APPENDIX A

Maintenance Plan

MAINTENANCE PLAN
for the
SAN BERNARDINO COUNTY MASTER STORM WATER SYSTEM MAINTENANCE PROGRAM

Prepared for:

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ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Definition
BMP	best management practice
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
DSOD	Division of Safety of Dams
EC	Environmental Compliance
EIR	environmental impact report
FEMA	federal Emergency Management Agency
GIS	geographic information systems
LOPP	local overlapping permitting process
MCT	Maintenance Compliance Tracker
NEPA	National Environmental Policy Act
RIP	Rehabilitation and Inspection Program
RWQCB	Regional Water Quality Control Board
SOP	standard operating procedure
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service

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1 INTRODUCTION

The San Bernardino County Flood Control District (District) was created in 1939 under the San Bernardino County Flood Control District Act (Act). The Act was approved by the California Legislature that same year, in response to the severe floods of March 1938, which caused loss of lives and millions of dollars of property damage within San Bernardino County (the County). The District is a separate legal entity from the County and is funded through property tax revenues, fees, and other local, state, and federal funding. While still maintaining its separate legal status, in 2000 the District was brought under the umbrella of the County Department of Public Works. With the inclusion of the District, the Department of Public Works oversees flood control, transportation, solid waste, and surveyor functions.

The District provides flood protection throughout the County through the construction of flood control facilities, acquisition of funds and assistance for capital projects, support of other departments with flood control issues, and maintenance of flood capacity in District-maintained facilities. The focus of this Maintenance Plan is on the latter function, maintenance of flood control facilities. Currently, the District routinely maintains approximately 500 flood control facilities within the County.

The majority of District facilities convey or contain some natural resource, whether it is water, vegetation, or wildlife. As a result, the majority of facilities fall under the jurisdiction of federal and/or state resource agencies. Resource agencies with oversight include the California Department of Fish and Wildlife (CDFW); the State Water Resources Control Board, including three of its Regional Water Quality Control Boards (RWQCBs); the U.S. Army Corps of Engineers (USACE), and in some cases, the U.S. Fish and Wildlife Service (USFWS). Often, maintenance of flood control activities requires environmental clearance under the California Environmental Quality Act (CEQA).

The District is obtaining long-term permits from the resource agencies and preparing an environmental impact report (EIR) in compliance with CEQA for the routine maintenance of its facilities as described in this Maintenance Plan. The maintenance effort, including the preparation of state and federal environmental clearance documents and permits, together with this Maintenance Plan (incorporating standard operating procedures (SOPs), compliance tracker, and annual reporting for permit compliance), is known as the Master Storm Water System Maintenance Program (proposed program).

1.1 Purpose of the Plan

This Maintenance Plan is intended to serve as a comprehensive guide to the maintenance of the District's existing flood control facilities. The Maintenance Plan includes a complete description of maintenance activities, SOPs, the frequency with which activities are conducted, seasonal restrictions, and methods for environmental compliance and reporting.

1.2 Program Location

San Bernardino County consists of an area of approximately 20,105 square miles and is composed of three distinct geographic regions: Valley, Mountain, and Desert. Geographically, approximately 80% of the County is within the Desert Region; however, most of the development occurs in the Valley Region, where approximately 77% of the District's facilities occur (Figure 1, Program Area).

The Valley Region is the most populated of all three geographic regions. This region occupies the southwest portion of the County and extends to Riverside County to the south, Orange County to the southwest, and Los Angeles County to the west. This area contains the San Bernardino and San Gabriel Mountain foothills and valley floors. The most conspicuous water feature is the Santa Ana River, spanning over 50 miles within San Bernardino County. There are three facilities that extend into Riverside County that are included as part of the Valley Region in this document.

The Mountain Region is situated between the Valley and Desert Regions and is composed of the San Gabriel and San Bernardino mountain ranges, which are separated by the Cajon Pass, a defining feature of the San Andreas Fault. The Mountain Region communities include, but are not limited to, Mount Baldy and Wrightwood to the west, the City of Big Bear Lake to the east, and Forest Falls to the southeast. Runoff from the mountains provides the main water source for the Santa Ana and Mojave Rivers. Fluvial landforms consist of a series of creeks, streams, and rivers that drain into mountain lakes as well as into the Valley and Desert Regions.

As stated previously, the Desert Region is the largest of the three geographic regions within the County. This region is located north of the San Bernardino and San Gabriel Mountains and extends east to the Arizona state line. Kern and Los Angeles Counties are located to the west, with Inyo County and the Nevada state line to the north. Within this region, there is an assemblage of low mountain ranges and desert floors, with the most conspicuous water features being the Mojave and Colorado Rivers.

The District's flood control systems are organized into six zones. Each zone has specific interests, responsibilities, or geographical divisions distinctive of the particular zone. In

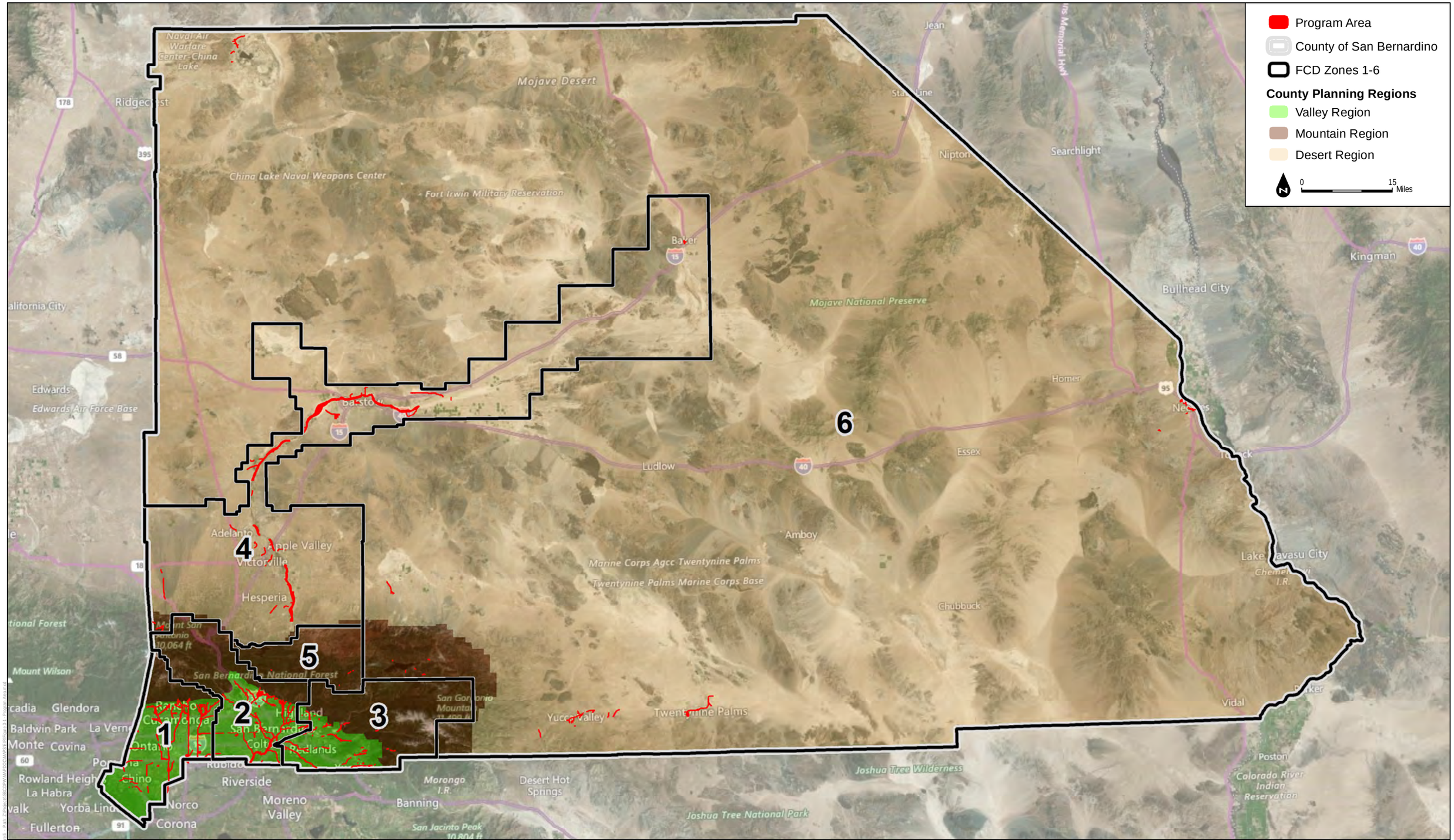
matters of taxation or ventures, each zone functions independently, although joint activities may be entered into by mutual arrangement. With a few exceptions, facilities within Flood Control Zones 1, 2, and 3 fall within the Valley Region; facilities within Zone 5 are within the Mountain Region; and facilities within Zones 4 and 6 are primarily within the Desert Region (Figure 1). Table 1 summarizes the extent of each zone within the County.

Table 1
District Zones

Flood Control Zone	Area (square miles)	City/Community
Zone 1	275	The western portion of the San Bernardino Valley extending from Beech Avenue in the Fontana area to the Los Angeles County line; all south of the San Gabriel Mountains. This includes the Cities of Chino, Chino Hills, Fontana, Montclair, Ontario, Rancho Cucamonga, and Upland, as well as the community of Etiwanda. **Watersheds:** Middle and Upper Santa Ana watershed (Reach 4), with sub-watersheds that include San Antonio Creek, Cucamonga and West Cucamonga Creek, and portions of Day Creek/Etiwanda Creek/San Sevaine.
Zone 2	318	The central area of the San Bernardino Valley, east of Zone 1 to approximately the Santa Ana River and City Creek demarcations. This includes the Cities of Colton, Fontana, Grand Terrace, Highland, Loma Linda, Redlands, Rialto, and San Bernardino, as well as the communities of Bloomington, Devore, and Muscoy. **Watersheds:** Middle and Upper Santa Ana watershed (Reaches 4 and 5), with sub-watersheds that include Lytle/Cajon Creek, Twin/Warm Creek, portions of Day Creek/ Etiwanda Creek/San Sevaine, Rialto, Grand Terrace, and City/Plunge/Mill Creeks.
Zone 3	366	The eastern end of the San Bernardino Valley, east of Zone 2, including the Cities of Highland, Loma Linda, Redlands, San Bernardino, and Yucaipa, as well as the community of Mentone. **Watersheds:** Upper Santa Ana watershed (Reach 5), with sub-watersheds that include San Timoteo Creek, Mission/Zanja, the Upper Santa Ana River, City/Plunge/Mill Creeks, and portions of Big Bear/Santa Ana River Headwaters and Twin/Warm Creek.
Zone 4	1,783	The Mojave River Valley from the San Bernardino Mountains to Silver Lakes; this includes the Cities/Towns of Adelanto, Apple Valley, Barstow, Hesperia, and Victorville, as well as all or portions of the communities of Baker, Baldy Mesa, Daggett, Desert Knolls, El Mirage, Helendale, Hinkley, Hodge, Lenwood, Oro Grande, Phelan, Piñon Hills, Silver Lakes, Spring Valley Lake, Wrightwood, and Yermo. **Watersheds:** Mojave River (Upper, Middle, Lower Reaches), Sheep Creek, and portions of Mojave/Baker.
Zone 5	163	The mountainous watershed of the Mojave River on the crest and north slopes of the San Bernardino Mountains, including the communities of Arrowbear Lake, Blue Jay, Cedar Glen, Crestline, Green Valley Lake, Lake Arrowhead, Lake Gregory, Rimforest, Running Springs, Silverwood Lake, Skyforest, Snow Valley, and Twin Peaks. **Watersheds:** Upstream portion of the Mojave River (Upper Reach) and upstream portion of the Santa Ana River (Reach 5), which includes upstream sections of the sub-watersheds of Lytle/Cajon, Twin/Warm, Upper Santa Ana, and City/Plunge/Mill Creeks.

Table 1
District Zones

Flood Control Zone	Area (square miles)	City/Community
Zone 6	17,200	The remainder of the County not embraced by other zones, including portions of the San Bernardino Mountains and the semi-desert portion of the County. This includes the Cities/Towns of Big Bear, Needles, Yucca Valley, and Twentynine Palms, as well as the communities of Amboy, Joshua Tree, Lucerne Valley, Morongo Valley, and Trona. **Watersheds:** Little Morongo Creek, Yucca Creek, Lucerne Valley Storm Drain, Trona, Needles/Sacramento and a portion of Mojave/Baker, Upper Mojave River, and Big Bear/Santa Ana River Headwaters.



DUDEK

SOURCE: ArcGIS Online Basemap (Bing), SBCDPW

FIGURE 1

Program Area

San Bernardino County Flood Control District

Master Storm Water System Maintenance Program Maintenance Plan

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2 MAINTAINED FACILITIES

The District has a flood control facility indexing system in which each facility has a unique system number that refers to a subunit of a drainage course with specific upstream and downstream limits. Approximately 500 facilities are routinely maintained and are the subject of this Maintenance Plan. The types of facilities maintained by the District include debris/detention basins, dams, channels, natural drainages, spreading grounds, levees, groins, and storm drains. As described in Section 2.2, Other Jurisdictions, some facilities are also under the jurisdiction of other federal and state agencies. While the District may identify a facility as a certain type (such as a basin), another agency with jurisdiction may also identify the same facility as a different type (such as a levee). The following sections provide an overview of these facility types. Appendix A to the Maintenance Plan identifies each maintained facility and its jurisdiction, maintenance activities, and timing.

2.1 Facility Types

The subsections that follow define the types of flood control features that exist throughout the District's system.

Natural Drainages

These are natural waterways which are maintained for flood control purposes; they may have received some level of improvement within certain areas but remain primarily in their historical location and in a natural or semi-natural state. These include creeks, canyons, washes, and rivers.

Creeks

These drainage courses generally follow historical streams, which may be channelized. See channel definition in this section.

Canyons

These are deep, steep gullies caused by extensive persistent erosion, such as from a river or, often in the desert, a wash. Canyons form the headwaters of creeks and rivers, with the canyon mouth being where the gullies widen out.

