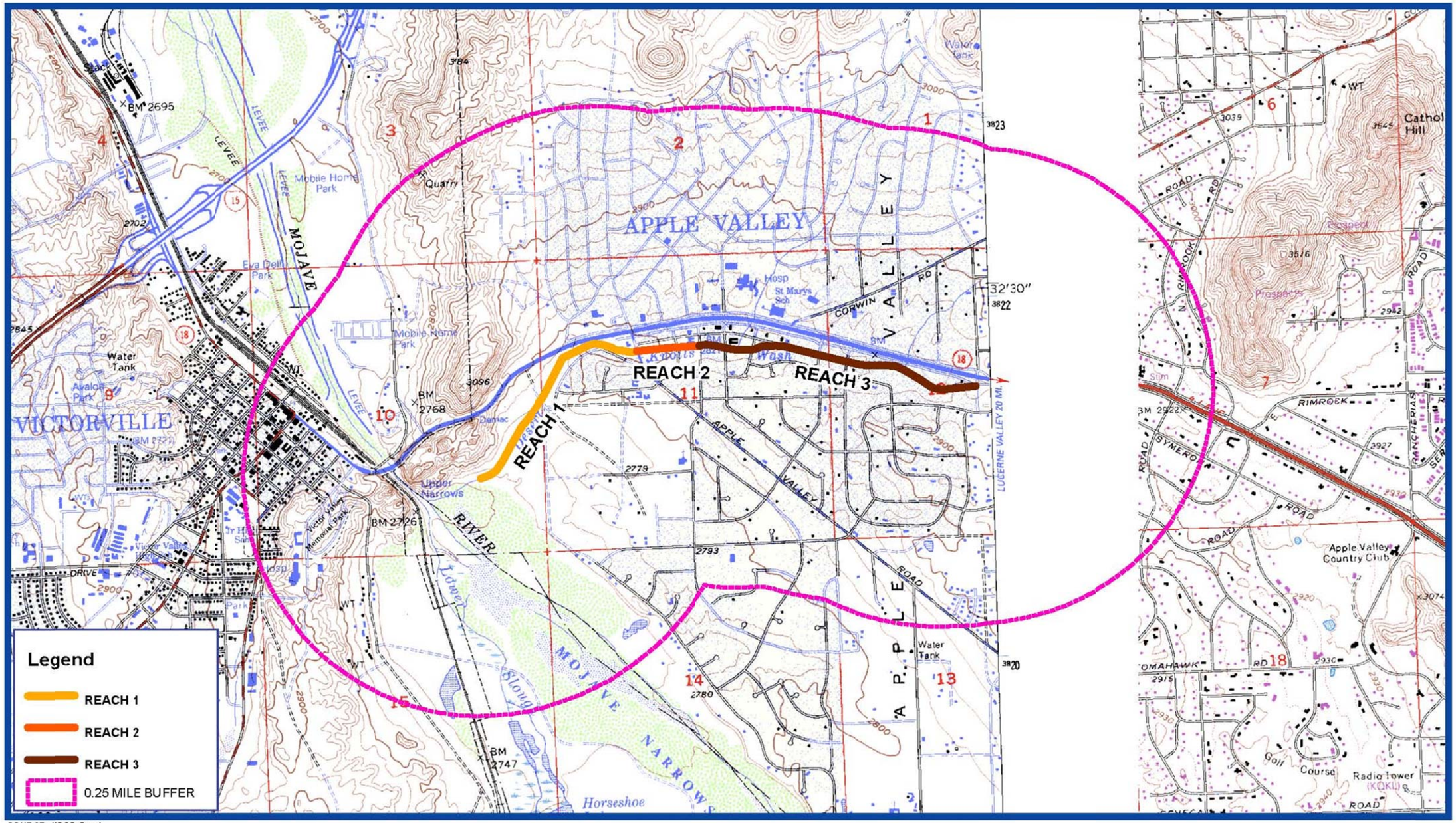
DESERT KNOLLS WASH FLOOD CONTROL IMPROVEMENT PROJECT

Project No.: 38001579

Date: August 2010

URS

Figure 2 – USGS Quadrangle Map



SOURCE: USGS Quad

2.0 Methods

Prior to beginning the field surveys in July 2010, available information was reviewed from resource management plans and other relevant documents to determine locations and types of biological resources that have the potential to exist within and adjacent to the study area (USFWS 2010a and 2010b, County of San Bernardino Department of Public Works 2008, and EREMICO Biological Services 2008). The California Department of Fish and Game's (CDFG) Natural Diversity Database (CDFG 2010) and California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants (CNPS 2010) file data were also queried for records of occurrence of special-status species and habitats within the Victorville USGS 7.5-minute Quadrangle Map.

URS biologists conducted a field survey to assess general and dominant vegetation community types, community sizes, habitat types, and species present within communities. Community type descriptions were based on observed dominant vegetation composition and density. Vegetation classifications of plant communities in the study area were derived from the criteria and definitions of Holland (1986) and Sawyer and Keeler-Wolf (1995). Plants were identified to the lowest taxonomic level sufficient to determine whether the plant species observed were non-native, native, or special-status. Plants of uncertain identity were subsequently identified from taxonomic keys (Hickman 1993). Scientific and common species names were recorded according to Hickman (1993). The presence of a wildlife species was based on direct observation, wildlife sign (e.g., tracks, burrows, nests, scat, etc.), or vocalization. Field data compiled for wildlife included the species' scientific name, common name, and evidence of sign when no direct observations were made. Wildlife of uncertain identity was documented and subsequently identified from specialized field guides and related literature (Burt and Grossenheider 1980, Halfpenny 2000, Sibley 2000, Elbroch 2003, and Stebbins 2003).

The study area was also assessed for its potential to support special-status species based on habitat suitability comparisons with reported occupied habitats. The following definitions were utilized to determine the need for subsequent surveys and to assess Project-related effects to special-status species:

Absent: Species distribution is restricted by substantive habitat requirements, which do not occur within the study area and no further survey / study is warranted to determine likely presence or absence of this species.

Low: Species distribution is restricted by substantive habitat requirements, which are negligible within the study area and no further survey / study is needed to determine likely presence or absence of this species.

Moderate: Species distribution is restricted by substantive habitat requirements, which marginally occur within the study area, and further survey / study may be necessary to determine likely presence or absence of species and to assess Project-related effects.

High: Species distribution is restricted by substantive habitat requirements, which occur within the study area, and further survey / study is necessary to determine likely presence or absence of species and to assess Project-related effects.

Present: Species or species sign were observed to be present in the study area.

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The USGS 7.5 minute Victorville Topographic Quadrangle Map (USGS 1978), National Wetlands Inventory (NWI 2009), and recent aerial photography (Digital Globe 2009) were also examined to determine the locations of "likely" special aquatic resource areas within study area boundaries. Additionally, those portions of the study area suspected of containing special aquatic resources (e.g., Waters of the United States, wetlands, Waters of the State, or sensitive riparian areas) were assessed by visual observation in the field. Likely special aquatic resource areas were evaluated by determining the presence of definable channels and/or hydrophytic vegetation, riparian habitat, and hydrologic regime[6] within the study area.

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[6] This evaluation was not intended to fulfill the substantive provisions set forth in the 1987 USACE Wetland Delineation Manual (EL 1987); Wakeley et al. (2006) Interim regional supplement to the USACE Wetland Delineation Manual: Arid West Region direction on delineating arid streams; the USACE and Environmental Protection Agency's (EPA) June 2007 issued Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in Rapanos v. United States & Carabell v. United States guidance document; or those analysis tools detailed in A Field Guide to Lake and Streambed Alteration Agreements Sections 1600-1607 (ESD 1994).

3.0 Results

URS biologists conducted surveys of the study area in July 2010. Weather conditions during the surveys included clear skies, temperatures ranging from 66-90 ^{o}F and winds from 0 to 3 mph. Four vegetation community / habitat types were observed within the study area: Mojave riparian forest, desert saltbush scrub, Mojave wash scrub, and developed (Fig. 3). Each community / habitat type is discussed further below. Representative photos from the study area are provided in Appendix A.

Mojave Riparian Forest

Mojave riparian forest is relatively open, broadleaved, winter deciduous riparian forest dominated by Fremont's cottonwood (*Populus fremontii*) and several species of willow trees (Holland 1986). The confluence of the Wash and Mojave River at the western edge of the study area was dominated by mixed stands of Goodding willow (*Salix gooddingii*) and Fremont's cottonwood, providing an overstory; while narrow leaf willow (*Salix exigua*), arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), and mulefat (*Baccharis salicifolia*) provided most of the understory structure within the Project area. Immediately surrounding the western end of Project area near the confluence with the Mojave River, marsh vegetation often makes up the understory of the Mojave riparian forest, containing patches of alkali bulrush (*Scirpus* spp.) and cattail (*Typha latifolia*).

Desert Saltbush Scrub

Within the study area, desert saltbush scrub includes low growing, microphyllous shrubs with some interspersed succulent species. Bare ground exists between widely spaced shrubs as well (Holland 1986). Dominate species observed within the study area include four-wing saltbush (*Atriplex canescens*), allscale (*Atriplex polycarpa*), and cheesebush (*Hymenoclea salsola*). Other species observed within the study area include creosote (*Larrea tridentata*), Joshua tree (*Yucca brevifolia*), and burrobush (*Ambrosia dumosa*).

Mojave Wash Scrub

Mojave wash scrub within the study area includes low, shrubby, and scattered microphyllous trees (Holland 1986). Dominate species within the study area include desert willow (*Chilopsis lineari*), rubber rabbitbrush (*Chrysothamnus nauseosus*), elm (*Ulmus pumila*), allscale, and cheesebush.

Developed

Developed / urban lands within the study area include roadways, parking lots, vacant lots, residences and other private/public infrastructure. Species composition in urban habitats within the study area varied with planting design and locale. The preponderance of urban vegetation observed within the study area was relatively static in species composition, because of anthropogenic influences.