Washes

Washes are dry beds of intermittent streams that only briefly carry water after a rain event. These features rarely hold water at or near the surface and therefore are subject to flash flooding during heavy rainstorms. Upstream sediment is gradually weathered and moved farther downstream

within the wash, usually depositing in an alluvial fan (a fan-shaped buildup of earthen materials) or dry lakebed.

Rivers

Rivers are major drainage courses that are fed by numerous streams, collecting water from a large combined drainage area.

Channels

Channels are constructed to collect and convey runoff flows, generally along historical stream paths. These facilities include fully developed concrete channels, earthen channels, or semi-improved channels, which consist of a combination of engineered and natural features. Semi-improved channels include a combination of engineered and natural features and may have, but are not limited to, the following: concrete bottom or walls, riprap, revetment, and/or earthen side slopes or bottoms. Channels are subdivided into reach segments for operational purposes.

Spreading Grounds

These facilities are typically large areas of native ground that contain above-ground-surface embankments (levees), or basins (below ground surface) with earthen bottoms, some of which are used by private and public water purveyors to impound water to recharge groundwater aquifers. Generally, spreading grounds are constructed in conjunction with a channel. The channel diverts flows into a spreading ground to impound the water for groundwater recharge.

Dams

A dam is usually a large embankment that blocks an existing watercourse. The embankment controls the release of stormwater downstream via an outlet pipe that limits the amount of water that can exit the dam. Any flows in excess of the capacity of the dam outlet are stored behind the dam. Dams also contain an overflow emergency spillway to carry outflows in excess of the design capacity. Larger dams are regulated by the Department of Water Resources, Division of Safety of Dams (DSOD). Some of the District's larger and more prominent dams are also regulated by the USACE, including the Seven Oaks Dam and the Mojave River Forks Dam (the Mojave River Forks Dam is maintained by the USACE). Smaller dams maintained by the District also function as basins. Dams contain sediment as water impounds at the embankment. This sediment is removed annually or as necessary to maintain design capacity. The District currently maintains 15 facilities that are certified by the DSOD (14 of which are designated as basins by the District).

Levees

In general, a levee is a manmade barrier such as an embankment, floodwall, or similar structure designed to provide flood protection to adjacent land areas during major storm events. A levee is usually constructed of earthen, concrete, or rock material to control or divert flow waters and ensure that the structure is not compromised. The design and construction of levee embankments are integral to the performance of a flood damage reduction system, and they undergo regular inspections to maintain their certification. Inspections are performed by the Federal Emergency Management Agency (FEMA) and/or the USACE under the Levee Safety Program and/or the Rehabilitation and Inspection Program (RIP). Of the 70 facilities maintained by the District that are part of a federal levee program (as described in Section 2.2.1, Federal Programs), 37 are classified as levees in this Maintenance Plan.

Basins

District basins are generally either detention basins or debris basins. Many water districts throughout San Bernardino County use the District's basins for groundwater recharge and conservation efforts. In an effort to improve the water conservation and recharge efforts in the District's basins, maintenance activities like disking, scarifying, ripping, and/or removing clay/ silt layers from the basin floors take place at more regular intervals over the long term. The surface area of an average basin is approximately 20 acres. The following are examples of the types of basins within the District.

Detention Basins

A detention basin's primary purpose is to detain peak flows and release them over a longer period. A basin usually will have an outlet pipe and overflow spillway, which is typically designed to detain the 1,000-year storm event (defined as a storm event with a 0.1% chance of happening in any year). Any flows that exceed the pipe's outflow capacity and remain below the spillway elevation are temporarily detained in the basin. Detention basins can be sized to store some sediment and debris, but their primary function is to reduce peak flows.

Debris Basins

Debris basins are usually located at the mouth of a canyon where there is a potential for large sediment and debris yields. The purpose of the debris basin is to capture sediment and debris, not water. Sediment and debris can reduce the capacity of downstream channels, if not contained, as well as block culverts and road crossings. In addition to spillways and outlet pipes, debris basins also have intake towers, which are designed to allow water to flow through the outlet pipes while retaining the sediment.

Groins

Groins are typically designed as a component of a levee system and are elongated berms with one end on the bank of the stream and the other end projecting into the flow. Groins are designed to direct or deflect flows into the desired watercourse without the necessity of constructing a continuous levee, berm, or other type of bank. Groins protect a system's main levees from the erosive action of stream currents by kicking the water away from the main levee. The orientation of the groin angle from the bank of a river or channel varies depending on the nature of the site. Deposition or sedimentation may occur, also depending on the site and the tributary watershed. A groin may be armored with rock or other materials, depending on the potential velocity of the storm flow, to prevent erosion and deterioration.

Storm Drains

Storm drains are generally smaller channels, or reinforced concrete boxes and pipes, that receive flows primarily from urban runoff. These small facilities drain to a larger channel, stream, or watercourse.

2.2 Other Jurisdictions

Some facilities within the proposed program fall under federal or state jurisdiction, with maintenance requirements dictated by the respective agency. Additionally, certain facilities and/or activities fall within local plans or are conditioned by existing permits received by the District. Federal, state, and local jurisdictions of facilities that affect the type of maintenance activities prescribed are described below.

2.2.1 Federal Programs

Some of the facilities in the proposed program are also subject to federal program maintenance requirements. These facilities either were constructed and/or funded by a federal agency or are certified under a federal program, and as a result must comply with applicable federal requirements. Federal programs and/or certifications that may be applicable to the District's facilities include the USACE Levee Safety Program, the USACE RIP, and the FEMA levee certification.

The USACE and FEMA have different roles and responsibilities related to levees. FEMA addresses mapping and floodplain management issues related to levees, and accredits levees as meeting requirements set forth by the National Flood Insurance Program. The USACE addresses a range of operations and maintenance, risk communication, risk management, and risk reduction issues as part of its responsibilities under the Levee Safety Program and the RIP, which are described in more detail below.

USACE Levee Safety Program

The USACE performs periodic inspections of levees across the United States that are part of the USACE Levee Safety Program. The goal of the Levee Safety Program is to maintain the integrity and viability of these levee systems so they are structurally sound in the event of severe weather. This minimizes risk to the public, property, and the environment. The inspections identify deficiencies that need to be corrected to maintain structural integrity, and effectively track the condition of the levees over time. Periodic inspections are a requirement to keep USACE levees active in the Levee Safety Program.

In order to pass the periodic USACE inspection, the facility must be maintained in accordance with the USACE requirements, including the federal Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures (USACE Vegetation Guidelines; USACE 2014 and subsequent updates). Guidelines include a vegetation-free zone both wide and tall enough to accommodate the likely access requirements. The minimum height of the corridor is 8 feet and the minimum width is 15 feet on each side of the structure, measured from the outer edge of the outermost critical structure. No vegetation other than approved grasses may penetrate the vegetation-free zone. This vegetation-free zone is classified as "federal maintenance" in the District's maintenance layer. Other aspects inspected include the following:

- Encroachments
- Good condition of closure structure, culverts, and/or discharge pipes
- Slope stability
- Freedom of structure from erosion, bank caving, depressions/rutting, and cracking
- Absence of settlement that could affect integrity of the levee
- Existence of an animal control program

USACE Rehabilitation and Inspection Program

The RIP was enacted through Public Law 84-99. The goal of the RIP is to help local communities rehabilitate flood control facilities that have sustained damage in a flood event. Under the RIP, the USACE's Emergency Management Division provides federal funds to supplement local funds for necessary repairs. For a flood control facility to quality for the RIP, the facility must be maintained in accordance with the RIP Levee Owner's Manual for Non-Federal Flood Control Works prepared by USACE (2006). According to the manual, each qualifying facility must be maintained in accordance with the USACE Vegetation Guidelines (USACE 2014 and subsequent updates).

Guidelines include a vegetation-free zone both wide and tall enough to accommodate the likely access requirements. The minimum height of the corridor is 8 feet and the minimum width is 15 feet on each side of the structure, measured from the outer edge of the outermost critical structure. No vegetation other than approved grasses may penetrate the vegetation-free zone. This vegetation-free zone is classified as "federal maintenance" in the District's maintenance layer. Other aspects inspected include the following:

- Encroachments
- Good condition of closure structure, culverts, and/or discharge pipes
- Slope stability
- Freedom of structure from erosion, bank caving, depressions/rutting, and cracking
- Absence of settlement that could affect integrity of the levee
- Existence of an animal control program

FEMA-Certified Levees

FEMA provides flood risk information to communities via Flood Insurance Rate Maps. In order to update these maps, FEMA requires levee owners to provide documentation certified by a professional engineer proving that their levees can protect their designated areas from a 100-year flood event and are compliant with Title 44 of the Code of Federal Regulations, Section 65.10. If the levee in question has previously been accredited and its owner cannot provide the required documentation right away, it becomes a Provisionally Accredited Levee and the required documentation must be delivered within 24 months. This will either certify or decertify the levee system. Once a licensed engineer has signed off on the certification, the levee system owner needs to prepare a maintenance manual for the levee to be considered accredited.

2.2.2 State Facilities

The DSOD has a process in place for constructing (or enlarging) dams or reservoirs that would be under its jurisdiction (DWR 2008). The facility must then be maintained to meet the design capacity and function. The DSOD conducts inspections of facilities for which it is responsible, including periodic evaluations of operational dams, inspections for in-depth review of an entire dam or a specific feature, and special inspections in response to an unusual condition, incident, or emergency (Baines 1999). Unlike the federal programs described above, the DSOD program does not have specific maintenance manuals; however, the inspections determine the maintenance requirements for these facilities. The operational inspection involves a thorough walk-over of the accessible features of the dam near abutment slopes and toe areas. Special

attention is given to previously noted defects or areas of distress and any changed conditions. Noticing changes is the single most important aspect of any inspection; once the change is noted, engineering judgment to evaluate the consequences and necessity for action is required. Further comments on judgment and actions will be made when discussing the inspection report. By far the most common or widespread problems found in earthen dams are undesirable vegetation and burrowing rodents; for concrete structures, the most common issue is surface deterioration (Baines 1999).

2.2.3 Local Overlapping Permitting Processes

Some of the facilities maintained by the District are also subject to local permits and/or regulatory processes, referred to in this document as "local overlapping permitting processes" (LOPPs), as described below.

Wash Plan

The District is a party to the Upper Santa Ana Wash Land Management and Habitat Conservation Plan (Wash Plan). The purpose of the Wash Plan is to allow the coordinated development and management of multiple resources within the Wash planning area. The Wash Plan designates specific areas within its planning area for public services and aggregate mining to balance ground-disturbing activities and habitat preservation. The Wash Plan includes certain District routine maintenance activities. The official draft of the Wash Plan was approved in May 2015, with implementation of the plan beginning on December 1 of the same year; since then, the Wash Plan has been reviewed and edited several times. Two bills—H.R. 4024 and S. 3080—have been introduced into the House of Representatives and the Senate that will allow for the land transfer needed for the successful implementation of the Wash Plan. Both bills are currently being looked over in committee. The Draft Wash Plan is complete, and the CEQA/National Environmental Policy Act (NEPA) draft environmental documents are currently being finalized. The Wash Plan and environmental documents are pending publication in the Federal Register, which will be followed by a 90-day public comment period. Finalization of all documents, including the Implementation Agreements, is scheduled for 2019.

District maintenance activities covered by the Wash Plan are included in this Maintenance Plan; however, regulatory clearance and mitigation for these activities are expected to be covered by the Wash Plan and its associated regulatory approvals. Conditions of the Wash Plan and its permits relevant to the District will be incorporated into the Maintenance Plan.

First Line of Defense Basins

The District's First Line of Defense Basins include approximately 40 basins located in the foothills of the Valley Region that capture storm and debris flow as it runs off the mountains during and after storm events. Currently the District is in the process of obtaining 5-year permits under Section 404 of the Clean Water Act from the USACE, a Water Quality Certification under Section 401 of the Clean Water Act from the Santa Ana RWQCB, and a Streambed Alteration Agreement from the CDFW for the maintenance of these basins. The proposed program covers the long-term maintenance of these basins, and conditions of the 5-year permit, once finalized, will be incorporated into this Maintenance Plan.

El Niño Maintenance Area

In 2015–2016, El Niño, a series of large storm events, was predicted to take place; in preparation, the District determined that a portion of the Santa Ana River needed to be maintained in order to restore capacity and prevent any flooding that could occur in the surrounding areas as a result of this projected weather condition. The District prepared the emergency permit required by the USACE for the proposed emergency activities and obtained a Notice to Proceed from the USACE (SPL 2015-00758-SLP) for the emergency activities. The District also submitted the requisite emergency permit notification to the Santa Ana RWQCB, as well as the CDFW's emergency notification application. Currently, the District is working with the USACE and the USFWS to obtain a Biological Opinion under the federal Endangered Species Act for potential impacts to regulated species in the emergency impact area. Because the District has determined that the emergency impact area is the same as what is needed as part of routine maintenance activities for the area, the conditions of the Biological Opinion, once finalized, will be incorporated by reference into the Maintenance Plan.

Lenwood Facilities

The District is in the process of obtaining separate 5-year maintenance and new construction permits for two Lenwood facilities: Lenwood Channel and Lenwood Spreading Grounds. These facilities encompass an area of more than 200 acres. The Lenwood facilities are located southwest of the City of Barstow. Permits include a Section 404 Permit from the USACE and related USFWS consultation leading to a Biological Opinion; a Water Quality Certification under Section 401 of the Clean Water Act from the Lahontan RWQCB; and a Streambed Alteration Agreement from the CDFW. Currently, the District does not have resource permits to conduct maintenance in these facilities; as a result, there has been a lack of maintenance. Within the spreading grounds, sediment and debris has built up over time, resulting in a decreased capacity for storm flow containment and groundwater recharge. In some areas, the sediment

buildup is 7 to 9 feet deep. In addition to maintenance, the District proposes to upgrade the spillway between the channel and spreading grounds, which was damaged during the 2014 storm season. Due to the size of the Lenwood facilities, the extent of maintenance required, and the nature of the scope of work, which combines maintenance with new construction elements, it was decided that these facilities would receive CEQA clearance and be permitted under a separate environmental process. Conditions of the 5-year maintenance permit, once finalized, will be incorporated into the Maintenance Plan.