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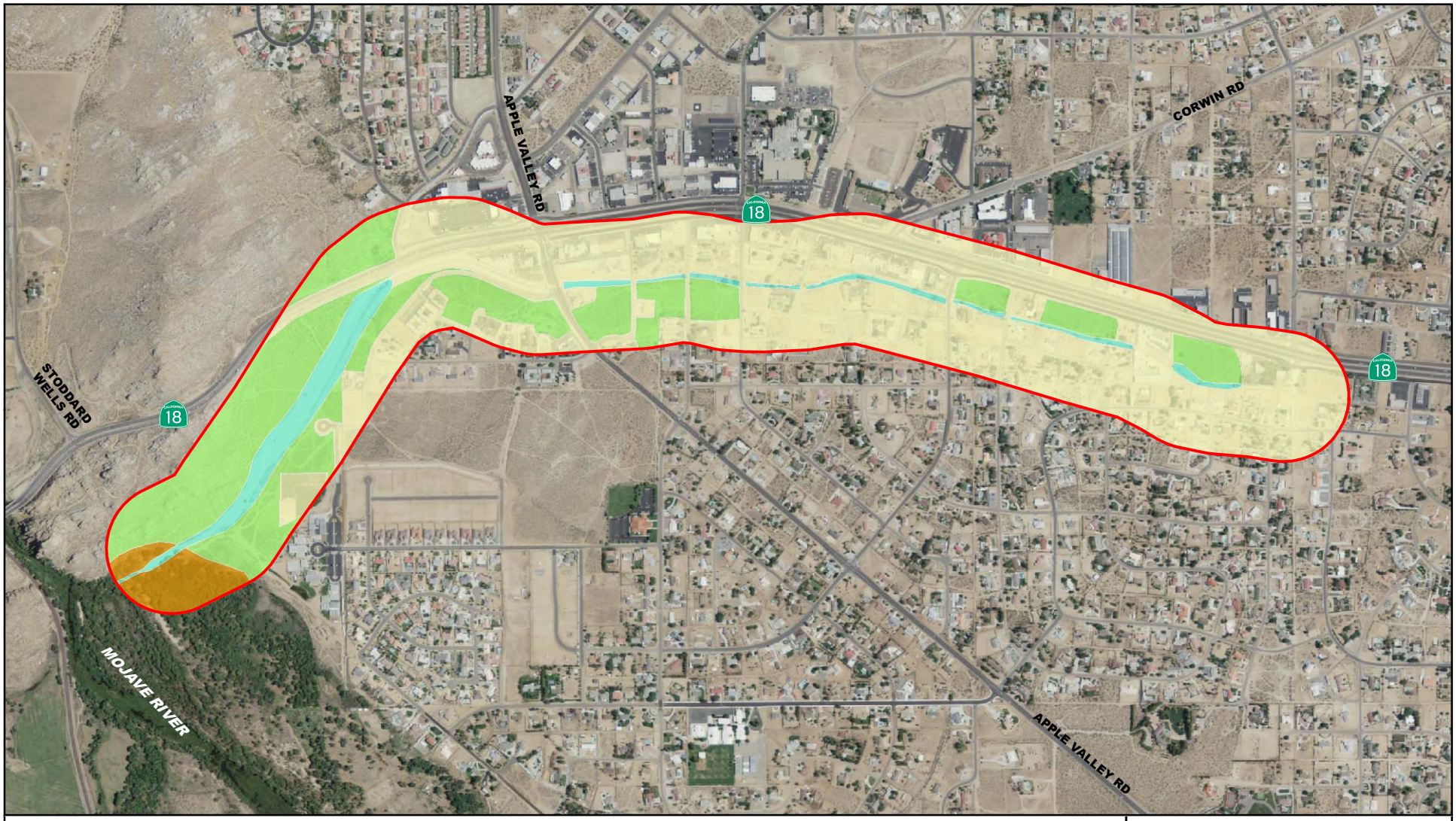

Legend

- Study Area
- Desert Saltbush Scrub
- Developed
- Mojave Riparian Forest
- Mojave Wash Scrub

N

0 600 1,200

Feet

FIGURE 3

VEGETATION COMMUNITIES

DESERT KNOLLS WASH FLOOD CONTROL IMPROVEMENT PROJECT

Project No.: 38001579

Date: August 2010

URS

Plant and wildlife species observed within the study area are listed in Tables 1 and 2 below.

Table 1. Plant Species Observed within the Study Area	
GYMNOSPERMS	
EPHEDRACEAE	EPHEDRA FAMILY
Ephedra californica	Desert tea
Ephedra nevadensis	Mormon tea
ANGIOSPERMS (DICOTYLEDONS)	
ASTERACEAE	SUNFLOWER FAMILY
Ambrosia dumosa	Burro bush
Baccharis salicifolia	Mulefat
Conyza bonariensis	Flax-leaved horseweed
Chrysothamnus nauseosus	Rubber rabbitbrush
Hymenoclea salsola	Cheesebush
*Lactuca serriola**	Prickly lettuce
Lessingia lemmonii	Vinegar-weed
*Sonchus oleraceus**	Common sow thistle
Stephanomeria pauciflora var. *pauciflora*	Wire lettuce
Tetradymia axillaris var. *longispina*	Cotton-thorn
Xanthium strumarium	Cocklebur
BIGNONIACEAE	BIGNONIA FAMILY
Chilopsis linearis	Desert willow
BRASSICACEAE	MUSTARD FAMILY
*Brassica rapa**	Field mustard
*Sisymbrium altissimum**	Tumble mustard
CACTACEAE	CACTUS FAMILY
Opuntia basilaris ssp. *basilaris*	Beavertail cactus
Opuntia echinocarpa	Golden cholla
Opuntia ramosissima	Pencil cholla
CHENOPODIACEAE	GOOSEFOOT FAMILY
Atriplex canescens	Four-wing saltbush
Atriplex polycarpa	Allscale
*Salsola tragus**	Tumbleweed
CUCURBITACEAE	GOURD FAMILY
Cucurbita palmata	Coyote melon
EUPHORBIACEAE	SPURGE FAMILY
Chamaesyce albomarginata	Rattlesnake weed
Stillingia linearifolia	Narrow-leaved stillingia
FABACEAE	LEGUME FAMILY
Prosopis glandulosa var. *torreyana*	Mesquite
GERANIACEAE	GERANIUM FAMILY
*Erodium cicutarium**	Red-stemmed filaree
HYDROPHYLLACEAE	WATERLEAF FAMILY
Heliotropium curassavicum	Wild heliotrope
LAMIACEAE	PEA FAMILY
Salazaria mexicana	Bladder sage
POLEMONIACEAE	PHLOX FAMILY

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Table 1. Plant Species Observed within the Study Area	
Eriastrum eremicum	Desert woolly star
POLYGONACEAE	BUCKWHEAT FAMILY
Eriogonum deflexum	Skeleton weed
Eriogonum fasciculatum	California buckwheat
Eriogonum gracile	Slender buckwheat
Eriogonum inflatum	Desert trumpet
Eriogonum plumatella	Wild buckwheat
Eriogonum reniforme	Buckwheat
SALICACEAE	WILLOW FAMILY
Populus fremontii	Fremont's cottonwood
Salix exigua	Sandbar willow
Salix laevigata	Red willow
Salix goodingii	Goodding willow
Salix lasiolepis	Arroyo willow
SOLANACEAE	NIGHTSHADE FAMILY
Datura wrightii	Jimson weed
Lycium sp.	Wolfberry
Nicotiana sp.	Tobacco bush
ULMACEAE	ELM FAMILY
*Ulmus pumila**	Siberian elm
ZYGOPHYLLACEAE	CALTROP FAMILY
Larrea tridentata	Creosote bush
ANGIOSPERMS (MONOCOTYLEDONS)	
AGAVACEAE	AGAVE FAMILY
Yucca brevifolia	Joshua tree
Yucca schidigera	Mohave yucca
POACEAE	GRASS FAMILY
*Bromus diandrus**	Ripgut grass
*Bromus madritensis rubens**	Foxtail chess
*Bromus tectorum**	Cheat grass
Polypogon sp.*	Beard grass
*denotes non-native species	

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Table 2. Wildlife Species Observed within the Study Area	
CLASS INSECTA	INSECTS
Libellula saturata	Red skimmer dragonfly
Aeshna sp.	Blue darner
CLASS REPTILIA	REPTILES
Aspidoscelis tigris	Western whiptail
Sceloporus occidentalis	Western fence lizard
Sceloporus orcutti	Granite spiny lizard
Sauromalus obesus	Chuckwalla
Uta stansburiana	Common side-blotched lizard
CLASS AVES	BIRDS
ODONTOPHORIDAE	NEW WORLD QUAIL
Callipepla californica	California quail
COLUMBIDAE	PIGEONS and DOVES
Zenaida macroura	Mourning dove
FALCONIDAE	FALCONS and CARACARAS
Falco sparverius	American kestrel
TROCHILIDAE	HUMMINGBIRDS
Calypte anna	Anna's hummingbird
PICIDAE	WOODPECKERS
Picoides nuttallii	Nuttall's woodpecker
Picoides pubescens	Downy woodpecker
Colaptes auratus cafer	Northern flicker
TYRANNIDAE	TYRANT FLYCATCHERS
Sayornis nigricans	Black phoebe
Myiarchus cinerascens	Ash-throated flycatcher
CORVIDAE	JAYS and CROWS
Corvus brachyrhynchos	American crow
Corvus corax	Common raven
REMIZIDAE	VERDIN
Auriparus flaviceps	Verdin
AEGITHALIDAE	BUSHTITS
Psaltriparus minimus	Bushtit
TROGLODYTIDAE	WRENS
Campylorhynchus brunneicapillus	Cactus wren
Thryomanes bewickii	Bewick's wren
STURNIDAE	STARLINGS
Sturnus vulgaris	European starling
PARULIDAE	WOOD WARBLERS
Dendroica petechia	Yellow warbler
EMBERIZIDAE	AMERICAN SPARROWS
Amphispiza bilineata	Black-throated sparrow
Chondestes grammacus	Lark sparrow
Melospiza melodia	Song sparrow
FRINGILLIDAE	FINCHES
Carpodacus mexicanus	House finch

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Table 2. Wildlife Species Observed within the Study Area	
PASSERIDAE	SPARROWS AND RELATIVES
Passer domesticus	House sparrow
CLASS MAMMALIA	MAMMALS
Ammospermophilus leucurus	White-tailed antelope squirrel
Canis latrans	Coyote (sign)
Dipodomys deserti	Desert kangaroo rat (sign)
Otospermophilus beecheyi	California ground squirrel
Sylvilagus audubonii	Desert cottontail

Special-Status Plants

Six special-status plant species are reported to occur within the USGS Victorville Quadrangle Map that includes the study area (Table 3). Two of the six special-status plant species were determined to have a low potential for occurrence designation applied to them, and no further survey / study is obligatory to determine likely presence or absence of this species. The remaining four special-status plants were determined to have a moderate potential for occurrence designation applied to them, and further evaluation would be necessary to assess Project-related effects to these species.

The four species with a moderate potential for occurrence within the study area include:

- Booth's evening-primrose (*Camissonia boothii* ssp. *boothii*);
- White pygmy poppy (*Canbya candida*);
- Desert cymopterus (*Cymopterus deserticola*); and
- Mojave monkey flower (*Mimulus mohavensis*).

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Table 3. Special-Status Plant Species Potential for Occurrence within the Study Area				
Scientific/Common Name	Habitat and Distribution	Flowering Season	Status	Potential for Occurrence
Camissonia boothii ssp. *boothii* Booth's evening primrose	Annual herb. Occurs in open Joshua Tree Woodland and Pinyon-Juniper Woodland habitats. Occurs at elevations between 2,925 and 7,800 ft.	Mar-May	Fed: None CA: None CNPS 2.3	Moderate
Canyba candida White pygmy-poppy	Annual herb. Occurs in sandy flats, in Joshua Tree Woodland and Mojave Desert scrub in the Western Mojave Desert at elevations between 1,950 and 4,745 ft.	Mar-June	Fed: None CA: None CNPS 4.2	Moderate
Cymopterus deserticola Desert cymopterus	Annual herb. Found in dry sandy areas in Joshua Tree Woodland and Mojave Creosote Bush Scrub. Elevation range from 1,950 to 4,875 ft.	Mar-May	Fed: None CA: None CNPS: 1B.2	Moderate
Mimulus mohavensis Mojave monkey flower	Occurs in gravelly wash banks in Joshua Tree Woodland and Mojave Creosote Bush Scrub. Elevation ranges from 1,950 to 3,900 ft.	April-June	Fed: None CA: None CNPS: 1B.2	Moderate
Scutellaria bolanderi ssp. *austromontana* Southern mountain skullcap	Perennial herb. Found in Chaparral, Foothill Woodland, Yellow Pine Forest, and wetland-riparian. Usually occurs in wetlands, but occasionally found in non wetlands. Elevation ranges between 0 and 4000 ft.	April-Aug	Fed: None CA: None CNPS: 1B.2	Low
Symphyotrichum defoliatum San Bernardino aster	Perennial herb. Prefers dry open grasslands and meadows, often near springs. Found at elevations between 7 and 6693 ft.	Aug-Nov	Fed: None CA: None CNPS: 1B.2	Low
Federal Designations: (Federal Endangered Species Act, USFWS): END: Federal-listed, endangered. THR: Federal-listed, threatened.		State Designations: (California Endangered Species Act, CDFG) END: State-listed, endangered. THR: State-listed, threatened.		
CNPS Lists: List 1B: Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction is low at this time List2: Distributed in a limited number of occurrences, occasionally more if each occurrence is small List :3 Distributed in one to several highly restricted occurrences, or present in such small numbers that it is seldom reported		CNPS Threat Code .1- Seriously endangered in California .2- Fairly endangered in California .3- Not very endangered in California		

Special-Status Wildlife

Eighteen special-status wildlife species are reported to occur within the USGS Victorville Quadrangle Map that includes the study area (Table 3). Four of the 16 special-status wildlife species had a low potential for occurrence designation applied to them and therefore no further survey / study is obligatory to determine likely presence or absence of this species. The remaining 14 special-status wildlife were determined to have a moderate or high potential for occurrence, and further evaluation would be necessary to assess Project-related effects to these species.

The 14 species with a moderate or high potential for occurrence within the study area include:

- San Emigdio blue butterfly (*Plebulina emigdionis*);

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- Victorville shoulderband (*Helminthoglypta mohaveana*);
- Coast horned lizard (*Phrynosoma blainvillii*);
- Desert tortoise (*Gopherus agassizii*);
- Cooper's hawk (*Accipiter cooperii*);
- Burrowing owl (*Athene cunicularia);*
- Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)*;*
- Southwestern willow flycatcher (*Empidonax trailii extimus*);
- Yellow-breasted chat (*Icteria virens*)*;*
- Summer tanager (*Piranga rubra*);
- San Joaquin Le Conte's thrasher (*Toxostoma lecontei macmillanorum*);
- Least Bell's vireo (*Vireo bellii pusillus*);
- Mojave river vole (*Microtus californicus mohavensis*); and
- Mohave ground squirrel (*Xerospermophilus mohavensis*).

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Table 4. Special-Status Wildlife Species Potential for Occurrence within the Study Area			
Scientific Name/Common Name	Habitat Description	Status	Potential for Occurrence
CLASS INSECTA	INSECTS		
Plebulina emigdionis San Emigdio blue butterfly	Found in Shadscale scrub in desert canyons and near washes through the Mojave Desert, San Joaquin Valley, Bouquet and Mint canyons, and Los Angeles County. Eggs laid on Four-wing saltbush leaves, three flights from April-September.	Fed: None CA: None	Moderate
CLASS GASTROPODA	SNAILS		
Helminthoglypta mohaveana Victorville shoulderband	Found in granite rocky outcrops, base of rocky cliffs along the Mojave River.	Fed: None CA: None	Moderate
CLASS REPTILIA	REPTILES		
Actinemys marmorata pallida Southwestern pond turtle	Inhabits permanent or nearly permanent bodies of water in many habitat types: below 6,000 ft elevation.	Fed: None CA: None CDFG: CSC	Low
Phrynosoma blainvillii Coast horned lizard	Inhabits open areas of sandy soil and low vegetation in valleys, foothills, and semiarid mountains from sea level to 8,000 ft in elevation. Found in grasslands, coniferous forests, woodlands, and chaparral, with open areas and patches of loose soil. Often found in lowlands along sandy washes with scattered shrubs and along dirt roads. Frequently found near ant hills.	Fed: None CA: None CDFG: CSC	Moderate
Gopherus agassizii Desert tortoise	River washes, rocky hillsides, and flat desert having sandy or gravelly soil with creosote bush, burro bush, saltbush, Joshua tree, Mojave yucca, cacti, other shrubs, grasses, and wildflowers.	Fed: THR CA: THR	Moderate
CLASS AMPHIBIA	AMPHIBIANS		
Rana draytonii California red-legged frog	Found mainly near ponds in humid forests, woodlands, grasslands, and streamsides with plant cover. Most common in lowlands or foothills. Frequently found in woods adjacent to streams. Breeding habitat is in permanent or ephemeral water sources; lakes, ponds, reservoirs, slow streams, marshes, bogs, and swamps. From sea level to 5,000 ft.	Fed: THR CA: None CDFG: CSC	Low
CLASS AVES	BIRDS		
Accipiter cooperii Cooper's hawk	(Nesting) woodland, chiefly of open, interrupted or marginal type. Nest sites mainly in riparian growths of deciduous trees, as in canyon bottoms on river flood-plains; also, live oaks.	Fed: None CA: None	High
Athene cunicularia Burrowing owl	Open annual grasslands or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Dependent upon burrowing mammals (especially California ground squirrel) for	Fed: None CA: None CDFG: CSC	Moderate

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Table 4. Special-Status Wildlife Species Potential for Occurrence within the Study Area			
Scientific Name/Common Name	Habitat Description	Status	Potential for Occurrence
	burrows.		
Coccyzus americanus occidentalis Western yellow-billed cuckoo	Nests in riparian habitats consisting of willows and cottonwoods.	Fed: CAN CA: END	Moderate
Empidonax trailii extimus Southwestern willow flycatcher	Nests in riparian woodlands in southern California.	Fed: END CA: END	High
Icteria virens Yellow-breasted chat	Summer resident that inhabits riparian thickets of willow and other brushy tangles near watercourses. Nests in low, dense riparian, consisting of willow, blackberry, wild grapes; forages and nests within 10 ft of the ground.	Fed: None CA: None CDFG: CSC	High
Piranga rubra Summer tanager	Summer resident of desert riparian along lower Colorado River, and locally elsewhere in California deserts. Requires cottonwood-willow riparian for nesting and foraging: prefers older, dense stands along streams.	Fed: None CA: None CDFG: CSC	High
Toxostoma lecontei macmillanorum San Joaquin Le Conte's thrasher	Found in open desert scrub, alkali desert scrub, and desert succulent scrub.	Fed: None CA: None CDFG: CSC	Moderate
Vireo bellii pusillus Least Bell's vireo	Resides in low riparian areas close to water or dry river beds. Their nests are usually constructed in bushes or within the branches of willows, mulefat, and mesquite. They are usually found below an elevation of 2,000 ft.	Fed: END CA: END CDFG: CSC	High
CLASS MAMMALIA	MAMMALS		
Chaetodipus fallax pallidus Pallid San Diego pocket mouse	Prefers chaparral habitat but can also be found in open, sandy areas.	Fed: None CA: None CDFG: CSC	Low
Microtus californicus mohavensis Mojave river vole	Occupies moist habitats including meadows, freshwater marshes and irrigated pastures in the vicinity of the Mojave River between Victorville and Helendale. Constructs runways in grassy habitats by clipping vegetation, often leading to shallow burrows in friable soil. Also associated with ponds and irrigation canals along with the Mojave River proper.	Fed: None CA: None CDFG: CSC	Moderate
Xerospermophilus mohavensis Mohave ground squirrel	Inhabits the western Mojave Desert occupying Joshua tree woodlands, creosote scrub, saltbush scrub, and Mojave mixed woody scrub.	Fed: None CA: THR	Moderate
Lasiurus cinereus Hoary bat	Most abundant in the forests of the Pacific Northwest and arid deserts of the Southwest. Prefers diverse forest habitats with a mixture of forest and small open areas that provide edges.	Fed: None CA: None CDFG: CSC	Low
Status Codes			

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Table 4. Special-Status Wildlife Species Potential for Occurrence within the Study Area			
Scientific Name/Common Name	Habitat Description	Status	Potential for Occurrence
Federal Designations: (Federal Endangered Species Act, USFWS):			
END:	Federal-listed, endangered.		
THR:	Federal-listed, threatened.		
State Designations: (California Endangered Species Act, CDFG)			
END:	State-listed, endangered.		
THR:	State-listed, threatened.		
State Designations: (CDFG Code)			
CSC	California Species of Special Concern		

Special Aquatic Resource Areas

This document presents our best effort at estimating the extent of special aquatic resource areas within the study area[6]; nonetheless, only the United States Army Corp of Engineers (USACE), California Department of Fish and Game (CDFG), and Regional Water Quality Control Board (RWQCB) can make a final determination of the boundaries of their jurisdictions. The Desert Knolls Wash Flood Channel and the Mojave River would likely qualify as CWA and CDFG jurisdictional features and are the largest drainage features within the study area. In addition, many smaller ephemeral washes and drainages serve as tributaries to the aforementioned aquatic features. Consequently, completion of a jurisdictional wetlands and waters determination on those lands likely subject to USACE, RWQCB, and CDFG jurisdiction, is warranted to determine Project implementation level affects to these and other features observed within the study area.

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[6] Formal wetlands and waters delineation was not performed by URS.