2.3 Maintenance of Future Facilities

The proposed program does not include the construction of new flood control facilities. The District must obtain environmental clearance, including CEQA review and obtaining relevant resource permits, for the construction of any new flood control facilities. Through this process, long-term maintenance of new facilities will be covered as part of the respective project approvals. It is assumed that SOPs in this Maintenance Plan will be incorporated into the maintenance requirements of the future capital improvement projects designed and constructed by the District in an effort to create uniformity among the facilities. The applicability of these SOPs for future projects would be determined in the CEQA review of the new projects and the SOPs may be supplemented by additional site- and/or facility-specific measures, if it is determined to be necessary based on the environmental impact analysis performed for the new project. It is also assumed that the long-term maintenance of new facilities will be incorporated into this Maintenance Plan, with any SOPs, mitigation measures, and/or permit conditions for those facilities incorporated into this Maintenance Plan and the applicable appendices of this Maintenance Plan updated. As a result, this Maintenance Plan would serve as the District's current comprehensive guide detailing all maintenance activities, SOPs, mitigation measures, and/or permit conditions.

2.4 Maintenance of Facilities Covered by LOPPs

As described in Section 2.2.3, Local Overlapping Permitting Processes, some facilities fall within other permits and programs currently underway, including the Wash Plan, the First Line of Defense Basins Project, the El Niño Maintenance Area, and the Lenwood facilities. The environmental clearances needed for facilities that fall under a LOPP are expected to be obtained through the applicable LOPP. Once environmental clearances have been obtained, the relevant mitigation measures and/or permit conditions for the affected facilities will be added to this Maintenance Plan, as well as to the applicable appendices.

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3 DESCRIPTION OF ROUTINE MAINTENANCE ACTIVITIES

The San Bernardino County Flood Control District (District) performs routine maintenance activities on a regular and ongoing basis in an effort to maintain its existing structures, access roads, and stockpiles. These routine maintenance activities do not require engineering or involve the construction of new or the expansion of existing facilities.

In order to develop a comprehensive maintenance program for its entire system, the District reviewed the maintenance manuals relevant to each facility, coordinated with Operations staff on standard procedures as well as maintenance needs, and conducted hydraulic analysis in an effort to determine the maintenance requirements for the system. Based on this effort, the District has identified the maintenance activities required for each facility (detailed in Appendix A to this Maintenance Plan) and developed a geographic information systems (GIS) layer that depicts the location and extent of each ground-disturbing maintenance activity. The GIS layer is available to District staff through the County of San Bernardino (County) Department of Public Works ArcGIS online system. Table 2 summarizes the applicable maintenance manuals.

Table 2
Maintenance Manuals

Manual Name	Prepared By	Year Prepared	Facility(ies) to Which This Applies
Manuals Applicable to Multiple Facilities			
Operations and Maintenance Plan For Flood Control Levees	District	2009	All District-designated levees
Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures	USACE	2014 (to include subsequent updates)	All USACE- and FEMA-designated levees
Periodic Inspection Report	USACE	Various	USACE-designated levees with inspection reports
FEMA Levee Certification Report	District	Various	FEMA-certified levees
Levee Owner's Manual for Non-Federal Flood Control Works	USACE	2006	Facilities in the RIP
Current Practices of the Department of Water Resources in Supervision of Dams and Reservoirs	DSOD	2008	All DSOD-designated dams
Dam Inspections	DSOD	1999	All DSOD-designated dams
Inspection of Dam and Reservoir in Certified Status	DSOD	Various	DSOD dams with inspection reports

Table 2
Maintenance Manuals

Manual Name	Prepared By	Year Prepared	Facility(ies) to Which This Applies
Chino Basin Recharge Facilities Operation Procedures	District	2006	The following basins: Upland, 7th and 8th Street, Lower Day; San Sevaine Nos. 1, 2, 3, 4, and 5; Banana and Hickory, Jurupa, Declez; Montclair Nos. 1, 2, 3, and 4; Brooks; Ely Nos. 1, 2, and 3; Turner Nos. 1, 2, 3, and 4; Victoria, RP3, and College Heights East and West
Facility-Specific Manuals			
O&M Manual Ely Basins Levee	District	2013	Ely Basins 1–3
O&M Manual Demens Debris Basin Collection Levee	District	2012	Demens Debris Basin
O&M Manual Day Creek Levee	District	2013	Day Creek Spreading Basin Nos. 1–5
O&M Manual Lower Devore Levee	District	2013	Lower Devore Levee
O&M Manual Muscoy Groin No. 2	District	2014	Muscoy Groin No. 2
O&M Manual Devil Creek Levee	District	2012	Devil Creek
O&M Manual Lynwood Basin Levee	District	2013	Lynwood Basin
O&M Manual Mill Basin Levee	District	2013	Mill Creek Levee
O&M Manual Donnell Basin Levee	District	2013	Donnell Basin
O&M Manual Quail Wash Levee	District	2013	Quail Wash Levee
Cucamonga Basin No. 6 Maintenance Guidebook	District	2010	Cucamonga Basin No. 6
Operation and Maintenance Manual East Twin Creek and Waterman Levees	District	2014	East Twin Creek and Waterman Levees
Operation and Maintenance Manual Riverside Groin Nos. 2, 3, 4, and 5	District	2014	Riverside Groin Nos. 2, 3, 4, and 5
Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual San Timoteo Creek Channel	District	2006	San Timoteo Creek Channel
Daley Basin O&M	District	2014	Daley Basin
Oak Glen Creek Basins Operational Plan	District	2009	Oak Glen Creek Basins
Operation, Maintenance, Repair, Replacement, and Rehabilitation Manual; San Timoteo Channel	District	2006	San Timoteo Channel

USACE = U.S. Army Corps of Engineers; FEMA = Federal Emergency Management Agency; RIP = Rehabilitation and Inspection Program; DSOD = Division of Safety of Dams; O&M = operations and maintenance.

3.1 Program Activities

Table 3 summarizes the proposed program activities, the estimated duration of those activities, and the equipment that could be used for each activity. Appendix A provides a detailed description of the maintenance activities to be conducted at each facility. The location and

geographic extent of the ground-disturbing maintenance activities are available to operations staff on the County's Department of Public Works ArcGIS online system.

Table 3
Typical Flood Control Maintenance Activities

Activity	Description	Activity Duration/Timing	Equipment
Ground-Disturbing Activities			
Federal maintenance	This activity refers to areas where a federal agency has jurisdiction over maintenance activities (as described in Section 2.2.1 of this Maintenance Plan). Maintenance activities generally consist of vegetation management. It is listed as a separate activity because federal jurisdiction requires removal of all vegetation except for grasses. The San Bernardino County Flood Control District's (District's) maintenance approach for vegetation management for non-federal facilities allows for avoidance and minimization measures such that some vegetation may remain in place as described for vegetation management below.	5–15 days	Dump truck Excavator Gradall Grader Loader Service truck Skidsteer loader Speed loader Sprayer trucks Water truck Tractor mowers Disk trailer Boom mowers
Vegetation management	Ground-disturbing vegetation management activities include mowing and disking to remove vegetation within facilities that prevents the proper conveyance of storm flows downstream. Dense vegetation can be uprooted in heavy storms and damage downstream facilities. Dense vegetation can trap sediment rather than transporting the material downstream, damage levees, reduce water quality, and inhibit wildlife feeding and movement. Vegetation management activities such as mowing and disking result in thinning and involve shallow soil disturbance, which encourages seed germination, soil aeration, and insect populations. Equipment used includes, but is not limited to, tractor mowers, tractor and disk trailer, and boom mowers.	5–15 days	Dump truck Excavator Gradall Grader Loader Service truck Skidsteer loader Speed loader Sprayer trucks Water truck Tractor mowers Disk trailer Boom mowers Scraper
Mechanized land clearing	Mechanized land clearing includes centerflow (the establishment and maintenance of a smaller center channel within a channel and/or basin) to convey and guide low-volume storm and dry weather (urban runoff) flows within the center of an earthen channel or basin to keep flows away from the slopes and for guiding flows. A centerflow is established by clearing sediment and vegetation within the center of the channel and/or basin. The centerflow generally represents a width of up to 20%–50% of the channel and a depth of approximately 2–3 feet. Mechanized land clearing includes grading the channel inverts	5–15 days	Dozer Dump truck Loader Excavator Service truck Skidsteer loader Speed loader Water truck Scraper

Table 3
Typical Flood Control Maintenance Activities

Activity	Description	Activity Duration/Timing	Equipment
	or basin bottoms to properly convey flows downstream. Mechanized land clearing includes debris and sediment removal for flood control, water quality, and groundwater recharge. Debris removal includes the removal of dead vegetation such as fallen boughs and leaves, as well as illegally dumped trash. Material is removed to maintain conveyance capacity of each facility as necessary. High-priority facilities must be maintained at 100% capacity. Sand and gravel operators often contract with the District to remove sediment. Silt and clay deposits are removed from the basin bottoms and soil is typically broken up and kept free of vegetation in an effort to restore groundwater recharge. Illegally dumped trash, vehicles, homeless camps, etc. are removed from District facilities, and material is taken to a landfill or appropriate recycling facility for disposal. Mechanical vegetation clearing includes the removal of vegetation with equipment such as dozers, graders, loaders, excavators, etc. to allow conveyance of flows downstream and to remove large areas of growth from regulated facilities that are certified/inspected by the Federal Emergency Management Agency, U.S. Army Corps of Engineers, and Division of Safety of Dams. Mechanical vegetation clearing is also required for fuel modification purposes per state and local fire codes.		
Ingress/ egress	Maintenance of access roads includes, but is not limited to, fencing and gate repairs, signage, road grading, and pavement repairs.	5–7 days	Grader Loader Service truck Skidsteer loader Water truck Broom (asphalt roads only) Pneumatic roller
Flood control structure repair	Flood control structure repair, or in-kind replacement, includes, but is not limited to, appurtenant structures such as inlets, outlets, culverts, spillways, bottom controls, water quality structures, riprap, and channel inverts.	12–20 days	Dump truck Grader Loader Scraper Service truck Water truck Cement truck
Bank repair	Bank repairs include, but are not limited to, removal of excess sediment and sand from the bottom (invert) of the channel or basin or on-site/off-site stockpile location and placing it onto the side slopes. Sometimes additional and	5–15 days	Dozer Dump truck Gradall

Table 3
Typical Flood Control Maintenance Activities

Activity	Description	Activity Duration/Timing	Equipment
	incidental riprap rock or gabion placement may be required for banks that experience frequent erosion resulting in high frequency of maintenance. Riprap repair includes repositioning, replacement, or placement of incidental riprap to stabilize the slopes. It also includes the repair of grouted and ungrouted sections of rock. Bank repair can also include the repair or replacement of steel revetment with more revetment or riprap rock.		Grader Loader Scraper Service truck Water truck
Stockpiling	Maintenance of stockpile locations includes placement of material (i.e., debris and sediment from District facilities) at specific locations for use in repairs as well as temporary storage. Stockpiles are often treated to avoid the spread of invasive plants.	5–10 days	Grader Loader Dump truck Water truck
Non-Ground-Disturbing Vegetation Management			
Manual vegetation management	The District employs manual vegetation management where sensitive resources are present or where ground-disturbing vegetation management is not necessary for flood control purposes. This consists of trimming and pruning vegetation with hand tools such as power trimmers, weed eaters, pruning loppers, saws, and clippers in an effort to trim and thin vegetation so it does not clog downstream facilities or reduce water quality.	5–15 days	Power trimmers Weed eaters Manual tools (pruning loppers, saws, clippers)
Non-Ground-Disturbing Activities			
Sand and gravel operations	The County hires sand and gravel operations vendors to sort the materials into different size materials and sells the surplus material that has been stockpiled through maintenance. The duration of sand and gravel operations varies. The average is 2 years, but there are situations where it can extend up to 5 years. This is a result of material sitting for a period of time until a buyer is found, which can occur during depressed economic years. The duration of the activity is market driven and is also dependent on the amount and type of material that is stockpiled on site. When the economy is good, and there is a lot of construction activity, sand and gravel operations move quickly.	2 years (average)	Front-end loader Water truck Dump truck Grizzly Portable power screen Portable power crusher
Ingress/ egress	Maintenance of access roads includes, but is not limited to, fencing and gate repairs and signage.	5–7 days	Service truck
Herbicide and rodenticide	Herbicide application, sometimes referred to as chemical vegetation clearing, is accomplished by trained and licensed applicators to manage vegetation. Herbicides are used to allow for proper conveyance of flows and to prevent the spread of invasive species and aquatic weeds, such as algae and grasses considered detrimental to flood control facilities. Typical aquatic herbicides applied include, but are not limited to, glyphosate, copper,	5–15 days Rodenticide is ongoing on an as-needed basis throughout the year	Sprayer truck Service truck Water truck

Table 3
Typical Flood Control Maintenance Activities

Activity	Description	Activity Duration/Timing	Equipment
	triclopyr, and diquat. Equipment used includes backpack sprayers or sprayers mounted on a service truck. Rodenticide is applied by a licensed applicator to control burrowing rodents and prevent them from destabilizing banks and levees. California ground squirrels (*Spermophilus beecheyi*) are generally the targeted species. In areas containing protected rodents such as the threatened Mohave ground squirrel (*S. mohavensis*) or the endangered San Bernardino kangaroo rat (*Dipodomys merriami parvus*), rodenticide is applied using special traps and in accordance with applicable federal and state laws, regulations, and policies and the County's agency-approved rodenticide plan.		
Graffiti removal	Graffiti is removed by spraying paint on the concrete facility. Graffiti removal also includes cleanup of discarded spray paint cans.	1–4 days	Hand tools Service truck
Vector control	Vector control primarily involves mosquito control to reduce the spread of disease, including West Nile virus. Vector control typically includes biopesticides. Historically it has also included introduction of mosquito-larva-eating fish, and this method may be utilized again in the future.	1–2 days	Service truck Sprayer truck/equipment
Stream gage maintenance	Maintenance of stream gages and stream gage sites, as well as maintenance of other scientific measurement devices to measure and record scientific data, including, but not limited to, water quality monitoring, wells, and sampling stations.	1–3 days	Service truck Water truck

3.2 Program Management Plans

The District implements several management plans to ensure proper implementation of rodent control and vegetation management, as well as nesting bird and burrowing owl (*Athene cunicularia*) avoidance. These plans are briefly described in the following subsections.