4.0 Conclusions

The analysis conducted by URS suggests that the study area supports habitats that could be utilized by numerous special-status plant and wildlife species. Accordingly, subsequent agency coordination and investigations may be needed to determine the Project's likely impacts on the following species:

- Booth's evening-primrose (*Camissonia boothii* ssp. *boothii*);
- White pygmy poppy (*Canbya candida*);
- Desert cymopterus (*Cymopterus deserticola*);
- Mojave monkey flower (*Mimulus mohavensis*);
- San Emigdio blue butterfly (*Plebulina emigdionis*);
- Victorville shoulderband (*Helminthoglypta mohaveana*);
- Coast horned lizard (*Phrynosoma blainvillii*);
- Desert tortoise (*Gopherus agassizii*);
- Cooper's hawk (*Accipiter cooperii*);
- Burrowing owl (*Athene cunicularia*);
- Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*);
- Southwestern willow flycatcher (*Empidonax trailii extimus*);
- Yellow-breasted chat (*Icteria virens);*
- Summer tanager (*Piranga rubra*);
- San Joaquin Le Conte's thrasher (*Toxostoma lecontei macmillanorum*);
- Least Bell's vireo (*Vireo bellii pusillus*);
- Mojave river vole (*Microtus californicus mohavensis*); and
- Mohave ground squirrel (*Xerospermophilus mohavensis*).

Furthermore, numerous special aquatic resource areas were identified within the study area. Consequently, completion of a jurisdictional determination on those lands likely subject to CWA, RWQCB, and CDFG jurisdiction is warranted to determine Project implementation level affects to these features.

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APPENDIX A PHOTOGRAPHIC LOG

	Photograph: 1 Photo Date: July 26, 2010 Direction: East
	Photograph: 2 Photo Date: July 26, 2010 Direction: East

	Photograph: 3 Photo Date: July 26, 2010 Direction: East
	Photograph: 4 Photo Date: July26, 2010 Direction: West

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	Photograph: 5 Photo Date: July 26, 2010 Direction: West
	Photograph: 6 Photo Date: July 26, 2010 Direction: East

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Photograph: 7
Photo Date: July 26, 2010
Direction: West

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I. Ecological Management Plan – Concept #1

Ecological Management Plan

For Desert Knolls Wash and Receiving Waters of the Mojave River

COUNTY OF SAN BERNARDINO

August 31, 2011

Concept #1 – Low Flow Side Channel

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #1 – Low Flow Side Channel)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
MUN (Municipal and Domestic Supply) and GWR (Groundwater)	The Mojave River is a dynamic, coarse sand perennial river system, most of which flows below the surface as groundwater. The alluvial aquifer of the Mojave River is the primary source of water for domestic supplies and irrigation in the western Mojave Desert. However, in the region known as the Upper Narrows, near the confluence of the Mojave River and Desert Knolls Wash a geomorphic constriction forces groundwater to the surface. Constant surface water within this portion of the riverbed allows for rapid and dense riparian and wetland vegetation growth. Water flow along the Mojave River, with the exception of storm flows, is very slow, shallow. Contributions of water by upstream uses such as the Mojave River Forks Dam, California Department of Fish and Game Fish Hatchery and Spring Valley Lake which has resulted in a denser, wetland and riparian habitat which occurs bank to bank within the area of the Mojave River and Desert Knolls Wash confluence. Cottonwood-willow forest dominates the confluence of Desert Knolls Wash and the Mojave River and uses more groundwater than the previous Goodding-willow *(Salix gooddingii),* dominated riparian area of the 1910s (Webb et al 2005). It is also known that invasive species can take up to three times the water as native vegetation. Invasive species removal efforts by the Lewis Center for Educational Research (LCER), the Mojave Weed Management Area (MWMA), Mojave Desert Resource Conservation District (RCD), National Resource Conservation Service (NCRS), County Flood Control District (FCD), and other organizations are ongoing. Invasive plant species have the potential to greatly impact ground water supplies, especially in arid environments. Desert Knolls wash consists of mostly soft sandy alluvial soils which convey flows to the Mojave River. During periods of high flow the bulk of the water is conveyed directly to the Mojave River with very little percolation however during low flows the porous sandy soils allow for ground water recharge.	The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel. The design diverts low flows for percolation while accommodating for high flows during storm events. Sediment loading at confluence will be greater due to concentrated flows. Irrigation is not available.	It is recognized that groundwater recharge occurs naturally and appropriate Best Management Practices (BMPs) shall be in place to maintain and if possible improve existing conditions. The FCD staff will ensure that final design plans, should this concept design alternative be selected, allow for groundwater recharge. The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel. This approach yields peak flows that are diverted from the flood channel to the low flow channel, which will increase the amount of runoff infiltration in this location.	Upon completion of the concept, FCD staff will coordinate with Lahontan Water Board planning staff to conduct water quality monitoring activities within the Desert Knolls Wash consistent with the California Surface Water Ambient Monitoring Program (SWAMP). The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.
AGR (Agricultural Supply) Objectives	In the Town of Apple Valley, there is a small portion of areas that are zoned for Residential Agriculture, in which hay is primarily produced. The City of Victorville has approximately 50 acres of designated agricultural land (primarily alfalfa, barley, and oats) located northeast of Highway 18.	It is not anticipated that the concept will impact any of the water sources that occur outside the concept area. Irrigation for crops and grazing are taken into consideration in the "production safe yield" figure calculated yearly by the Mojave Water Agency.	Avoidance and minimization measures are not required for the concept relative to agricultural water supply as the concept will not impact water sources used for irrigation for crops and grazing.	None required.

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #1 – Low Flow Side Channel)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
FRSH (Freshwater replenishment)	Desert Knolls wash consists of mostly soft sandy alluvial soils which convey flows to the Mojave River. During periods of high flow the bulk of the water is conveyed directly to the Mojave River with very little percolation however during low flows the porous sandy soils allow for ground water recharge and fresh water replenishment.	The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel. The design will also produce less sediment than existing conditions and further benefit fresh water replenishment in the low flow condition.	The low flow channel provides the opportunity for infiltration within the project. Additional design features, including the use of baffle blocks and other such mechanisms, will be identified during final design of the concept to reduce sediment and maximize fresh water replenishment.	Upon completion of the concept, FCD staff will coordinate with Lahontan Water Board planning staff to conduct water quality monitoring activities within the Desert Knolls Wash consistent with the California Surface Water Ambient Monitoring Program (SWAMP). The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.
WARM and COLD (Warm and Cold Freshwater Habitat)	Cold Freshwater Habitat is likely to occur in the headwaters of the Mojave River, however due to the natural conditions of the desert (climate, solar heating), the confluence of Desert Knolls Wash and the Mojave River would be considered warm freshwater habitat. Several plant communities are present at the confluence including riparian, wetland marsh, rocky outcrops and open water which have the potential to support a variety of wildlife species including but not limited to mammals, amphibians, birds, reptiles, invertebrates. In addition, low-flow surface water supports algae and herbaceous vegetation, which provides cover and food for water dependent micro- and macro organisms (Mojave River Floodplain Maintenance Plan 1997).	There are no consistent flows anticipated in this design concept; the low flow channel will maintain warm water flows. The main channel accommodates storm surge.	As this is an intermittent stream, COLD flows are not manageable nor are they currently maintained. The FCD will evaluate warm freshwater habitat and will allow for habitat enhancement where appropriate through natural revegetation, removal of nonnative vegetation (e.g. tamarisk, arrundo, Siberian elm) and monitoring. The low flow natural channel will be allowed to re-vegetate with native vegetation as feasible to ensure the continued functions and values for wildlife. Subsequent agency coordination and investigations will be done during the final design phase to determine the specific features which will provide the most benefit and reduce impacts within the natural channel.	Upon completion of the concept, FCD staff will conduct warm freshwater habitat monitoring activities to assess the status of such resources as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop an informal compensatory mitigation and/or monitoring plan to offset or compensate for impacts to natural resource areas to ensure the continued functions and values for wildlife and beneficial uses within the channel.
WILD (Wildlife Habitat)	The Desert Knolls Wash flows through two diverse habitat types; the upper Desert Knolls wash is dominated by desert saltbush scrub and Mojave wash scrub while the lower end of the wash flows through a natural wetland and Mojave riparian forest habitat into the Mojave River. A review of the California Natural Diversity Database (Victorville Quad 2010) reveals that the concept and the immediate surrounding area supports, or has the potential to support over 43 protected or endangered species/habitat as well as a diverse variety of non-status wildlife species.	The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel. The low flow channel may provide an area for which wildlife can continue to occupy and function. It is not anticipated that the low flow channel has sufficient water to maintain sufficient habitat.	The FCD will evaluate the area for wildlife habitat and conduct habitat enhancement through natural re-vegetation, removal of nonnative species and monitoring. On site nonnative removal (tamarisk, arundo, Siberian elm) will be done to enhance and restore native habitat. Additional design features, including the planting of native vegetation for wildlife, will be assessed and identified for the low flow natural channel during the final design phase. Subsequent agency coordination and investigations will be done during the final design phase to determine the specific features which will provide the most benefit and reduce impacts within the natural channel.	Upon completion of the concept, FCD staff will conduct wildlife habitat monitoring activities to assess the status of such resources as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop an informal compensatory mitigation and/or monitoring plan offset or compensate for impacts to natural resource areas to ensure the continued functions and values for wildlife and beneficial uses within the channel.
RARE (Rare, Threatened, or Endangered Species)	The Mojave River near Victorville is a center of endemism, being the sole locality for a number of state sensitive species. The habitat within the Desert Knolls Wash and Mojave River confluence has a high value due to the number of sensitive species it can support. There is potential for the following avian species to occur within the immediate surrounding area of the Mojave River and Desert Knolls Wash confluence: summer tanager (state species of special concern); yellow breasted chat (state species of special concern); Copper's hawk (state species of concern); least Bell's vireo (federally and state endangered); yellow billed cuckoo (federal candidate and state endangered); and southwestern willow flycatcher (state and federal endangered; federal critical habitat).	The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel. It is not anticipated that the low flow channel has sufficient water to maintain future habitat.	The FCD will evaluate the Mojave River vole population and conduct habitat enhancement through natural revegetation, removal of nonnative species and monitoring. The FCD will maintain, improve and increase suitable habitat for least Bell's vireo and southwestern willow flycatcher through habitat monitoring, re-vegetation, removal of nonnative vegetation, and annual bird surveys. In addition, the FCD will continue to remove brown-headed cowbirds (*Molothrus ater*), which brood parasite a number of nesting	Upon completion of the concept, FCD staff will conduct habitat monitoring activities to assess the status of such resources as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop an informal compensatory mitigation and/or monitoring plan to offset or compensate for impacts to natural resource areas to ensure the continued functions and values for wildlife and beneficial uses within the channel.