3.2.1 Rodent Control Program

The District implements an Integrated Pest Management Plan for pest management in District facilities. Federal and state agencies provide oversight of the structural condition and hydraulic capacity of critical District facilities, requiring strict zero-tolerance programs for the eradication of burrowing rodents. Levees, dams, and earthen embankments provide an ideal habitat for

burrowing rodents such as ground squirrels and gophers that can seriously weaken earthen flood-control facilities, resulting in flooding or catastrophic failure.

The Integrated Pest Management Plan includes a Facility Pesticide Use Table, which is a compilation of best management practices (BMPs) required by law and found on the California Department of Pesticide Regulation PRESCRIBE database according to facility location. The Facility Pesticide Use Table also includes BMPs self-imposed by the District. These self-imposed BMPs cover any gaps in the PRESCRIBE website and afford greater attention to burrowing owl, raptor (bird of prey), and large predator habitats. Once the BMPs are identified, the Pest Control Operator considers seasonality, ground squirrel population size, facility, and adjacent habitat size. District Ecological Resource Specialists (ecologists), the Pest Control Operator, and District staff partner for implementation of the BMPs, which include frequent monitoring for rodent activity around critical facilities, management of the local environment to exclude and reduce rodent habitat, training for District staff, consideration and application of effective and environmentally responsible control techniques, and record keeping. The Integrated Pest Management Plan will be implemented within proposed program facilities to manage rodents while also minimizing negative effects to special-status biological resources through scientifically based and environmentally acceptable approaches.

3.2.2 Vegetation Management Plan

The District has developed a vegetation management plan (provided in Appendix B to this Maintenance Plan) with the primary goal of outlining SOPs for all vegetation management operations. The vegetation management plan identifies control methods, types of herbicides authorized for use, and proper application methods; seasonal timing; and avoidance and minimization measures.

3.2.3 Nesting Bird and Burrowing Owl Management Plan

The District implements a nesting bird and burrowing owl management plan (provided in Appendix C to this Maintenance Plan) to avoid impacts to nesting birds and burrowing owls, which has been approved by the CDFW. The plan provides measures that will be taken by the District to ensure the protection of nesting birds and burrowing owls during maintenance activities on the District's facilities. The plan also provides detailed avoidance and minimization measures, survey protocols, procedures for establishing buffers, and directives for monitoring and reporting.

3.3 Schedule

Under the proposed program, maintenance activities in each flood control facility occur on an annual basis or more or less often, as needed. Some facilities may only require maintenance once every several years or following large storm events, whereas others may require maintenance more than once a year. On average, 30% of flood control facilities are expected to be maintained each year (see Table 4). The timing of flood control maintenance is dictated by the following:

- **Weed Abatement Notices** – June through September. Chemical and mechanical treatment may be needed twice per year—once before spring, and again before fall—to adequately control and remove dry brush and weeds in accordance with local fire code requirements.
- **Storm Season** – Varies, but generally from October through April. Work typically occurs only after the wetted portions of a channel or basin are dry enough to safely operate equipment. During monsoon season in the desert areas, storms can also occur in July, August, and September.
- **Nesting Season for Migratory Birds –** Depending on specific location and weather patterns, nesting season is generally January 15 through August 31. For areas with sensitive biological resources, the District avoids conducting maintenance during nesting season if practicable. The District applies avoidance measures for their facilities during the nesting season to ensure compliance with regulations protecting nesting birds.
- **Unforeseen and Urgent Maintenance Repairs Discovered** – Sometimes during maintenance inspections or as a result of outside agency notifications to the District, previously unknown damage to facilities is discovered, and the nature of the damage is such that immediate attention is required for public safety purposes. Examples of work requiring immediate attention include slope erosion that undermines an access road known to be used by the public or adjacent to a railroad or other public structure, or imminent failure of concrete structures or revetment requiring in-kind repairs. Emergency work is exempt under CEQA Guidelines Section 15269, Emergency Projects (14 CCR 15269). In these circumstances, the District processes environmental clearance as required by the resource agencies.

Table 4
Seasonal Restrictions

			Nesting Bird Season (January 15–August 31)																						
			Storm Season (October–April)										Desert Monsoon Season (July–September)						Storm Season (October–April)					
				Herbicide (Growing Season)													Herbicide (Fall and Early Winter)							
			Jan		Feb		Mar		Apr		May		June		July		Aug		Sep		Oct		Nov		Dec	
	Activity Types		1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15	1	15
ID	Activity																									
1	Federal maintenance																									
2	Vegetation management																									
3	Mechanized land clearing																									
															(Desert)											
4	Access road grading, vegetation clearing, and other ground-disturbing access road maintenance																									
5	Flood control structure repair																									
6	Bank repair																									
7	Manual vegetation management																									
8	Stockpiling																									
9	Sand and gravel operations																									
10	Non-ground-disturbing maintenance of access roads (fencing, gate repairs, signage, etc.)																									
11	Herbicide and rodenticide application																		Pre-emergent herbicide sprayed prior to seedling germination prior to the first significant predicted rainfall to ensure pre-emergent herbicide is "watered-in."							
			Foliar herbicides will be used throughout the growing season, prior to seeding to prevent further spread.																							
12	Graffiti removal																									
13	Vector control																									
14	Stream gage maintenance																									

Note: The Environmental Management Division (EMD) typically evaluates maintenance requests and ensures compliance with environmental measures and conditions. This schedule depicts typical seasonal restrictions for specific activities but does not preclude coordination with the EMD outside of these time periods.

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4 COMPLIANCE AND REPORTING REQUIREMENTS

The proposed program is required to comply with all state, federal, and local laws and policies. In compliance with the California Environmental Quality Act (CEQA), the San Bernardino County Flood Control District (District) is preparing an environmental impact report (EIR) to analyze the potential environmental impacts from implementation of the proposed program. The mitigation measures set forth in the EIR for the proposed program must be applied during implementation of maintenance activities described in this manual and compliance with these measures must be documented by the District. The mitigation monitoring and reporting program of the approved EIR will be provided as Appendix D of this Maintenance Plan upon certification of the EIR.

In addition to CEQA, resource permits, certifications, and agreements that authorize work within state and federal jurisdictional waters and incidental take of federally and/or state-listed species are required for many of the activities described in this Maintenance Plan. Collectively, these permits, certifications, and agreements are referred to as *resource permits* and the agencies authorizing these permits are referred to as *resource agencies*. Copies of these resource permits will be provided in Appendix E upon receipt of the permits. Work conducted under this Maintenance Plan shall comply with the conditions of the following resource permits:

- Clean Water Act Section 404 Authorization from the U.S. Army Corps of Engineers (USACE)
- Waste Discharge Report and/or Clean Water Act Section 401 Water Quality Certification from the State Water Resources Control Board
- Streambed Alteration Agreement from the California Department of Fish and Wildlife (CDFW)
- Incidental Take Permit or Consistency Determination from the CDFW
- Biological Opinion from the U.S. Fish and Wildlife Service (USFWS)

The standard operating procedures (SOPs) described in this Maintenance Plan, the CEQA mitigation measures, and the conditions from the resource permits collectively constitute the proposed program's environmental measures and conditions. The proposed program will document and track compliance with the environmental measures and conditions, calculate accurate impact and mitigation acreages and types, and provide the resource agencies with annual reports on the program. This chapter of the Maintenance Plan identifies the process for compliance, notification, and annual reporting.

4.1 Environmental Compliance

The District is implementing a GIS-based compliance communication and reporting system called the Maintenance Compliance Tracker (MCT). This system will serve two purposes: (1) to improve communication and provide comprehensive tools between Environmental Management Division (EMD) and Operations staff and (2) to track, ensure compliance, and report to the resource agencies activities completed on an annual basis. The MCT will ensure that the proposed program remains in compliance with the applicable environmental measures and conditions and will consist of two components: a database and a map viewer. For each facility, the MCT will include the following, as applicable:

- A map depicting the geographic extent of ground-disturbing maintenance activities
- Documentation of previous maintenance activities conducted, including maintenance type, equipment used, and start and end dates of each maintenance activity
- Information regarding sensitive environmental resources present (such as, but not limited to, special-status species, sensitive vegetation communities, archaeological resources, potential hazardous sites)
- A list of SOPs relevant to the facility
- A list of CEQA/National Environmental Policy Act (NEPA) mitigation measures relevant to the facility
- A list of resource permit conditions relevant to the facility
- Seasonal timing restrictions relevant to the facility
- Frequency limitations for the facility
- Notification requirements applicable to the facility (such as coordination with District ecologists or special resource agency pre- and post-activity notification requirements)

The MCT is currently in progress. In the event it has not been finalized at the time of the proposed program's approval and implementation, the following interim solution will be implemented. The geographic extent of maintenance activities will remain available to County staff on the County Department of Public Works ArcGIS online system. A compliance matrix will be developed for each facility, detailing the applicable SOPs, mitigation measures, and permit conditions. An Environmental Compliance (EC) form will be developed to document compliance, which will include all pertinent information listed above. These EC forms and other relevant data required by resource agency staff will be submitted annually to the appropriate resource agency staff to document environmental compliance.

4.2 Notification

This section summarizes notification to be conducted under the proposed program and will be updated as necessary based on resource permit conditions. The notification procedure below is primarily internal to the District and will ensure that maintenance activities remain in compliance with the applicable environmental measures and conditions. The pre- and post-activity notification processes described below generally consist of notification of District EMD staff by Operations staff. Pre- and post-activity notification to resource agencies may occur for certain facilities or activities as identified in the resource permits.

Pre-Activity Notification

Pre-activity notification will occur to ensure that EMD staff have the opportunity to review proposed maintenance activities and implement applicable environmental measures and conditions. At least 2 weeks prior to commencement of work, Operations staff will notify EMD staff of proposed maintenance areas and activities, including information on equipment to be used, start and end dates for each proposed activity, and the footprint of each proposed activity.

EMD staff will confirm whether the proposed activities comply with the proposed program's environmental measures and conditions, and whether any required pre-activity measures have been implemented. For example, a site visit by EMD staff may be required to determine presence/ absence of sensitive resources and/or monitoring may be required during maintenance activities. If applicable, EMD staff will map the extent of sensitive resources present at a scale suitable for inclusion with the annual report.

EMD staff will notify Operations staff when pre-activity environmental measures and conditions have been completed and the activities can be initiated. When required, as determined by the resource permits, pre-activity notification will be sent to the resource agencies.

Post-Activity Notification

Post-activity notification will occur to ensure that the applicable environmental measures and conditions have been completed. Following completion of maintenance activities, compliance with the environmental measures and conditions will be documented in the MCT or the EC form. As applicable, the following additional information will be uploaded to the MCT or to a geo-database maintained by District GIS staff or approved vendor:

1. Pre-activity and post-activity photographs
2. Final temporary and permanent impacts to regulated resources mapped to scale

When required, as determined by the resource permits, post-activity notification will be sent to the resource agencies.

4.3 Annual Reporting

4.3.1 Annual Work Plan

The District will prepare an annual work plan that will identify the facilities that are anticipated to be maintained that year, the time of year each facility will be maintained, and maintenance activities to be conducted at each facility.

4.3.2 Annual Report

The District will complete annual reporting to the resource agencies to document the proposed program's compliance with the applicable environmental measures and conditions. Each year for the life of the long-term permits, the District will prepare an annual report and submit the report to each of the resource agencies by February 15 of each year or as otherwise required by the resource permits. The annual report will meet the reporting requirements of the resource agencies but at minimum is expected to include the following for each facility:

- Facility name
- Facility number (if name or number has changed, reference to previous name/number will be provided)
- Maintenance activities conducted, including type, equipment used, and start and end dates for each activity
- SOPs implemented
- CEQA/NEPA mitigation measures implemented
- Permit conditions implemented (identified by permit, permit number, and condition number)
- Pre-activity and post-activity photographs
- Final temporary and permanent impacts to regulated resources mapped to scale
- Acreages of permanent impacts to regulated resources
- Summary of mitigation obligation
- Additional items as required by the resource permits

5 STANDARD OPERATING PROCEDURES

This section describes the standard operating procedures (SOPs) that are implemented during maintenance activities as part of the San Bernardino County Flood Control District's (District's) standard practice.

SOP-AQ-1 **Diesel Particulate Filters.** Maintenance equipment incorporates control devices on auxiliary and main engines such as, but not limited to, diesel particulate filters. This reduces DPM and NO_x emissions from main engines and auxiliary engines.

SOP-AQ-2 **Maintenance Equipment.** Where Tier 4 equipment is reasonably available, for off-road equipment with engines rated at 50 horsepower or greater, no equipment is used that is less than the Tier 4 Interim Standards.

SOP-AQ-3 **Fugitive Dust.** Maintenance activities are conducted in conformance with Rule 403 for both MDAQMD and SCAQMD.

SOP-BIO-1 **Least Bell's Vireo.** To avoid direct harm to least Bell's vireo (*Vireo bellii pusillus*), maintenance activities within suitable riparian areas occur outside the typical nesting period for this species (approximately March 15–August 15). If maintenance activities in riparian areas must be conducted during this period, a pre-activity survey is conducted by a qualified biologist within 3 days of the start of the activity. If a least Bell's vireo nest or territorial individuals are identified, a minimum 300-foot activity-free buffer is established to avoid direct and indirect impacts. A qualified biologist monitors maintenance activities as needed to confirm that activities are not impacting the active nest. If the qualified biologist determines that maintenance activities are adversely affecting the nest, maintenance activities immediately cease until the nest is no longer active or additional measures have been put in place to avoid impacts to the active nest.

SOP-BIO-2 **Coastal California Gnatcatcher.** To avoid direct harm to coastal California gnatcatcher (*Polioptila californica californica*), maintenance activities within suitable sage scrub areas occur outside the typical nesting period for this species (approximately February 15–August 31). If maintenance activities are required in suitable habitat for coastal California gnatcatcher during the nesting period, a pre-activity survey is conducted by a qualified biologist within 3 days prior to the activity. If coastal California gnatcatcher nests are identified, a minimum 300-foot buffer is established where no maintenance activities could occur to avoid potential indirect impacts. A qualified biologist monitors maintenance activities as needed to confirm that activities are not impacting active nests. If the qualified

biologist determines that maintenance activities are adversely affecting nests, maintenance activities immediately cease until the nests are no longer active or additional measures have been put in place to avoid impacts to active nests.

SOP-BIO-3 **Southwestern Willow Flycatcher.** To avoid impacts to southwestern willow flycatcher (*Empidonax traillii extimus*), maintenance activities within suitable riparian habitat occur outside the typical nesting period for this species (approximately May 1–August 31). If maintenance activities in suitable riparian areas are required during the nesting period, a pre-activity survey is conducted by a qualified biologist within 3 days of the start of the activity. If southwestern willow flycatcher nests are identified, a minimum 1,000-foot buffer is established where no maintenance activities may occur to avoid potential direct and indirect impacts. A qualified biologist monitors maintenance activities as needed to confirm that activities are not impacting active nests. If the qualified biologist determines that maintenance activities are adversely affecting nests, maintenance activities immediately cease until the nests are no longer active or additional measures have been put in place to avoid impacts to active nests.

To determine southwestern willow flycatcher presence or absence within suitable habitat, protocol focused surveys for southwestern willow flycatcher are conducted prior to maintenance events within suitable habitat or as determined by the proposed program's resource agency permits.

SOP-BIO-4 **Native Fish Avoidance.** Maintenance activities within the facilities suitable for native fish occur when the applicable portion of the facility is dry to the maximum extent practicable. If activities occur when water is present, a water diversion plan is developed that includes measures to avoid impacts to native fish.

SOP-BIO-5 **Nesting Birds.** Potential impacts to nesting birds are avoided through implementation of the District's Nesting Bird and Burrowing Owl Management Plan. Generally, no more than 3 days prior to implementation of maintenance activities during the nesting bird season (defined broadly to include January 15–August 31) a qualified biologist completes a nesting bird survey within the maintenance footprint and appropriate buffer for nesting bird species protected by the Migratory Bird Treaty Act and/or the California Fish and Game Code. If active nests are found, they are protected in place with an adequate activity-free buffer until the nest is determined by a qualified biologist to be inactive. Limits of the buffer are established in the field with stakes, flagging, or other highly visible method. Maintenance personnel are instructed on the sensitivity of nest areas and

are made aware of flagging that demarks buffers. Summary results of the nesting bird surveys are provided to the CDFW in an annual report.

SOP-BIO-6 **Burrowing Owl.** Prior to implementation of maintenance activities in suitable burrowing owl (*Athene cunicularia*) habitat, the District implements the measures described in the District Nesting Bird and Burrowing Owl Management Plan, which states that if burrowing owls are present, the District will consult with CDFW prior to any maintenance and any agreed-upon measures will be implemented. Measures include establishment of an activity-free buffer zone; eviction, if required and approved by CDFW; and/or creation of permanent artificial burrows to replace any occupied burrows that have been removed. Replacement of occupied burrows is typically completed at a minimum 2:1 ratio. If eviction and/or replacement of burrows is required, a management plan is prepared and approved by CDFW. The management plan includes forced dispersal (eviction) methods, post-eviction data, and construction timing/ specifications/requirements for creating permanent artificial burrows.

SOP-BIO-7 **Bat Roosts.** Maintenance activities in suitable bat roost habitat, including bridges and mature riparian forests and woodlands, generally occur outside the bat maternity season (generally between April 1 and July 31). If maintenance activities must occur during the bat maternity season, pre-activity surveys are conducted by a qualified biologist to confirm absence of bat roosts. If bat roosts are present, a qualified biologist will implement avoidance measures including establishing an avoidance buffer, monitoring the roost, and stopping or adjusting maintenance activities in coordination with the operations supervisor to ensure that impacts do not occur to the roost.

SOP-BIO-8 **Western Spadefoot.** Implementation of maintenance activities within basins and other temporary pools that are considered suitable for western spadefoot (*Spea hammondii*) breeding (i.e., basins/pools that hold water temporarily and have adjacent native habitats) occurs only when the basins are completely dry to minimize the potential for direct harm to eggs, tadpoles, metamorphs, or adults. If avoidance is not practicable, an avoidance plan is prepared and coordinated with CDFW prior to implementation of maintenance activity.

SOP-BIO-9 **Arroyo Toad.** To avoid potential direct harm to arroyo toad (*Anaxyrus californicus*) adults, juveniles, and larvae that may be within surface waters from upstream occupied areas, maintenance activities along the upper Mojave River (generally upstream of Hesperia Lake Park) occur either when no

surface waters are present or outside the breeding window (approximately March–July) and the period when tadpoles or metamorphs could be present (approximately April–September).

SOP-BIO-10 **Desert Tortoise.** Within 24 hours prior to initiation of maintenance activities in desert tortoise (*Gopherus agassizii*) habitat, a pre-activity survey is conducted by a qualified desert tortoise biologist. Any occupied or potentially suitable desert tortoise burrows are flagged and avoided. If individuals or other sign of desert tortoise are observed during the pre-activity survey, a biological monitor is present at all times during all maintenance activities unless exclusion fencing is utilized. The biological monitor stops maintenance activities as needed to avoid impacts to desert tortoise.

SOP-BIO-11 **Mojave Fringe-Toed Lizard.** To reduce the potential for any impacts to Mojave fringe-toed lizard (*Uma scoparia*) or their eggs or hibernating individuals, maintenance activities in desert dune habitat are scheduled to occur in April, or between August and October, when individuals are most likely to be active on the surface. If maintenance activities are required in suitable habitat from April to October, a qualified biologist familiar with Mojave fringe-toed lizard conducts a pre-activity survey no more than 24 hours prior to the maintenance activity. If individuals or sign of Mojave fringe-toed lizard are detected during the survey, biological monitoring of the maintenance activity is conducted to reduce the potential for direct harm. The biological monitor stops maintenance activities as needed to avoid impacts to Mojave fringe-toed lizard.

SOP-BIO-12 **Western Pond Turtle.** Prior to the initiation of any maintenance activities, areas where ponded waters occur and have the potential to support western pond turtle (*Actinemys marmorata*) on the Mojave River are mapped and documented by a qualified biologist as described in the Maintenance Plan. For maintenance activities within documented ponded areas, a qualified biological monitor is present to ensure that the pond is first drained and that any western pond turtles that may be present are able to leave the area that is to be maintained.

SOP-BIO-13 **Southern Rubber Boa.** To avoid the potential for direct harm to southern rubber boa (*Charina umbratica*), the District completes maintenance activities within suitable habitat between approximately November 1 and April 1, when boas are likely in hibernation and deep in the ground within upland rock outcrops or in association with large, down logs.

To avoid the potential for direct harm and permanent loss of habitat for southern rubber boa, riparian vegetation within suitable habitat is removed by hand crews only between approximately November 1 and April 1. By restricting the work to this time frame, the District helps ensure that the habitat is suitable for southern rubber boa by the summer.

To further minimize potential harm to southern rubber boa during vegetation management activities, hand crews receive training specific to southern rubber boa prior to beginning work in habitat suitable for southern rubber boa.

SOP-BIO-14 **Special-Status Plants Pre-Activity Surveys and Avoidance.** Prior to maintenance activities within facilities that provide suitable habitat for special-status plant species, the District completes pre-activity surveys for special-status plant species during the blooming period prior to the anticipated maintenance activity. For facilities within the Narrow Endemic Plant Species Survey Area of the Western Riverside County Multiple Species Habitat Conservation Plan, pre-activity surveys include the narrow endemic plants as target species. Due to the program's proposed schedule of maintenance occurring on average at 30% of facilities each year, special-status plant surveys are anticipated approximately every 3 years for facilities supporting suitable habitat.

Surveys are conducted by a qualified botanist during a time when the plant species with potential to occur are identifiable (i.e., during their blooming period for annual species) within the maintenance area that would be subject to direct or indirect impacts. Surveys conform to the California Native Plant Society Botanical Survey Guidelines (CNPS 2001), Protocols for Surveying and Evaluating Impacts to Special Status Native Populations and Natural Communities (CDFG 2009), and the Endangered Species Recovery Program's General Rare Plant Survey Guidelines (Cypher 2002) or the most current accepted protocol. Plant species encountered during the field surveys are identified to subspecies or variety, if applicable, to determine sensitivity status.

Populations and individuals of any special-status plant species found during pre-activity surveys are mapped with GPS and documented in accordance with the Maintenance Plan. Mapped populations of listed species are avoided unless take authorization has been obtained from the respective resource agency. Non-listed special-status plants are avoided during maintenance activities as practicable. Installation of protective fencing and erosion and sediment control measures, as

appropriate, is implemented to protect special-status plant populations found near maintenance sites.

SOP-BIO-15 **Worker Environmental Awareness Program.** If special-status biological resources are determined to potentially occur within or immediately adjacent to any of the maintenance activities during the environmental compliance review described in the Maintenance Plan, the following steps are implemented. A qualified biologist conducts a pre-activity survey for special-status species. The pre-activity survey includes all maintenance activity areas and an appropriate buffer (i.e., 300–500 feet for nesting birds, 100 feet for kit fox and badger). The qualified biologist conducts a training/education session for operations staff members and/or District contractors. The biologist addresses any resources that could occur within avoided habitat and measures to minimize adverse impacts to avoided habitat areas. The biologist gives direction outlining actions to be taken should any special-status species or community be observed within or adjacent to maintenance areas. As applicable, the biologist reviews and/or designates the vegetation management area in the field with maintenance personnel. When there is a high potential for special-status species to be present during maintenance activities, as determined by the pre-activity review and the pre-activity survey, the qualified biologist monitors maintenance activities and moves wildlife out of harm's way as appropriate. The qualified biologist stops maintenance activities as needed to avoid harm to special-status species. If kit fox dens are present, dens are identified as inactive, potentially active, or definitely active and coordination is undertaken with CDFW prior to collapsing dens. The biologist discusses with maintenance personnel that any vehicles or equipment driven and/or operated adjacent to natural open space areas is to be checked and maintained daily to prevent leaks of materials/liquids into these areas. When working in areas with potential to support special-status wildlife, maintenance vehicles travel at no more than 15 miles per hour.

SOP-BIO-16 **Best Management Practices.** The District uses best management practices to ensure that no trash, debris, oil, petroleum products, or other organic material from any maintenance activity is allowed to enter into watercourses or is placed where it may be washed by rainfall or runoff into adjacent natural habitat areas or watercourses. When maintenance operations are completed, any debris or excess materials are removed from work areas.

SOP-BIO-17 **Monitoring.** As described in the Maintenance Plan, qualified District staff (or their designee) confirm implementation of SOPs and other relevant mitigation

measures and permit conditions as described in the Maintenance Plan. The District submits occurrences of special-status species to the California Natural Diversity Database.

SOP-BIO-18 **Restoration of Temporary Impacts.** Temporary impacts to special-status vegetation communities from bank stabilization are revegetated as determined by District ecologists with an application of a native seed mix to promote passive restoration of the area to pre-project conditions. Prior to seeding temporary ground-disturbance areas, District ecologists review the seeding palette to ensure that no seeding of invasive plant species, as identified in the most recent version of the California Invasive Plant Inventory, occurs.

SOP-BIO-19 **Herbicide Application.** The District applies pesticides, herbicides, and related surfactants within its facilities in accordance with the District's Vegetation Management Plan, which complies with the Statewide General National Pollutant Discharge Elimination System (NPDES) Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications, General Permit No. CAG990005, Order No. 2013-0002-DWQ (Permit), dated 2013, and the District Weed Control Aquatic Pesticide Application Plan, dated 2014. The District's Vegetation Management Plan seeks to reduce the amount of herbicides used by using selective herbicides and application techniques, timing applications for maximum effect, avoiding fixed application schedules, using mechanical control techniques where appropriate, and encouraging natural controls. For areas within USFWS-designated critical habitat for desert tortoise or areas identified as suitable for desert tortoise by a qualified biologist, herbicide use is coordinated with a qualified desert tortoise biologist prior to application. Any measures identified by the qualified biologist, including avoidance or biological monitoring, are implemented.

SOP-BIO-20 **Jurisdictional Waters Avoidance.** The District avoids impacts to jurisdictional waters as defined under state or federal law from stockpiles by placing stockpile material outside of jurisdictional waters as practicable.

SOP-CR-1 **Project-Specific APE.** An area of potential effect (APE) is established as needed on a project-specific basis for County projects, to facilitate implementing cultural resource and paleontological studies. The APE is defined by various means including but not limited to maps, aerials, plot plans, and/or a written description. APEs may be either contiguous or noncontiguous. In the absence of any defined APE boundary, the APE for maintenance projects consists of previously disturbed

soils. No project-specific work outside of any APE boundary is performed without survey by a qualified cultural consultant. It is understood that recommendations for conducting cultural surveys within any defined APE vary on a project-specific basis, including survey methods, evaluation protocols, and report preparation formats and guidelines.

SOP-CR-2 **Impacts to Archaeological/Built Environment Resources.** Should unanticipated or inadvertent surface and/or subsurface prehistoric or historic archaeological resources, and/or built environment resources, appear to be encountered during a maintenance activity associated with any County project, then all work within the immediate vicinity of the discovery halts until a qualified professional can evaluate the discovery. If the finds are archaeological or historic in nature, then an archaeologist meeting the Secretary of the Interior's Professional Qualification Standards for prehistoric and/or historic archaeology evaluates the significance of the find. This archaeologist has the authority to modify the no-work radius as appropriate, using professional judgment. The following apply, depending on the nature of the find:

- If the professional archaeologist determines that the find *does not* represent a cultural resource, then work may resume immediately.
- If the professional archaeologist determines that the find *does* represent a cultural resource from any historical period or cultural affiliation, appropriate treatment measures are developed, depending on the nature of the discovery.