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #1 – Low Flow Side Channel)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
	Three pairs of southwestern willow flycatchers (*Empidonax traillii extimus*), were detected just downstream from the I-15 Bridge by Nuekirk (1995), however recent surveys conducted by San Bernardino County Flood Control District (2002-2009) along the Mojave River, have resulted in no observations. Within the Mojave River and Desert Knolls confluence, no southwestern willow flycatchers were detected in 2002 and 2009. Least Bell's vireo (*Vireo bellii pusillus*) has been detected within the Mojave River immediately adjacent to the concept (Romich, 2002). None were detected in a focused survey in 2009 (Romich and Sims). Surveys were conducted for the Mojave River vole (*Microtus californicus mohavensis*), a state listed species, in 2002 and 2004 downstream of the Narrows which resulted in a large number of individuals being trapped within the wetland habitat. The habitat located within the concept area directly northeast of the Desert Knolls Wash / Mojave River confluence and 500 feet immediately upstream contains heavily disturbed desert wash scrub that is moderately/marginally suitable for the federally threatened Mojave Ground squirrel, *Spermophilus mohavensis* (EREMICO, 2008). A focused desert tortoise survey (*Gopherus agassizii*) was performed within the concept area and no individuals or sign, or any other sensitive species, were observed (Biological Resource Specialists, 2008). There is also the potential for the arroyo toad (*Bufo californicus)* a federally threatened and state species of special concern) and southwestern pond turtle (*Actinemys marmorata)* a state species of special concern. More specifically, although suitable habitat exists within isolated locations throughout the Mojave River, surveys for the arroyo toad, a federal and state endangered species, found no presence immediately downstream of the Upper Narrows (Michael Brandman and Associates; 1999, 2000, and 2002). Victorville shoulderband snail (*Helminthoglypta mohaveana*) a state listed species, has been observed along the west bank of the Mojave River, downstream of the concept area (CNDDB, 2010). A disjunct population of the San Emigdio blue butterfly (*Plebulina emigdionis*) is known to exist at the edge of the Mojave River near Victorville.		birds, including the least Bell's vireo and southwestern willow flycatcher from the Mojave River from the Mojave Narrows Regional Park to the VVWRA . Lewis Education Center (LCER) will continue its nonnative vegetation eradication efforts.	
REC - 1 (Contact Water Recreation) Objectives	Recreational activities involving body contact with water where ingestion of water is reasonably possible including but not limited to swimming, wading and fishing are not present within Desert Knolls Wash.	The proposed concept will be consistent with existing conditions and contact water recreation will continue to be unavailable within the limits of the drainage area.	Avoidance and minimization measures related to impacts on contact water recreation are not required for this concept as this is not currently used or planned as a beneficial use for the Desert Knolls Wash concept.	None required.

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #1 – Low Flow Side Channel)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
REC-2 (Non-Contact Water Recreation) Objectives	Non-contact recreation including, but not limited to, birding, hiking, marine life study, and aesthetic enjoyment are available within the Desert Knolls and Mojave River confluence and the immediate surrounding area. Students and visitors to the LCER use the Mojave River for educational purposes. In addition, a designated horse trail that traverses the Mojave River within the concept area is used.	Opportunities for non-contact recreation, consistent with existing opportunities, will still be available under the proposed concept design and will be further addressed during the final design stage of the concept.	The FCD will, to the maximum extent practicable, provide design modifications during the final design stage of the concept to allow access for hiking and cross-country running. The FCD will also coordinate with enforcement personnel to further minimize illegal off-road vehicle use.	Upon completion of the concept, FCD staff will conduct periodic monitoring activities to assess non-contact recreation activities in the Desert Knolls Wash as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.
COMM (Commercial and Sports Fishing)	The California Department of Fish and Game stock fish within the lakes of the Mojave Narrows Regional Park, however no fish are stocked within the Mojave River. There are no opportunities for commercial or sports fishing along the Mojave River.	The proposed concept will be consistent with existing conditions and no opportunities for commercial or sports fishing will be available within the limits of the drainage area.	Avoidance and minimization measures related to impacts on commercial sports fishing activities are not required for this concept as this is not currently or planned as a beneficial use for the Desert Knolls Wash concept.	None required.
WQE (Water Quality Enhancement) Beneficial	The Mojave River is a dynamic water system. Sediment is naturally eroded in some areas, and deposited in others. Human activities have accelerated the rate and amount of erosion or deposition in both Desert Knolls Wash and the receiving waters of the Mojave. It has been estimated that sedimentation at the confluence of Desert Knolls Wash and the Mojave River has occurred at a rate of approximately 1 foot per year (Huffine 2009). In addition, not only does the Upper Narrows, which is located just downstream from the Desert Knolls Wash and Mojave River confluence, collect and slow sediment, a large wetland and riparian habitat also facilitates this process as well. Upstream of the concept site is a fish hatchery, as well as, a water treatment facility. Both of these operations have the potential to influence negatively the nutrient/chemical quality of the water. Abundant seed source and high groundwater in the riparian/wetland areas promotes rapid vegetation recovery from natural events, such as floods and erosion. The wetland vegetation within the Desert Knolls Wash and Mojave River confluence assists in erosion control, while the riparian vegetation retains and reduces surface waters, helping to distribute and slow the flows over the floodplain. The wetland vegetation within the Desert Knolls Wash and Mojave River confluence facilitates the removal of nitrogen and phosphorus from surface water, improving water quality by processing organic wastes, reducing suspended sediments, and removing or retaining inorganic nutrients.	The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel. This design is anticipated to divert low flows that will allow for greater percolation and groundwater recharge. The design will also produce less sediment than existing conditions and further benefit water quality in the region. Urban run-off low flows may have the higher concentrations of urban pollutants. The low flow channels assist in water quality enhancement by providing opportunity for infiltration before migration downstream.	The LCER will collaborate with FCD staff in fluvial sediment monitoring (observation and photos taken over time). To ensure protection of riparian and wetland habitat that occurs downstream of the concept, the FCD will reduce scour and sediment transport upstream that is adversely affecting the riparian wetland. Protection options will be assessed and identified during review and approval of project final design plans. To the maximum extent practicable, the FCD will incorporate into final plans natural enhancements for improvement of water quality through such devises as erosion control, bank stabilizers, siltation control, and maintenance to ensure channel integrity, and filtration and purification of urban runoff pollutants. These additional elements will vary as the flows change and the low flow channel matures.	Upon completion of the concept, FCD staff will conduct periodic monitoring activities to assess water quality in the Desert Knolls Wash as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.
FLD (Flood Peak Attenuation/Flood Water Storage)	The existing Desert Knolls Wash condition does not provide any flood peak attenuation or flood water storage.	The concept design allows for bypass flows from a concrete flood channel to an adjacent low flow natural channel. The low flow channel will provide opportunity for infiltration and allow for some diversion of peak event flows. Main channel is designed to meet 100 year event flows.	The low flow channel provides the opportunity for infiltration within the project.	Upon completion of the project, FCD staff will conduct periodic monitoring activities to assess flood water issues in the Desert Knolls Wash as a result of implemented design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #1 – Low Flow Side Channel)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
Cultural Resource	**Native American Cultural Resources –** There is a complex archaeological site (a prehistoric village) located near the confluence of the Mojave River and Desert Knolls Wash. This site/resource has been determined to appear to qualify as eligible to the National Register of Historic Places. The resources onsite have educational value in that the area can be studied and artifacts displayed to educate others on the rich history of the area. The archaeological site/source was identified and mapped during a Phase I Cultural Resource survey of Desert Knolls Wash. The resource will undergo Phase II Testing to determine the vertical and horizontal limits of the site, and a Phase III Mitigation plan will be developed and implemented as necessary.	Construction activities associated with the concept within Reach 1 may result in the disturbance of the identified archaeological site.	FCD will coordinate with the Lewis Center to house found artifacts at LCER for educational purposes. Native American consultation will be implemented throughout the concept. Monitors will be onsite during excavation and construction activities to minimize impacts to the archaeological resources present.	Approval documentation from Department of Public Works Environmental Management Division staff will be required prior commencement of construction activities. Documentation shall indicate that all required monitoring activities, including Native American consultation, has occurred as required. Upon completion of the project, a final report will be prepared by Department of Public Works Environmental Management Division staff to identify any cultural resources discovered during concept construction and final disposition of such resources.

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J. Ecological Management Plan – Concept #2

Ecological Management Plan

For Desert Knolls Wash and Receiving Waters of the Mojave River

COUNTY OF SAN BERNARDINO

August 31,2011

Concept #2 – Gabion Mat Drop Structure

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #2 – Gabion Mat Drop Structure)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
MUN (Municipal and Domestic Supply) and GWR (Groundwater)	The Mojave River is a dynamic, coarse sand perennial river system, most of which flows below the surface as groundwater. The alluvial aquifer of the Mojave River is the primary source of water for domestic supplies and irrigation in the western Mojave Desert. However, in the region known as the Upper Narrows, near the confluence of the Mojave River and Desert Knolls Wash a geomorphic constriction forces groundwater to the surface. Constant surface water within this portion of the riverbed allows for rapid and dense riparian and wetland vegetation growth. Water flow along the Mojave River, with the exception of storm flows, is very slow, shallow. Contributions of water by upstream uses such as the Mojave River Forks Dam, California Department of Fish and Game Fish Hatchery and Spring Valley Lake which has resulted in a denser, wetland and riparian habitat which occurs bank to bank within the area of the Mojave River and Desert Knolls Wash confluence. Cottonwood-willow forest dominates the confluence of Desert Knolls Wash and the Mojave River and uses more groundwater than the previous Goodding-willow *(Salix gooddingii),* dominated riparian area of the 1910s (Webb et al 2005). It is also known that invasive species can take up to three times the water as native vegetation. Invasive species removal efforts by the Lewis Center for Educational Research (LCER), the Mojave Weed Management Area (MWMA), Mojave Desert Resource Conservation District (RCD), National Resource Conservation Service (NCRS), County Flood Control District, and other organizations are ongoing. Invasive plant species have the potential to greatly impact ground water supplies, especially in arid environments. Desert Knolls wash consists of mostly soft sandy alluvial soils which convey flows to the Mojave River. During periods of high flow the bulk of the water is conveyed directly to the Mojave River with very little percolation however during low flows the porous sandy soils allow for ground water recharge.	The concept design allows for a natural channel with gabion mattress drop structures which function as stabilizers throughout the wash plan. A natural rock slope will be utilized as allowed and identified in final concept design plans. This design is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge. The design will also produce less sediment than existing conditions and further benefit municipal and domestic water supplies for the region. Irrigation is not available.	It is recognized that groundwater recharge occurs naturally and appropriate Best Management Practices (BMPs) shall be in place to maintain and, if possible, improve existing conditions. The FCD staff will ensure that final design plans, should this concept design alternative be selected, allow for groundwater recharge. The gabion mat drop structure design allows for significant percolation and groundwater recharge which will increase the amount of runoff infiltration in this location. This design approach increases water volume storage capacity within the gabion structure, which then infiltrates locally.	Upon completion of the concept, FCD staff will coordinate with Lahontan Water Board planning staff to conduct water quality monitoring activities within the Desert Knolls Wash consistent with the California Surface Water Ambient Monitoring Program (SWAMP). The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.
AGR (Agricultural Supply) Objectives	In the Town of Apple Valley, there is a small portion of areas that are zoned for Residential Agriculture, in which hay is primarily produced. The City of Victorville has approximately 50 acres of designated agricultural land (primarily alfalfa, barley, and oats) located northeast of Highway 18.	It is not anticipated that the concept will impact any of the water sources that occur outside the concept area. Irrigation for crops and grazing are taken into consideration in the “production safe yield” figure calculated yearly by the Mojave Water Agency.	Avoidance and minimization measures are not required for the concept relative to agricultural water supply as the concept will not impact water sources used for irrigation for crops and grazing.	None required.