If the find represents a Native American or potentially Native American resource that does not include human remains, which may or may not include a Tribal Cultural Resource, then the archaeologist establishes an appropriate "no-work" buffer and consults with appropriate Tribe(s) on whether the resource represents a Tribal Cultural Resource, a Historical Resource, or both, and if so, consults on appropriate treatment measures. Preservation in place is the preferred treatment, if feasible. Work cannot resume within the no-work radius until the County, through consultation as appropriate, determines that either (1) the site is not a Tribal Cultural Resource or Historical Resource or (2) the treatment measures for the Tribal Cultural Resource or Historical Resource have been completed.

SOP-CR-3 **Human Remains.** If a find during a maintenance activity includes human remains, or remains that are potentially human, the archaeologist ensures that reasonable protection measures are taken to protect the discovery from

disturbance (Assembly Bill 2641). The archaeologist notifies the San Bernardino County Coroner (per Section 7050.5 of the California Health and Safety Code). The Coroner's Office may be contacted at Coroner's Division, County of San Bernardino, 175 South Lena Road, San Bernardino, California 92415 or by calling 909.387.2978. The provisions of Section 7050.5 of the California Health and Safety Code, Section 5097.98 of the California Public Resources Code, and Assembly Bill 2641 are implemented. If the Coroner determines the remains are Native American and not the result of a crime, the Coroner notifies the Native American Heritage Commission (NAHC), which then designates a Native American Most Likely Descendant (MLD) for the project (Section 5097.98 of the California Public Resources Code). The designated MLD has 48 hours from the time access to the property is granted to make recommendations concerning treatment of the remains. If the landowner does not agree with the recommendations of the MLD, the NAHC can mediate (Section 5097.94 of the California Public Resources Code). If no agreement is reached, the landowner must rebury the remains where they will not be further disturbed (Section 5097.98 of the California Public Resources Code). This also includes recording the site with either the NAHC or the appropriate Information Center, using an open space or conservation zoning designation or easement, or recording a reinterment document with the county in which the property is located (Assembly Bill 2641). Work may not resume within the no-work radius until the County, through consultation as appropriate, determines that the treatment measures have been completed to its satisfaction.

SOP-CR-4 **Changes Based on Consultation and Legal Requirements.** As necessary, and in accordance with project-specific consultations conducted with the NAHC and various Tribal entities in association with Assembly Bill 52, Senate Bill 18, and/or any other legal guidelines relating to Native American consultations, the specific language noted in SOP-CR-2 and SOP-CR-3 may change to reflect project-specific needs and requirements.

SOP-GEO-1 **Earthwork and Grading Best Practices**. The District implements the following earthwork considerations, as applicable, during routine maintenance activities:

- *Remedial Grading*. Prior to grading, any fill zone is cleared of surface and subsurface obstructions. Voids created by removal of buried material are backfilled with properly compacted soil. Exposed subgrade in fill zones are scarified to a depth of at least 6 inches, moisture-conditioned to above optimum, and compacted to at least 90% of the ASTM D 1557-12 (modified

Proctor) laboratory maximum density. In some cases, wet subgrades may need to be stabilized with crushed rock, geogrids, and/or other methods.

- *Compacted Fill/Backfill*. Fill materials are naturally occurring, well-graded soil or soil/rock combinations, free of wood, trash, and construction debris and organic, contaminated, or deleterious material.
- *Slope Gradients.* New cut and fill slopes of drainage channels, basins, levees, dams, or adjacent hillsides may not exceed a gradient of 2:1 (horizontal to vertical) unless authorized by District engineering staff.
- *Temporary Slopes*. When necessary to prevent caving and to protect adjacent structures or property, temporary steep slopes are shored, sheeted, braced, or sloped in accordance with California Code of Regulations Title 8 and the regulations of local authorities with jurisdiction.

SOP-HYD-1 **Scheduling.** Scheduling is the development of a plan that includes sequencing of maintenance activities and the implementation of BMPs such as erosion control and sediment control while taking local climate (rainfall, wind, etc.) into consideration. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff, and vehicle tracking, and to perform the maintenance activities and control practices in accordance with the plan. The District schedules work only after the wetted portions of a channel or basin are dry enough to safely operate equipment when practicable and develops and implements a water diversion plan if activities occur when water is present; incorporates implementation of water quality BMPs into the planning and scheduling of maintenance activities to the greatest feasible extent; and sequences work to avoid periods of rain and high winds.

SOP-HYD-2 **Vegetation Management.** Vegetation clearing is avoided/minimized to the greatest extent practicable in areas within flood control rights-of-way that do not impact the District's ability to maintain flood control capacity and do not impact the District's ability to comply with federal and state flood protection requirements. Clippings and cuttings are properly disposed of. All work is completed in accordance with the District's Vegetation Management Plan. Vegetation management activities reduce the flood risk by maintaining conveyance capacity for flood control facilities, maintain access, and preserve visibility for inspections and maintenance activities. Vegetation management includes maintaining in-stream vegetation, removing non-native weeds, removing vegetation on stockpiles and adjacent properties, removing hazardous trees,

applying herbicide, implementing selective clearing operations, and in some cases, encouraging vegetation establishment and promotion. Vegetation can support the maintenance of flood control facilities through soil conservation and erosion control. (See SOP-HYD-4 regarding herbicide/pesticide application.)

SOP-HYD-3 **Minimization of Controllable Discharge of Sediment.** The District uses BMPs during program maintenance activities to minimize the controllable discharges of sediment to drainage systems or other waters of the state and of the United States. This includes the use of some or all of the following, as appropriate:

- **Storm Drain Inlet Protection.** Storm drain inlet protection consists of protective measures before runoff enters the storm drain. Control measures such as sediment filtration devices and/or impounding the area around or upstream of storm drains are implemented for sediment reduction. The following protection controls can be used: filter fabric and gravel bag barriers. The District maintains inlet protections regularly to keep them functioning properly.
- **Fiber Rolls.** Fiber rolls are used to intercept runoff, reduce its flow velocity, and release runoff as sheet flow. Fiber rolls are placed at the toe or on the face of slopes, along the perimeter of a program site, around temporary stockpiles, and downslope of exposed soil areas. Fiber rolls are one of many erosion control devices that can be and are employed by the District, as applicable.
- **Sandbag Barrier.** A sandbag barrier is a series of sand-filled bags placed on a level contour to intercept or to divert sheet flows. Sandbag barriers placed on a level contour pond sheet flow runoff, allowing sediment to settle out. Sandbag barriers are one of many erosion control devices that can be and are employed by the District, as applicable.
- **Gravel Bag Berms.** Gravel bag berms are a series of gravel-filled bags used to intercept sheet flows, pond the runoff flow, and allow the sediment to settle out and slowly release the sheet flow. Gravel bag berms can be used as a sediment/erosion control measure in the program area. Gravel bag berms are one of many erosion control devices that can be and are employed by the District, as applicable.
- **Stabilized Work Area Entrance/Exit**. A stabilized work area entrance/exit reduces the tracking of mud and dirt onto public roads by work trucks. The stabilization feature can be built by using different techniques. Some of the common techniques are using 3- to 6-inch-diameter stones, placing steel

rubble racks, and limiting the points of entrance/exit to the work area. The effectiveness of stabilized maintenance location entrances and exits are monitored and adjusted as necessary, and any vehicular trackouts of sediment are swept up.

- **Wind Erosion Control.** This control measure prevents dust and wind erosion by simply applying water or other dust palliatives as necessary to reduce or alleviate dust nuisance generated by maintenance activities. Wind erosion control is one of many erosion control devices that can be and are employed by the District, when necessary.
- **Straw Bales Barrier.** This temporary linear sediment barrier is placed where sediment-laden sheet flows from the work area can pond and settle out within the project site. Straw bales have limited applications. Straw bales barriers are one of many erosion control devices that can be and are employed by the District, as applicable.
- **Geotextiles and Mats.** Mattings, or rolled erosion control products (RECPs), are made of natural or synthetic materials or a combination of the two. RECPs are used to cover the soil surface to reduce erosion from rainfall impact, hold soil in place, and absorb and hold moisture near the soil surface. Additionally, RECPs are used to stabilize soils until vegetation is established or to reinforce non-woody surface vegetation. The District applies geotextiles and mats as applicable.
- **Soil Binders.** Soil binding consists of application and maintenance of a soil stabilizer to exposed soil surfaces. Soil binders are materials applied to the soil surface to temporarily prevent water- and wind-induced erosion of exposed soils on maintenance activity sites.
- **Temporary Stream Crossing.** A temporary stream crossing is a temporary culvert, ford, or bridge placed across a waterway to provide access for maintenance purposes for a period of less than 1 year. Temporary access crossings are not intended to maintain traffic for the public. The temporary access eliminates erosion and downstream sedimentation caused by vehicles.
- **Clear Water Diversion.** Clear water diversion consists of a system of structures and measures that intercept clear surface water runoff upstream of an activity, transport it around the work area, and discharge it downstream with minimal water quality degradation from either the program's maintenance activities or the creation of the diversion. Clear water diversions are used in a waterway to enclose a work area and reduce sediment pollution from maintenance work occurring in or adjacent to water. Structures

commonly used as part of this system include diversion ditches, berms, dikes, slope drains, rock, gravel bags, wood, aqua barriers, cofferdams, filter fabric or turbidity curtains, drainage and interceptor swales, pipes, or flumes. The District conducts clear water diversion as applicable to the specific maintenance project.

- **Preservation of Native Vegetation.** Native vegetation that does not impact facility capacity or compromise the integrity of the facility and that is not mandated for removal under federal and state regulatory agencies to ensure structural integrity is avoided to the greatest feasible extent, to protect soil from erosion. Vegetation incorporated into the facility as part of the project design is maintained to as-built conditions.
- **Hydroseeding.** Hydroseeding typically consists of applying a mixture of a hydraulic mulch, seed, fertilizer, and stabilizing emulsion with a hydraulic mulcher, to temporarily protect exposed soils from erosion by water and wind. Hydraulic seeding, or hydroseeding, is simply the method by which temporary or permanent seed is applied to the soil surface. The District applies hydroseeding when appropriate.
- **Silt Fences.** Silt fences are a temporary control measure that is made of woven geotextile and is entrenched, attached to supporting poles, and sometimes backed by plastic or wire mesh. Silt fences are one of many erosion control devices that can be and are employed by the District, as applicable.
- **Location of Temporary Stockpiles.** Temporary stockpiles may be placed in channel bottoms or debris basins if located on barren soil or areas with non-native weeds, and are not placed in such a manner that the stockpiles are exposed to flowing water. No temporary stockpiles are placed on channel beds or banks from October through April for more than the duration of the sediment removal work. Permanent stockpiles are not created within County rights-of-way in areas located within the 100-year flood hazard zone.

SOP-HYD-4 **Minimization of Controllable Discharge of Pollutants.** The District uses SOPs during program maintenance activities to minimize the controllable discharges of petroleum and chemical waste to drainage systems or other waters of the state and of the United States. This includes the use of some or all of the following, as appropriate:

- **Control of Corrosive Substances.** Substances resulting from program-related activities that could be harmful to aquatic life, including, but not limited to, petroleum lubricants and fuels, cured and uncured cements, epoxies, paints and other protective coating materials, Portland cement concrete or asphalt concrete, and washings and cuttings thereof, are not discharged to soils or waters of the state. All waste concrete is removed and properly disposed of.
- **Illegal Discharge.** Procedures and practices are put in place for contractors to recognize illegally dumped or discharged materials on a work site and to report incidents.
- **Road Base Discharge Avoidance.** The District implements measures to prevent the discharge of road base, fill, sediment, concrete, and/or asphalt beyond the previously established roadbed when maintaining existing driveways and dirt access roads within the maintenance activity area.
- **Spill and Leak Avoidance.** The District ensures that all equipment operating in and near a watercourse or in a basin is in good working condition and free of leaks. No equipment maintenance or refueling occurs in a channel or basin bottom. Spill containment materials are kept on site or readily available for any equipment maintenance or refueling that occurs adjacent to a watercourse. Further, a spill kit essential for controlling contaminants is available at all times. Operations staff members working with heavy equipment are trained in the use of the equipment and in spill containment and response for any unforeseeable accidents that may occur. Special care is taken to prevent liquid paint from entering aquatic resources while painting in association with graffiti removal.
- **Spill Notification.** Should any spills occur, the District contracts with the County Fire Marshal–Hazardous Materials Division to prepare and implement spills response plans and report spills to any applicable state and federal regulatory agencies, including the California Office of Emergency Services. Depending on the magnitude of the spill, the District has hazardous materials handlers to implement spill response plans prepared by the County Fire Marshal–Hazardous Materials Division and to safely handle and dispose of hazardous materials.