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #2 – Gabion Mat Drop Structure)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
FRSH (Freshwater replenishment)	Desert Knolls wash consists of mostly soft sandy alluvial soils which convey flows to the Mojave River. During periods of high flow the bulk of the water is conveyed directly to the Mojave River with very little percolation however during low flows the porous sandy soils allow for ground water recharge and fresh water replenishment.	The concept design allows for a natural channel with gabion mattress drop structures which function as stabilizers throughout the wash plan. A natural rock slope will be utilized as allowed and identified in final concept design plans.	Design features, including the gabion mattress, natural rock slope, gravel filters, and other such natural design features, will be identified during final design of the concept to reduce sediment and maximize fresh water replenishment.	Upon completion of the concept, FCD staff will coordinate with Lahontan Water Board planning staff to conduct water quality monitoring activities within the Desert Knolls Wash consistent with the California Surface Water Ambient Monitoring Program (SWAMP). The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.
WARM and COLD (Warm and Cold Freshwater Habitat)	Cold Freshwater Habitat is likely to occur in the headwaters of the Mojave River, however due to the natural conditions of the desert (climate, solar heating), the confluence of Desert Knolls Wash and the Mojave River would be considered warm freshwater habitat. Several plant communities are present at the confluence including riparian, wetland marsh, rocky outcrops and open water which have the potential to support a variety of wildlife species including but not limited to mammals, amphibians, birds, reptiles, invertebrates. In addition, low-flow surface water supports algae and herbaceous vegetation, which provides cover and food for water dependent micro- and macro organisms (Mojave River Floodplain Maintenance Plan 1997).	The concept alternative has been designed to include a natural channel with gabion mattress drop structures which function as stabilizers. The natural channel concept will allow existing plant communities to be maintained and supported.	As this is an intermittent stream, COLD flows are not manageable nor are they currently maintained. The FCD will evaluate warm freshwater habitat and will allow for habitat enhancement where appropriate through natural revegetation, removal of invasive species, and monitoring. The project area will be allowed to re-vegetate with native vegetation where appropriate to ensure continued functions and values for wildlife. Additional design featureswill be identified for this concept alternative during the final design phase. Subsequent agency coordination and investigations will be done during the final design phase to determine the specific features which will provide the most benefit and reduce impacts within the natural channel.	Upon completion of the concept, FCD staff will conduct warm freshwater habitat monitoring activities to assess the status of such resources as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop an informal compensatory mitigation and/or monitoring plan to offset or compensate for impacts to natural resource areas to ensure the continued functions and values for wildlife and beneficial uses within the channel.
WILD (Wildlife Habitat)	The Desert Knolls Wash flows through two diverse habitat types; the upper Desert Knolls wash is dominated by desert saltbush scrub and Mojave wash scrub while the lower end of the wash flows through a natural wetland and Mojave riparian forest habitat into the Mojave River. A review of the California Natural Diversity Database (Victorville Quad 2010) reveals that the concept and the immediate surrounding area supports, or has the potential to support over 43 protected or endangered species/habitat as well as a diverse variety of non-status wildlife species.	The concept alternative has been designed to include a natural channel with gabion mattress drop structures which function as stabilizers. The natural channel concept will provide an area for which wildlife habitat can continue to occupy and function. Habitat will be allowed to be established along the banks and away from the main channel.	The FCD will evaluate area wildlife habitat and conduct habitat enhancement through natural revegetation, removal of nonnative species (e.g. tamarisk, arrundo, Siberian elm) and monitoring. Natural revegetation will be allowed where appropriate to promote its use by area wildlife. Subsequent agency coordination and investigations will be done during the final design phase to determine the specific features which will provide the most benefit and reduce impacts within the natural channel.	Upon completion of the concept, FCD staff will conduct wildlife habitat monitoring activities to assess the status of such resources as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop an informal compensatory mitigation and/or monitoring plan to offset or compensate for impacts to natural resource areas to ensure the continued functions and values for wildlife and beneficial uses within the channel.
RARE (Rare, Threatened, or Endangered Species)	The Mojave River near Victorville is a center of endemism, being the sole locality for a number of state sensitive species. The habitat within the Desert Knolls Wash and Mojave River confluence has a high value due to the number of sensitive species it can support. There is potential for the following avian species to occur within the immediate surrounding area of the Mojave River and Desert Knolls Wash confluence: summer tanager (state species of special concern); yellow breasted chat (state species of special concern); Copper's hawk (state species of concern); least Bell's vireo (federally and state endangered); yellow billed cuckoo (federal candidate and state endangered); and southwestern willow flycatcher (state and federal endangered; federal critical habitat).	The concept alternative has been designed to include a natural channel with gabion mattress drop structures which function as stabilizers. The natural channel concept will provide an area for identified rare, threatened or endangered species in the area can continue to occupy and function.	The FCD will evaluate the Mojave River vole population and conduct habitat enhancement through natural revegetation, removal of nonnative species, and monitoring. The FCD is to maintain, improve and increase suitable habitat for least Bell's vireo and southwestern willow flycatcher through habitat monitoring, revegetation, removal of nonnative species, and annual bird surveys. In addition, the FCD will continue to remove brown-headed cowbirds (*Molothrus ater*), which brood parasite a number of nesting birds, including the least Bell's vireo and	Upon completion of the concept, FCD staff will conduct habitat monitoring activities to assess the status of such resources as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop an informal compensatory mitigation and/or monitoring plan to offset or compensate for impacts to natural resource areas to ensure the continued functions and values for wildlife and beneficial uses within the channel.

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #2 – Gabion Mat Drop Structure)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
	Three pairs of southwestern willow flycatchers (*Empidonax traillii extimus*), were detected just downstream from the I-15 Bridge by Nuekirk (1995), however recent surveys conducted by San Bernardino County Flood Control District (2002-2009) along the Mojave River, have resulted in no observations. Within the Mojave River and Desert Knolls confluence, no southwestern willow flycatchers were detected in 2002 and 2009. Least Bell's vireo (*Vireo bellii pusillus*) has been detected within the Mojave River immediately adjacent to the concept (Romich, 2002). None were detected in a focused survey in 2009 (Romich and Sims). Surveys were conducted for the Mojave River vole (*Microtus californicus mohavensis*), a state listed species, in 2002 and 2004 downstream of the Narrows which resulted in a large number of individuals being trapped within the wetland habitat. The habitat located within the concept area directly northeast of the Desert Knolls Wash / Mojave River confluence and 500 feet immediately upstream contains heavily disturbed desert wash scrub that is moderately/marginally suitable for the federally threatened Mojave Ground squirrel, *Spermophilus mohavensis* (EREMICO, 2008). A focused desert tortoise survey (*Gopherus agassizii*) was performed within the concept area and no individuals or sign, or any other sensitive species, were observed (Biological Resource Specialists, 2008). There is also the potential for the arroyo toad (*Bufo californicus)* a federally threatened and state species of special concern) and southwestern pond turtle (*Actinemys marmorata)* a state species of special concern. More specifically, although suitable habitat exists within isolated locations throughout the Mojave River, surveys for the arroyo toad, a federal and state endangered species, found no presence immediately downstream of the Upper Narrows (Michael Brandman and Associates; 1999, 2000, and 2002). Victorville shoulderband snail (*Helminthoglypta mohaveana*) a state listed species, has been observed along the west bank of the Mojave River, downstream of the concept area (CNDDB, 2010). A disjunct population of the San Emigdio blue butterfly (*Plebulina emigdionis*) is known to exist at the edge of the Mojave River near Victorville.		southwestern willow flycatcher from the Mojave River from the Mojave Narrows Regional Park to the VVWRA .	
REC - 1 (Contact Water Recreation) Objectives	Recreational activities involving body contact with water where ingestion of water is reasonably possible including but not limited to swimming, wading and fishing are not present within Desert Knolls Wash.	The proposed concept will be consistent with existing conditions and contact water recreation will continue to be unavailable within the limits of the drainage area.	Avoidance and minimization measures related to impacts on contact water recreation are not required for this concept as this is not currently or planned as a beneficial use for the Desert Knolls Wash concept.	None required.