- **Housekeeping Practices.** The District promotes efficient and safe housekeeping practices (storage, use, and cleanup) when handling potentially harmful materials such as fertilizers, pesticides, cleaning solutions, paint products, automotive products, and swimming pool chemicals.
- **Non-Stormwater Discharges.** The District monitors and permits non-stormwater discharges as required and applicable under its NPDES MS4 permit.
- **Prohibition of Machine Maintenance near Streams.** Motorized equipment is not maintained or parked within or near any stream crossing, channel, or lake margin in such a manner that petroleum products or other pollutants from the equipment may enter these areas under any flow conditions. No equipment is operated in areas of flowing water. Vehicle maintenance, staging, storage, and dispensing of fuel occur in designated upland areas. These areas are located in a manner to prevent any runoff from entering waters of the United States.
- **Concrete Washout Protocols.** The District implements appropriate waste management practices during on-site concrete repair operations. Waste management practices are applied to the stockpiling of concrete, curing and finishing of concrete, and concrete wash-out operations. Waste management practices are adequate to ensure that fluids associated with the curing, finishing, and wash-out of concrete are not discharged to the channel or basin. Concrete wastes are stockpiled separately from sediment and protected by erosion control measures so that concrete dust and debris are not discharged to the channel, basin, or waters of the state. The District determines the appropriate waste management practices based on considerations of flow velocities, site conditions, availability of erosion control materials, maintenance activity costs, and other requirements that may be outlined in the District's MS4 permit.
- **Aquatic Pesticide and Herbicide.** The District applies pesticides, herbicides, and related surfactants within its facilities in accordance with the District's Vegetation Management Plan, which complies with the Statewide General NPDES Permit for Residual Aquatic Pesticide Discharges to Waters of the United States from Algae and Aquatic Weed Control Applications, General Permit No. CAG990005, Order No. 2013-0002-DWQ (Permit), dated 2013, and the District Weed Control Aquatic Pesticide Application Plan, dated 2014. The District's Vegetation Management Plan seeks to reduce the amount of herbicides used, by using selective herbicides and application techniques, timing applications for maximum effect, avoiding fixed application schedules,

using mechanical control techniques where appropriate, and encouraging natural controls. See SOP-HYD-2 for a description of the overall purpose of the District's Vegetation Management Plan.

- **Drainage System Maintenance.** As a consequence of its function, the stormwater conveyance system collects and transports urban runoff that may contain certain pollutants. Maintaining catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis removes pollutants, prevents clogging of the downstream conveyance system, restores catch basins' sediment trapping capacity, and ensures that the system functions properly hydraulically to avoid flooding.
- **Outdoor Storage of Raw Materials.** Raw materials, by-products, finished products, containers, and material storage areas exposed to rain and/or runoff can pollute stormwater. Stormwater can become contaminated when materials wash off or dissolve into water or are added to runoff by spills and leaks. Improper storage of these materials can result in accidental spills and the release of materials. To prevent or reduce the discharge of pollutants to stormwater from material delivery and storage, the District implements pollution prevention and source control measures, such as minimizing the storage of hazardous materials on site, enclosing or covering materials, storing materials in a designated area, installing secondary containment, conducting regular inspections, preventing stormwater run-on and runoff, and training employees and subcontractors.
- **Stockpile Management.** The District implements appropriate stockpile management practices. Stockpile management procedures and practices reduce or eliminate air and stormwater pollution from stockpiles of soil; soil amendments; sand; paving materials, such as Portland cement concrete rubble, asphalt concrete, asphalt concrete rubble, aggregate base, aggregate sub base or pre-mixed aggregate, and asphalt minder (so called "cold mix" asphalt); and pressure-treated wood.
- **Structural Demolition/Removal Over or Adjacent to Water.** The District implements procedures to protect water bodies from debris and wastes associated with structure demolition or removal over or adjacent to watercourses.

SOP-NOI-1 **Avoidance of Impacts to Noise-Sensitive Receptors during Earthworks.** In order to minimize noise at nearby noise-sensitive receptors, proposed program activities implement the following earthwork considerations, as applicable:

- Noise-generating maintenance activities are restricted to the daytime, generally 7:00 a.m. to 7:00 p.m. Monday through Friday, or to the applicable local permitted hours if the work is located within a jurisdictional boundary in the program area, except for urgent or emergency situations. As necessary, the District coordinates with the applicable local jurisdiction regarding activities that are not consistent with local ordinances to avoid/minimize impacts.
- When a maintenance activity within the City of Rancho Cucamonga (City) boundaries or Sphere of Influence is located within 660 feet of a residential use and/or zone, the District will inform the City planning department prior to the commencement of the activity. For maintenance activities that require the use of the City's right-of-way for hauling excavated material, the District will provide a map of the route that will be used by haul vehicles.
- Electrically powered equipment is used instead of pneumatic or internal-combustion-powered equipment, where feasible.
- Temporary material stockpiles and mobile equipment staging and parking are located as far as practicable from noise-sensitive receptors.

SOP-PUB-1 **Fire Extinguisher.** Due to the risk of fire, all maintenance vehicles are equipped with a fire extinguisher in case of incidental sparks caused by maintenance.

SOP-PUB-2 **Fire Safety Measures.** The maintenance crew provides fire safety measures during maintenance activities in compliance with Chapter 33 of the California Fire Code. Gasoline-powered or diesel-powered machinery used during maintenance are equipped with standard exhaust controls and muffling devices that also act as spark arrestors. Fire containment and extinguishing equipment are available and accessible during maintenance activities. The maintenance crew is trained in the use of the fire suppression equipment and is not permitted to idle vehicles on the job site when they are not in use. Where hot work is necessary, it is performed in compliance with the California Fire Code's Chapter 35, "Welding and Other Hot Work," and the National Fire Protection Association's 51-B, "Fire Prevention During Welding, Cutting and Other Hot Work."

SOP-REC-1 **Agency Coordination.** During scheduling of maintenance activities, the District reaches out to the applicable agencies (e.g., agencies with jurisdiction over parks

and recreational resources, California Department of Fish and Wildlife, Bureau of Land Management, U.S. Forest Service, utility and water agencies) to ensure that scheduled maintenance would not be in conflict with the goals, responsibilities, and existing infrastructure of agencies with overlapping jurisdiction, including other closures planned by the agencies, maintenance of existing infrastructure, or applicable goals and policies of the respective agencies.

SOP-TR-1 **District Coordination and Traffic Control Plan.** The District coordinates with local jurisdictions, emergency service providers, or transit providers, as appropriate, when maintenance activities affect emergency access or bicycle, pedestrian, or transit facilities. Coordination is also required if maintenance activities cause interference with roadway operations, such as lane closures during peak hours or detours. If required by the affected jurisdiction, a traffic control plan is prepared.

6 REFERENCES

14 CCR 15000–15387 and Appendices A–L. Guidelines for Implementation of the California Environmental Quality Act, as amended.

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DWR (California Department of Water Resources). 2008. "Current Practices of the Department of Water Resources in Supervision of Dams and Reservoirs." Guide/Handbook.

USACE (U.S. Army Corps of Engineers). 2006. *Levee Owner's Manual for Non-Federal Flood Control Works*. The Rehabilitation and Inspection Program, Public Law 84-99. March 2006. http://media.swf.usace.army.mil/pubdata/ppmd/emermgt/pdf/leveeownersmanual.pdf.

USACE. 2014. *Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures*. Technical Letter No. ETL 1110-2-583. April 30, 2014.

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APPENDIX A

Facility Maintenance Matrix

APPENDIX A
Routine Maintenance Final List

Line Number	Facility Name	Flood Control Facility System Index Number	Facility Type	Interim/Ultimate	Hydraulic Analysis Conducted?	Rational for Not Conducting Hydraulic Analysis	Estimated Duration of Work	Maintenance Occurrence (Spring: Mar-May; Summer: Jun-Aug; Fall: Sep-Nov; Winter: Dec-Feb)	Type of Maintenance Activity										Type of Equipment Used and Number of Equipment																			
		FCD	FCD						Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column
									Bank Repair	Concrete Structure Repair	Graffiti Removal	Herbicide and Rodenticide	Ingress/Egress	Mechanized Land Clearing/Excavation	Mowing, Hand Tools, and Related Vegetation Removal	Stockpile Maintenance	Stream Gage Maintenance	Vector Control	Broom	Cement Truck	Dozer	Dump Truck	Excavator	Gradall	Grader	Loader	Non-mechanized Equipment (Hand-held)	Pneumatic Roller	Scraper	Service Truck	Skidsteer Loader	Speed Loader	Sprayer Trucks/Equipment	Tractor and Disc	Tractor/Boom Mower	Water Truck
1	San Antonio Channel (USACE)	1-101-1G	Levee	Ultimate	N	Concrete	12	spring, summer, fall	x	x	x	x	x	x	x			x				1				1				1	1	1	1			
2	San Antonio Channel (USACE)	1-101-1H	Levee	Ultimate	N	Concrete	12	spring, summer, fall	x	x	x	x	x	x	x			x				1			1	1	1			1	1	1	1		1	1
3	Chino Creek	1-102-1A	Channel	Ultimate	N	Concrete	12	spring, summer, fall	x	x	x	x	x	x	x			x				1			1	1	1			1	1	1	1		1	1
4	College Heights Spreading Grounds	1-108-2A	Spreading Ground	Interim	N	Basin	12	spring, summer, fall	x	x	x	x	x		x			x				2	1		1	1	1			1		1	1		1	1
5	West State Street Storm Drain	1-112-6A	Channel	Interim	N	Concrete	11	spring, summer, fall			x	x	x	x				x				1			1	1				1	1	1				1
6	West State Street Storm Drain	1-112-6B	Channel	Interim	N	Concrete	11	spring, summer, fall			x	x	x	x				x				1			1	1				1	1	1				1
7	Carbon Canyon Creek Channel	1-114-1A	Channel	Interim	N	Concrete	12	spring, summer, fall			x	x	x	x	x			x				1				1				1	1	1	1		1	1
8	Carbon Canyon Creek Channel	1-114-1B	Channel	Interim/ Ultimate	N	Low Resource Value	12	summer, fall	x	x	x	x	x	x	x			x				5	1	1	1	1	1			3	1	1	1		1	1
9	Chino Storm Drain	1-120-6A	Channel	Interim	N	Concrete	15	spring, summer, fall	x	x	x	x	x	x	x			x				2			1	1	1			2	1	1	2			1
10	Lake Los Serranos Channel	1-124-1A	Channel	Ultimate	N	Concrete	12	spring, summer, fall	x	x	x	x	x	x	x			x				2			1	1	1			2	1	1	1			1
11	Lower Los Serranos Channel	1-125-1A	Channel	Ultimate	N	Concrete	14	spring, summer, fall		x	x	x	x		x			x				2	1	1	1	1	1			2	1	1	1			1
12	Soquel Canyon Channel	1-126-1A	Channel	Unknown	N	Concrete	14	summer			x	x	x	x	x			x				5	1	1	1	1	1			2		1	1			1
13	English Canyon Channel	1-127-1A	Channel	Ultimate	N	Low Resource Value	11	fall, winter	x	x	x	x	x	x	x			x				1			1		1			2			1	1		1
14	West Cucamonga Channel	1-201-1E	Channel	Ultimate	N	Concrete	11	fall, winter	x	x	x	x	x	x	x			x	1			2		1	1	1	1			2	1	1	2			1
15	West Cucamonga Channel	1-201-1G	Channel	Ultimate	N	Concrete	11	spring, summer, fall	x	x	x	x	x	x	x			x				2			1	1	1			2	1	1	2			1
16	West Cucamonga Channel	1-201-1H	Levee	Interim	N	Concrete	11	spring, summer, fall	x	x	x	x	x	x	x			x				1			1	1	1			1	1	1	1			1
17	8th Street Basin No 1	1-209-4A	Detention Basin	Interim	N	Basin	11	summer, fall, winter	x	x	x	x	x	x	x			x				2		1	1	1	1			2	1	1	2		1	1
18	8th Street Basin No 2	1-209-4B	Detention Basin	Interim	N	Basin	11	summer, fall, winter	x	x	x	x	x	x	x			x				2		1	1	1	1			2	1	1	2		1	1
19	8th Street Basin No 3	1-209-4C	Detention Basin	Interim	N	Basin	11	summer, fall, winter	x	x	x	x	x	x	x			x				2		1	1	1	1			2	1	1	2		1	1

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									Bank Repair	Concrete Structure Repair	Graffiti Removal	Herbicide and Rodenticide	Ingress/Egress	Mechanized Land Clearing/Excavation	Mowing, Hand Tools, and Related Vegetation Removal	Stockpile Maintenance	Stream Gage Maintenance	Vector Control	Broom	Cement Truck	Dozer	Dump Truck	Excavator	Gradall	Grader	Loader	Non-mechanized Equipment (Hand-held)	Pneumatic Roller	Scraper	Service Truck	Skidsteer Loader	Speed Loader	Sprayer Trucks/Equipment	Tractor and Disc	Tractor/Boom Mower	Water Truck
20	Ely Basin No 1	1-211-4A	Detention Basin	Ultimate	N	Basin	11	summer, fall, winter	x	x	x	x	x	x	x			x				2		1	1	1	1			2	1	1	2		1	1
21	Ely Basin No 2	1-211-4B	Detention Basin	Ultimate	N	Basin	11	summer, fall, winter	x	x	x	x	x	x	x			x				2		1	1	1	1			2	1	1	2		1	1
22	19th Street Storm Drain	1-202-6A	Channel	Interim	N	Interim Facility	13	summer, fall, winter			X	x	x	x	x			x				2		1	1	1	1			2	1	1	1		1	1
23	Cucamonga Channel (USACE)	1-301-1B	Channel	Ultimate	N	Concrete	13	summer, fall, winter		x	x	x	x	x	x			x							1		1			1		1				1
24	Cucamonga Channel (USACE)	1-301-1C	Channel	Ultimate	N	Concrete	11	summer, fall, winter		x	x	x	x	x	x			x	1	1		2			1	1	1			1	1	1	2		1	1
25	Cucamonga Channel (USACE)	1-301-1D	Channel	Ultimate	N	Concrete	11	summer, fall, winter		x	x	x	x	x	x			x	1	1		2			1	1	1			1	1	1	2		1	1
26	Cucamonga Channel (USACE)	1-301-1E	Channel	Ultimate	N	Concrete	11	summer, fall, winter		x	x	x	x	x	x			x	1	1		2			1	1	1			1	1	1	2		1	1
27	Cucamonga Channel (USACE)	1-301-1F	Channel	Ultimate	N	Concrete	11	summer, fall, winter		x	x	x	x	x	x			x	1	1		2			1	1	1			1	1	1	2		1	1
28	Cucamonga Channel (USACE)	1-301-1G	Channel	Ultimate	N	Concrete	11	summer, fall, winter		x	x	x	x	x	x			x	1	1		2			1	1	1			1	1	1	2		1	1
29	Cucamonga Channel (USACE)	1-301-1H	Channel	Ultimate	N	Concrete	11	summer, fall, winter		x	x	x	x	x	x			x	1	1		2			1	1	1			1	1	1	2		1	1
30	Cucamonga Channel (USACE)	1-301-1I	Channel	Ultimate	N	Concrete	11	summer, fall, winter		x	x	x	x	x	x			x	1	1		3	1		1	1	1	1			1	1	1		1	1
31	Cucamonga Spreading Grounds	1-303-2A	Spreading Ground	Ultimate	N	Basin	14	spring, summer, fall, winter		x	x	x	x	x	x	x		x	1		1	4	1		1	1	1		1	2		1	1		1	1
32	Cucamonga Basin No 7	1-304-4B	Detention Basin	Ultimate	N	Basin	12	fall	x	x	x	x	x	x	x			x				2				1	1			2		1				
33	Cucamonga Basin No 8	1-304-4C	Debris/Detention Basin	Ultimate	N	Basin	12	fall, winter	x	x	x	x	x	x	x			x	1			2		1	1	1	1			2	1	1	1		1	1
34	Cucamonga Basin No 6	1-306-4B	Detention Basin	Ultimate	N	Basin	12	spring, summer, fall, winter	x	x	x	x	x	x	x			x				2			1	1	1			2	1	1	1		1	1