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BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #2 – Gabion Mat Drop Structure)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
REC-2 (Non-Contact Water Recreation) Objectives	Non-contact recreation including, but not limited to, birding, hiking, marine life study, and aesthetic enjoyment are available within the Desert Knolls and Mojave River confluence and the immediate surrounding area. Students and visitors to the Lewis Education Center use the Mojave River for educational purposes. In addition, a designated horse trail that traverses the Mojave River within the concept area is used.	Opportunities for non-contact recreation, consistent with existing opportunities, will still be available under the proposed concept design and will be further addressed during the final design stage of the concept. Non-contact recreation except near the LCER in Reach 1 is anticipated to be limited. A pedestrian trail may be established in final design plans depending on available right-of-way and hydraulic features.	The FCD will, to the maximum extent practicable, provide design modifications during the final design stage of the concept, to allow access for hiking and cross-country running. The FCD will also coordinate with enforcement personnel to further minimize illegal off-road vehicle use.	Upon completion of the concept, FCD staff will conduct periodic monitoring activities to assess non-contact recreation activities in the Desert Knolls Wash as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.
COMM (Commercial and Sports Fishing)	The California Department of Fish and Game stock fish within the lakes of the Mojave Narrows Regional Park, however no fish are stocked within the Mojave River. There are no opportunities for commercial or sports fishing along the Mojave River.	The proposed concept will be consistent with existing conditions and no opportunities for commercial or sports fishing will be available within the limits of the drainage area.	Avoidance and minimization measures related to impacts on commercial sports fishing activities are not required for this concept as this is not currently or planned as a beneficial use for the Desert Knolls Wash concept.	None required.
WQE (Water Quality Enhancement) Beneficial	The Mojave River is a dynamic water system. Sediment is naturally eroded in some areas, and deposited in others. Human activities have accelerated the rate and amount of erosion or deposition in both Desert Knolls Wash and the receiving waters of the Mojave. It has been estimated that sedimentation at the confluence of Desert Knolls Wash and the Mojave River has occurred at a rate of approximately 1 foot per year (Huffine 2009). In addition, not only does the Upper Narrows, which is located just downstream from the Desert Knolls Wash and Mojave River confluence, collect and slow sediment, a large wetland and riparian habitat also facilitates this process as well. Upstream of the concept site is a fish hatchery, as well as, a water treatment facility. Both of these operations have the potential to influence negatively the nutrient/chemical quality of the water. Abundant seed source and high groundwater in the riparian/wetland areas promotes rapid vegetation recovery from natural events, such as floods and erosion. The wetland vegetation within the Desert Knolls Wash and Mojave River confluence assists in erosion control, while the riparian vegetation retains and reduces surface waters, helping to distribute and slow the flows over the floodplain. The wetland vegetation within the Desert Knolls Wash and Mojave River confluence facilitates the removal of nitrogen and phosphorus from surface water, improving water quality by processing organic wastes, reducing suspended sediments, and removing or retaining inorganic nutrients.	The concept alternative has been designed to include a natural channel with gabion mattress drop structures which function as stabilizers. This design is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge. The design will also produce less sediment than existing conditions and further benefit water quality in the region. Opportunities may also be available to manage the stream bottom to maximize the lower flows percolation.	The LCER will collaborate with FCD staff to undertake fluvial sediment monitoring (observation and photos taken over time) To ensure protection of riparian and wetland habitat that occurs downstream of the concept, the FCD will reduce scour and sediment transport upstream that is adversely affecting the riparian wetland. Protection options will be identified in the final design alternative analysis. To the maximum extent practicable, the FCD will incorporate into final plans natural enhancements for improvement of water quality through such devices as erosion control, bank stabilizers, siltation control, and maintenance to ensure channel integrity, and filtration and purification of naturally occurring water pollutants. These additional elements will vary as the flows change and the low flow channel matures.	Upon completion of the concept, FCD staff will conduct periodic monitoring activities to assess water quality in the Desert Knolls Wash as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.
FLD (Flood Peak Attenuation/Flood Water Storage)	The existing Desert Knolls Wash condition does not provide any flood peak attenuation or flood water storage.	The concept alternative has been designed to include a natural channel with gabion mattress drop structures which function as stabilizers. Limited water storage is available in this concept except for managed low flows.	To avoid and/or minimize the excess flow runoff, the gabion structure is anticipated to provide a means to manage the low flow volume and to allow infiltration.	Upon completion of the project, FCD staff will conduct periodic monitoring activities to assess flood water issues in the Desert Knolls Wash as a result of implemented design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #2 – Gabion Mat Drop Structure)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
Cultural Resource	**Native American Cultural Resources –** There is a complex archaeological site (a prehistoric village) located near the confluence of the Mojave River and Desert Knolls Wash. This site/resource has been determined to appear to qualify as eligible to the National Register of Historic Places. The resources onsite have educational value in that the area can be studied and artifacts displayed to educate others on the rich history of the area. The archaeological site/source was identified and mapped during a Phase I Cultural Resource survey of Desert Knolls Wash. The resource will undergo Phase II Testing to determine the vertical and horizontal limits of the site, and a Phase III Mitigation plan will be developed and implemented as necessary.	Construction activities associated with the concept within Reach 1 may result in the disturbance of the identified archaeological site.	FCD will coordinate with the LCER to house found artifacts at LCER for educational purposes. Native American consultation will be implemented throughout the concept. Monitors will be onsite during excavation and construction activities to minimize impacts to the archaeological resources present.	Approval documentation from Department of Public Works Environmental Management Division staff will be required prior commencement of construction activities. Documentation shall indicate that all required monitoring activities, including Native American consultation, has occurred as required. Upon completion of the concept, a final report will be prepared by Department of Public Works Environmental Management Division staff to identify any cultural resources discovered during concept construction and final disposition of such resources.

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K. Ecological Management Plan – Concept #3

Ecological Management Plan

For Desert Knolls Wash and Receiving Waters of the Mojave River

COUNTY OF SAN BERNARDINO

August 31, 2011

Concept #3 – Boulder Stabilizer

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #3 – Boulder Stabilizer)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
MUN (Municipal and Domestic Supply) and GWR (Groundwater)	The Mojave River is a dynamic, coarse sand perennial river system, most of which flows below the surface as groundwater. The alluvial aquifer of the Mojave River is the primary source of water for domestic supplies and irrigation in the western Mojave Desert. However, in the region known as the Upper Narrows, near the confluence of the Mojave River and Desert Knolls Wash a geomorphic constriction forces groundwater to the surface. Constant surface water within this portion of the riverbed allows for rapid and dense riparian and wetland vegetation growth. Water flow along the Mojave River, with the exception of storm flows, is very slow, shallow. Contributions of water by upstream uses such as the Mojave River Forks Dam, California Department of Fish and Game Fish Hatchery and Spring Valley Lake which has resulted in a denser, wetland and riparian habitat which occurs bank to bank within the area of the Mojave River and Desert Knolls Wash confluence. Cottonwood-willow forest dominates the confluence of Desert Knolls Wash and the Mojave River and uses more groundwater than the previous Goodding-willow *(Salix gooddingii),* dominated riparian area of the 1910s (Webb et al 2005). It is also known that invasive species can take up to three times the water as native vegetation. Invasive species removal efforts by the Lewis Center for Educational Research (LCER), the Mojave Weed Management Area (MWMA), Mojave Desert Resource Conservation District (RCD), National Resource Conservation Service (NCRS), County Flood Control District (FCD), and other organizations are ongoing. Invasive plant species have the potential to greatly impact ground water supplies, especially in arid environments. Desert Knolls wash consists of mostly soft sandy alluvial soils which convey flows to the Mojave River. During periods of high flow the bulk of the water is conveyed directly to the Mojave River with very little percolation however during low flows the porous sandy soils allow for ground water recharge.	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area may be constructed adjacent to the natural channel and identified in final concept design plans. This design is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge. The design will also produce less sediment than existing conditions and further benefit municipal and domestic water supplies for the region. Irrigation is not available.	It is recognized that groundwater recharge occurs naturally and appropriate Best Management Practices (BMPs) shall be in place to maintain and, if possible, improve existing conditions. The FCD staff will ensure that our preferred design allows for groundwater recharge. The boulder stabilizer design allows for significant percolation and groundwater recharge which will increase the amount of runoff infiltration in this location. This design approach increases water volume storage capacity within the boulder voids which then infiltrates locally.	Upon completion of the concept, FCD staff will coordinate with Lahontan Water Board planning staff to conduct water quality monitoring activities within the Desert Knolls Wash consistent with the California Surface Water Ambient Monitoring Program (SWAMP). The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.
AGR (Agricultural Supply) Objectives	In the Town of Apple Valley, there is a small portion of areas that are zoned for Residential Agriculture, in which hay is primarily produced. The City of Victorville has approximately 50 acres of designated agricultural land (primarily alfalfa, barley, and oats) located northeast of Highway 18.	It is not anticipated that the concept will impact any of the water sources that occur outside the concept area. Irrigation for crops and grazing are taken into consideration in the "production safe yield" figure calculated yearly by the Mojave Water Agency.	Avoidance and minimization measures are not required for the concept relative to agricultural water supply as the concept will not impact water sources used for irrigation for crops and grazing.	None required.

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #3 – Boulder Stabilizer)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
FRSH (Freshwater replenishment)	Desert Knolls wash consists of mostly soft sandy alluvial soils which convey flows to the Mojave River. During periods of high flow the bulk of the water is conveyed directly to the Mojave River with very little percolation however during low flows the porous sandy soils allow for ground water recharge and fresh water replenishment.	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area may naturally occur adjacent to the natural channel.	Design features, including the boulder stabilizers, natural vegetated areas, and other such natural design features, will be identified during final design of the concept to reduce sediment and maximize fresh water replenishment.	Upon completion of the concept, FCD staff will coordinate with Lahontan Water Board planning staff to conduct water quality monitoring activities within the Desert Knolls Wash consistent with the California Surface Water Ambient Monitoring Program (SWAMP). The included in an annual report to be prepared by Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.
WARM and COLD (Warm and Cold Freshwater Habitat)	Cold Freshwater Habitat is likely to occur in the headwaters of the Mojave River, however due to the natural conditions of the desert (climate, solar heating), the confluence of Desert Knolls Wash and the Mojave River would be considered warm freshwater habitat. Several plant communities are present at the confluence including riparian, wetland marsh, rocky outcrops and open water which have the potential to support a variety of wildlife species including but not limited to mammals, amphibians, birds, reptiles, invertebrates. In addition, low-flow surface water supports algae and herbaceous vegetation, which provides cover and food for water dependent micro- and macro organisms (Mojave River Floodplain Maintenance Plan 1997).	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area can be constructed adjacent to the natural channel and identified with further details in final design plans. The natural channel concept and adjacent naturally vegetated area will allow existing plant communities to be maintained and supported.	As this is an intermittent stream, COLD flows are not manageable nor are they currently maintained. The FCD will evaluate warm freshwater habitat and will allow for habitat enhancement where appropriate within the low flow channel through natural revegetation, removal of invasive species and monitoring. The project area will be allowed to re-vegetate with native vegetation where appropriate to ensure continued functions and values for wildlife. Additional design features will be identified for this concept alternative during the final design phase. Subsequent agency coordination and investigations will be done during the final design phase to determine the specific features which will provide the most benefit and reduce impacts within the natural channel.	Upon completion of the concept, FCD staff will conduct warm freshwater habitat monitoring activities to assess the status of such resources as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop an informal compensatory mitigation and/or monitoring plan to offset or compensate for impacts to natural resource areas to ensure the continued functions and values for wildlife and beneficial uses within the channel.
WILD (Wildlife Habitat)	The Desert Knolls Wash flows through two diverse habitat types; the upper Desert Knolls wash is dominated by desert saltbush scrub and Mojave wash scrub while the lower end of the wash flows through a natural wetland and Mojave riparian forest habitats into the Mojave River. A review of the California Natural Diversity Database (Victorville Quad 2010) reveals that the concept and the immediate surrounding area supports, or has the potential to support over 43 protected or endangered species/habitat as well as a diverse variety of non-status wildlife species.	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area will be constructed adjacent to the natural channel and identified in final concept design plans. The natural channel concept will provide an area for which wildlife habitat may continue to occupy and function.	The FCD will evaluate area wildlife habitat and conduct habitat enhancement through natural revegetation, removal of nonnative species (e.g. tamarisk, arrundo, Siberian elm) and monitoring. Natural revegetation will be allowed where appropriate to promote its use by area wildlife. Subsequent agency coordination and investigations will be done during the final design phase to determine the specific features which will provide the most benefit and reduce impacts within the natural channel.	Upon completion of the concept, FCD staff will conduct wildlife habitat monitoring activities to assess the status of such resources as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop an informal compensatory mitigation and/or monitoring plan offset or compensate for impacts to natural resource areas to ensure the continued functions and values for wildlife and beneficial uses within the channel.
RARE (Rare, Threatened, or Endangered Species)	The Mojave River near Victorville is a center of endemism, being the sole locality for a number of state sensitive species. The habitat within the Desert Knolls Wash and Mojave River confluence has a high value due to the number of sensitive species it can support. There is potential for the following avian species to occur within the immediate surrounding area of the Mojave River and Desert Knolls Wash confluence: summer tanager (state species of special concern); yellow breasted chat (state species of special concern); Copper's hawk (state species of concern); least Bell's vireo (federally and state endangered); yellow billed cuckoo (federal candidate and state endangered); and southwestern willow flycatcher (state and federal endangered; federal critical habitat). Three pairs of southwestern willow flycatchers (*Empidonax traillii*	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area will be constructed adjacent to the natural channel and identified in final design plans. The natural channel concept will provide an area for which identified rare, threatened or endangered species in the area can continue to occupy and function.	The FCD will evaluate the Mojave River vole population and conduct habitat enhancement through natural revegetation, removal of nonnative species and monitoring. The FCD is to maintain, improve and increase suitable habitat for least Bell's vireo and southwestern willow flycatcher through habitat monitoring, revegetation, removal of nonnative species and annual bird surveys. In addition, the FCD will continue to remove brown-headed cowbirds (*Molothrus ater*), which brood parasite a number of nesting birds, including the least Bell's vireo and southwestern willow flycatcher from the	Upon completion of the concept, FCD staff will conduct habitat monitoring activities to assess the status of such resources as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop an informal compensatory mitigation and/or monitoring plan to offset or compensate for impacts to natural resource areas to ensure the continued functions and values for wildlife and beneficial uses within the channel.

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #3 – Boulder Stabilizer)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
	extimus), were detected just downstream from the I-15 Bridge by Nuekirk (1995), however recent surveys conducted by San Bernardino County Flood Control District (2002-2009) along the Mojave River, have resulted in no observations. Within the Mojave River and Desert Knolls confluence, no southwestern willow flycatchers were detected in 2002 and 2009. Least Bell's vireo (*Vireo bellii pusillus*) has been detected within the Mojave River immediately adjacent to the concept (Romich, 2002). None were detected in a focused survey in 2009 (Romich and Sims). Surveys were conducted for the Mojave River vole (*Microtus californicus mohavensis*), a state listed species, in 2002 and 2004 downstream of the Narrows which resulted in a large number of individuals being trapped within the wetland habitat. The habitat located within the concept area directly northeast of the Desert Knolls Wash / Mojave River confluence and 500 feet immediately upstream contains heavily disturbed desert wash scrub that is moderately/marginally suitable for the federally threatened Mojave Ground squirrel, *Spermophilus mohavensis* (EREMICO, 2008). A focused desert tortoise survey (*Gopherus agassizii*) was performed within the concept area and no individuals or sign, or any other sensitive species, were observed (Biological Resource Specialists, 2008). There is also the potential for the arroyo toad (*Bufo californicus)* a federally threatened and state species of special concern) and southwestern pond turtle (*Actinemys marmorata)* a state species of special concern. More specifically, although suitable habitat exists within isolated locations throughout the Mojave River, surveys for the arroyo toad, a federal and state endangered species, found no presence immediately downstream of the Upper Narrows (Michael Brandman and Associates; 1999, 2000, and 2002). Victorville shoulderband snail (*Helminthoglypta mohaveana*) a state listed species, has been observed along the west bank of the Mojave River, downstream of the concept area (CNDDB, 2010). A disjunct population of the San Emigdio blue butterfly (*Plebulina emigdionis*) is known to exist at the edge of the Mojave River near Victorville.		Mojave River from the Mojave Narrows Regional Park to the VVWRA . Lewis Education Center (LCER) will continue its nonnative eradication efforts.	
REC - 1 (Contact Water Recreation) Objectives	Recreational activities involving body contact with water where ingestion of water is reasonably possible including but not limited to swimming, wading and fishing are not present within Desert Knolls Wash.	The proposed concept will be consistent with existing conditions and contact water recreation will continue to be unavailable within the limits of the drainage area.	Avoidance and minimization measures related to impacts on contact water recreation are not required for this concept as this is not currently or planned as a beneficial use for the Desert Knolls Wash concept.	None required.

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #3 – Boulder Stabilizer)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
REC-2 (Non-Contact Water Recreation) Objectives	Non-contact recreation including, but not limited to, birding, hiking, marine life study, and aesthetic enjoyment are available within the Desert Knolls and Mojave River confluence and the immediate surrounding area. Students and visitors to the Lewis Education Center use the Mojave River for educational purposes. In addition, a designated horse trail that traverses the Mojave River within the concept area is used.	Opportunities for non-contact recreation, consistent with existing opportunities, will still have limited availability under the proposed concept design. A pedestrian trail may be established in final design plans depending on available right-of-way and hydraulic features.	The FCD will to the maximum extent practicable provide design modifications to allow access for hiking and cross-country running. The FCD will also coordinate with enforcement personnel to further minimize illegal off-road vehicle use.	
COMM (Commercial and Sports Fishing)	The California Department of Fish and Game stock fish within the lakes of the Mojave Narrows Regional Park, however no fish are stocked within the Mojave River. There are no opportunities for commercial or sports fishing along the Mojave River.	The proposed concept will be consistent with existing conditions and no opportunities for commercial or sports fishing will be available within the limits of the drainage area.	Avoidance and minimization measures related to impacts on commercial sports fishing activities are not required for this concept as this is not currently or planned as a beneficial use for the Desert Knolls Wash concept.	None required.
WQE (Water Quality Enhancement) Beneficial	The Mojave River is a dynamic water system. Sediment is naturally eroded in some areas, and deposited in others. Human activities have accelerated the rate and amount of erosion or deposition in both Desert Knolls Wash and the receiving waters of the Mojave. It has been estimated that sedimentation at the confluence of Desert Knolls Wash and the Mojave River has occurred at a rate of approximately 1 foot per year (Huffine 2009). In addition, not only does the Upper Narrows, which is located just downstream from the Desert Knolls Wash and Mojave River confluence, collect and slow sediment, a large wetland and riparian habitat also facilitates this process as well. Upstream of the concept site is a fish hatchery, as well as, a water treatment facility. Both of these operations have the potential to influence negatively the nutrient/chemical quality of the water. Abundant seed source and high groundwater in the riparian/wetland areas promotes rapid vegetation recovery from natural events, such as floods and erosion. The wetland vegetation within the Desert Knolls Wash and Mojave River confluence assists in erosion control, while the riparian vegetation retains and reduces surface waters, helping to distribute and slow the flows over the floodplain. The wetland vegetation within the Desert Knolls Wash and Mojave River confluence facilitates the removal of nitrogen and phosphorus from surface water, improving water quality by processing organic wastes, reducing suspended sediments, and removing or retaining inorganic nutrients.	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area will be constructed adjacent to the natural channel and identified in final concept design plans. This design is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge. The design will also produce less sediment than existing conditions and further benefit water quality in the region.	The LCER will collaborate with FCD staff to undertake fluvial sediment monitoring (observation and photos taken over time). To ensure protection of riparian and wetland habitat that occurs downstream of the concept, the FCD will reduce scour and sediment transport upstream that is adversely affecting the riparian wetland. Protection options will be identified in the final design alternative analysis. To the maximum extent practicable, the FCD will incorporate natural enhancements for improvement of water quality through such devices as erosion control, bank stabilizers, siltation control, and maintenance to ensure channel integrity, and filtration and purification of naturally occurring water pollutants. These additional elements will vary as the flows change and the low flow channel matures.	Upon completion of the concept, FCD staff will conduct periodic monitoring activities to assess water quality in the Desert Knolls Wash as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.
FLD (Flood Peak Attenuation/Flood Water Storage)	The existing Desert Knolls Wash condition does not provide any flood peak attenuation or flood water storage.	The concept design allows for a proposed natural channel with boulder stabilizers throughout the wash plan. A natural vegetated area will be constructed adjacent to the natural channel and identified in final concept design plans. This design is anticipated to reduce high velocity flows to a rate that will allow for greater percolation and groundwater recharge.	To avoid and/or minimize the excess flow runoff, FCD is proposing the boulder stabilizer method as a means to manage the low flow volume and to allow infiltration.	Upon completion of the concept, FCD staff will conduct periodic monitoring activities to assess flood water issues in the Desert Knolls Wash as a result of implemented concept design features. The Department of Public Works Environmental Management Division office will coordinate with the Water Board to develop a monitoring plan.

BENEFICIAL USES / FUNCTIONS	EXISTING CONDITIONS/ VALUES	CONDITION WITH CONCEPT ALTERNATIVE (Concept #3 – Boulder Stabilizer)	AVOIDANCE AND MINIMIZATION MEASURES	MONITORING
Cultural Resource	**Native American Cultural Resources –** There is a complex archaeological site (a prehistoric village) located near the confluence of the Mojave River and Desert Knolls Wash. This site/resource has been determined to appear to qualify as eligible to the National Register of Historic Places. The resources onsite have educational value in that the area can be studied and artifacts displayed to educate others on the rich history of the area. The archaeological site/source was identified and mapped during a Phase I Cultural Resource survey of Desert Knolls Wash. The resource will undergo Phase II Testing to determine the vertical and horizontal limits of the site, and a Phase III Mitigation plan will be developed and implemented as necessary.	Construction activities associated with the concept within Reach 1 will result in the disturbance of the identified archaeological site.	FCD will coordinate with the LCER to house found artifacts at LCER for educational purposes. Native American consultation will be implemented throughout the concept. Monitors will be onsite during excavation and construction activities to minimize impacts to the archaeological resources present.	Approval documentation from Department of Public Works Environmental Management Division staff will be required prior commencement of concept construction activities. Documentation shall indicate that all required monitoring activities, including Native American consultation, has occurred as required. Upon completion of the concept, a final report will be prepared by Department of Public Works Environmental Management Division staff to identify any cultural resources discovered during concept construction and final disposition of such resources.

Literature Cited

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