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									Bank Repair	Concrete Structure Repair	Graffiti Removal	Herbicide and Rodenticide	Ingress/Egress	Mechanized Land Clearing/Excavation	Mowing, Hand Tools, and Related Vegetation Removal	Stockpile Maintenance	Stream Gage Maintenance	Vector Control
35	Lower Cucamonga Spreading Grounds (previously 2A only, now 2A-2D)	1-310-2A	Spreading Ground	Interim	N	Basin	16	summer, fall, winter	x	x	x	x	x	x	x			x
36	Lower Cucamonga Spreading Grounds (previously2A only, now 2A-2D)	1-310-2B	Spreading Ground	Interim	N	Basin	16	summer, fall, winter	x	x	x	x	x	x	x			x
37	Lower Cucamonga Spreading Grounds (reviously 2A then 4A-4D, now 2A-2D)	1-310-2C	Spreading Ground	Interim	N	Basin	16	summer, fall, winter	x	x	x	x	x	x	x			x
38	Lower Cucamonga Spreading Grounds (reviously 2A then 4A-4D, now 2A-2D)	1-310-2D	Spreading Ground	Interim	N	Basin	16	summer, fall, winter	x	x		x	x	x	x			x
39	San Antonio Heights Intercept (USACE)	1-313-1A	Channel	Unknown	N	Concrete	12	summer, fall		x	x	x	x	x	x	x		x
40	San Antonio Heights Basin No 1 (Frankish) (USACE)	1-313-4A	Debris Basin	Interim	N	Basin	12	spring, summer, fall, winter	x	x	x	x	x	x	x			x
41	San Antonio Heights Basin No 5 (Marble) (USACE)	1-313-4B	Debris Basin	Interim	N	Basin	12	spring, summer, fall, winter	x	x	x	x	x	x	x			x
42	San Antonio Heights Basin (West Frankish)	1-313-4D	Debris Basin	Interim	N	Basin	12	spring, summer, fall, winter	x	x	x	x	x	x	x			x
43	San Antonio Heights Basin No 3 (Cherbak) (USACE)	1-313-4E	Debris Basin	Interim	N	Basin	12	spring, summer, fall, winter	x	x	x	x	x	x	x			x
44	San Antonio Heights Basin No 2 (Meryl) (USACE)	1-313-4F	Debris Basin	Interim	N	Basin	12	spring, summer, fall, winter	x	x	x	x	x	x	x			x

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	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column	Ops/ EMD Mich: Column
	Broom	Cement Truck	Dozer	Dump Truck	Excavator	Gradall	Grader	Loader	Non-mechanized Equipment (Hand-held)	Pneumatic Roller	Scraper	Service Truck	Skidsteer Loader	Speed Loader	Sprayer Trucks/Equipment	Tractor and Disc	Tractor/Boom Mower	Water Truck
35			1	4	1	1	1	1	1			3	1	1	2	1	1	1
36			1	4	1	1	1	1	1			3	1	1	2	1	1	1
37			1	4	1	1	1	1	1			3	1	1	2	1	1	1
38			1	4	1	1	1	1	1			3	1	1	2	1	1	1
39				2			1	1	1			2	1	1	2		1	1
40				2			1	1	1			2	1	1	1		1	1
41				2			1	1	1			2	1	1	1		1	1
42				2			1	1	1			2	1	1	1		1	1
43				2			1	1	1			2	1	1	1		1	1
44				2			1	1	1			2	1	1	1		1	1

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45	San Antonio Heights Basin No 4 (Gray) (USACE)	1-313-4G	Debris Basin	Interim	N	Basin	12	spring, summer, fall, winter	x	x	x	x	x	x	x			x				2			1	1	1			2	1	1	1		1	1
46	San Antonio Heights Basin No 6 (USACE)	1-313-4H	Debris Basin	Interim	N	Basin	12	spring, summer, fall, winter	x	x	x	x	x	x	x			x				2			1	1	1			2	1	1	1		1	1
47	Almond Intercept Channel	1-315-1A	Channel	Interim	N	Concrete	12	spring, summer, fall, winter		x	x	x	x	x	x			x				2					x			x			x		x	x
48	County Line Channel	1-317-1A	Channel	Ultimate	N	Concrete	13	spring, summer, fall		x	x	x	x	x	x			x	1			2			1	1	1			2	1	1	1			1
49	Cucamonga Dam, (USACE (DSOD))	1-352-3A	Debris Basin	Ultimate	N	Basin	15	summer, fall	x	x	x	x	x	x	x	x		x			1	5	1		1	1	1		2	3		1	1		1	1
50	Cucamonga Channel (USACE)	1-301-1A	Channel	#N/A	N	Maintenance only along access road	12	spring, summer, fall	x	x	x	x	x	x	x			x				2			1	1	1			1	1	1	1		1	1
51	Demens Creek Channel (USACE)	1-401-1B	Channel	Ultimate	N	Concrete	11	fall	x	x	x	x	x	x	x			x				X	X	X	X	X				X					X	X
52	Demens Basin Channel	1-402-1A	Channel	Ultimate	N	Low Resource Value	13	spring, summer, fall, winter	x	x	x	x	x	x	x			x	1			2		1	1	1	1			2	1	1	1		1	1
53	Demens Basin Channel	1-402-1B	Channel	Ultimate	N	Low Resource Value	11	fall, winter	x			x	x	x	x			x				2			1	1	1			2	1	1	1		1	1
54	Demens Basin No 1, (USACE (DSOD))	1-402-3A	Debris Basin	Ultimate	N	Basin	12	fall, winter	x	x	x	x	x	x	x	x		x			1	2	1	1	1	1	1		2	2	1	1	2		1	1
55	Alta Loma Storm Drain	1-405-6A	Storm Drain	Ultimate	N	Concrete	12	fall, winter		x	x	x	x	x	x			x				2			1	1	1			2	1	1	1			1
56	Alta Loma Storm Drain	1-405-6B	Storm Drain	Ultimate	N	Concrete	12	fall, winter		x	x	x	x	x	x			x				2			1	1	1		2	2	1	1				1
57	Alta Loma Basin No 1 (DSOD)	1-406-3A	Detention Basin	Ultimate	N	Basin	12	fall, winter		x	x	x	x	x	x			x			1	5	1	1	1	1	1			3	1	1	2		1	1
58	Alta Loma Basin No 2 (DSOD)	1-406-3B	Detention Basin	Ultimate	N	Basin	12	fall, winter		x	x	x	x	x	x			x			1	5	1	1	1	1	1			3	1	1	2		1	1

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59	Alta Loma Basin No 3	1-406-4C	Detention Basin	Ultimate	N	Basin	12	fall, winter		x	x	x	x	x	x			x			1	5	1	1	1	1	1			3	1	1	2		1	1
60	Cucamonga Connector (formerly 1-312-1A)	1-312-6A	Channel	Unknown	N	Facility is adjacent to property and must be maintained to fullest extent.	11	fall, winter			x	x	x		x			x									1									
61	Deer Creek Channel (USACE)	1-501-1B	Channel	Ultimate	N	Concrete	11	spring, summer, fall, winter		x	x	x	x	x	x	x		x	1			2			1	1	1			1	1	1	2		1	1
62	Deer Creek Channel (USACE)	1-501-1C	Channel	Ultimate	N	Concrete	11	spring, summer, fall, winter		x	x	x	x	x	x			x	1			2			1	1	1			1	1	1	2		1	1
63	Deer Creek Channel (USACE)	1-501-1D	Channel	Ultimate	N	Concrete	11	spring, summer, fall, winter		x	x	x	x	x	x			x	1			2			1	1	1			1	1	1	2		1	1
64	Deer Creek Channel (USACE)	1-501-1E	Channel	Ultimate	N	Concrete	11	spring, summer, fall, winter		x	x	x	x	x	x			x	1			2			1	1	1			1	1	1	2		1	1
65	Deer Creek Channel (USACE)	1-501-1F	Channel	Ultimate	N	Concrete	11	spring, summer, fall, winter		x	x	x	x	x	x			x	1			2			1	1	1			1	1	1	2		1	1
66	Lower Deer Creek Channel	1-501-1I	Channel	Ultimate	N	Concrete	11	spring, summer, fall, winter		x	x	x	x	x	x			x	1			2			1	1	1			1	1	1	2		1	1
67	Chris Basin	1-501-4A	Detention Basin	Interim	N	Basin	14	fall	x	x	x	x	x	x	x			x			1	4	1	1	1	1	1			2	1	1	1	1	1	1
68	Deer Creek Spreading Ground	1-502-2A	Spreading Ground	Interim	N	Basin	12	winter			x	x	x	x				x			1	4			1	1				2					1	1
69	Deer Creek Reception Levee	1-503-5A	Channel	Interim	N	Interim Facility	12	fall				x	x					x							1					1			1			1
70	Turner Basin No 1	1-504-4A	Spreading Ground	Interim	N	Basin	12	fall			x	x	x	x	x	x		x			1	3	1	1	1	1	1			2	1	1	1	1	1	1
71	Turner Basin No 2	1-504-4B	Spreading Ground	Interim	N	Basin	12	spring, summer, fall, winter			x	x	x	x	x			x			1	3	1	1	1	1	1			2	1	1	1	1	1	1
72	Turner Basin No 3	1-504-4C	Spreading Ground	Interim	N	Basin	12	spring, summer, fall	x	x		x	x	x	x			x			1	3	1	1	1	1	1			2	1	1	1	1	1	1
73	Turner Basin No 4	1-504-4D	Spreading Ground	Interim	N	Basin	12	spring, summer, fall	x	x	x	x	x	x	x			x			1	3	1	1	1	1	1			2	1	1	1	1	1	1
74	Turner Basin No 5	1-504-4E	Spreading Ground	Interim	N	Basin	12	spring, summer, fall	x	x	x	x	x	x	x			x			1	3	1	1	1	1	1			2	1	1	1	1	1	1

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									Bank Repair	Concrete Structure Repair	Graffiti Removal	Herbicide and Rodenticide	Ingress/Egress	Mechanized Land Clearing/Excavation	Mowing, Hand Tools, and Related Vegetation Removal	Stockpile Maintenance	Stream Gage Maintenance	Vector Control	Broom	Cement Truck	Dozer	Dump Truck	Excavator	Gradall	Grader	Loader	Non-mechanized Equipment (Hand-held)	Pneumatic Roller	Scraper	Service Truck	Skidsteer Loader	Speed Loader	Sprayer Trucks/Equipment	Tractor and Disc	Tractor/Boom Mower	Water Truck
75	Deer Creek Debris Basin, (USACE (DSOD))	1-506-3A	Debris Basin	Ultimate	N	Basin	14	fall	x	x	x	x	x	x	x			x			1	4			1	1	1		2	3		1	2		1	1
76	Hillside Channel (USACE)	1-552-1A	Channel	Ultimate	N	Concrete	13	fall	x	x	x	x	x	x	x			x	1			2			1	1	1			2	1	1	1		2	X
77	Hillside Basin (USACE)	1-552-4A	Debris Basin	Ultimate	N	Basin	13	fall	x	x	x	x	x	x	x	x		x	1			2			1	1	1			2	1	1	2		1	1
78	Day Creek Channel	1-601-1A	Channel	Ultimate	N	Concrete	12	spring, summer, fall		x	x	x	x	x	x			x	1			2			1	1	1			2	1	1	2		1	1
79	Day Creek Channel	1-601-1B	Channel	Ultimate	N	Concrete	12	spring, summer, fall		x	x	x	x	x	x			x	1			2			1	1	1			2	1	1	2		1	1
80	Day Creek Channel	1-601-1C	Channel	Ultimate	N	Concrete	12	spring, summer, fall		x	x	x	x	x	x			x	1			2			1	1	1			2	1	1	2		1	1
81	Day Creek Channel	1-601-1D	Channel	Ultimate	N	Concrete	12	spring, summer, fall		x	x	x	x	x	x			x	1			2			1	1	1			2	1	1	2		1	1
82	Day Creek Channel	1-601-1E	Channel	Ultimate	N	Concrete	12	spring, summer, fall		x	x	x	x	x	x			x	1			2			1	1	1			2	1	1	2		1	1
83	Day Creek Channel	1-601-1F	Channel	Ultimate	N	Concrete	12	spring, summer, fall		x	x	x	x	x	x			x	1			2			1	1	1			2	1	1	2		1	1
84	Day Creek Spreading Grounds	1-602-2A	Spreading Ground	Unknown	N	Basin	15	summer	x	x	x	x	x	x	x	x		x				2			1	1	1			2		1	1		1	1
85	Wineville Basin	1-603-4A	Detention Basin	Interim	N	Basin	15	summer, fall	x	x	x	x	x	x	x			x			1	4	1	1	1	1	1		2	2	1	1	1	1	1	1
86	Riverside Basin	1-604-4A	Detention Basin	Interim	N	Basin	15	summer, fall	x	x	x	x	x	x	x			x	1	1	1	1	1	1	1	1	1			1	1	1	1		1	1
87	Day Creek Basin No 1	1-606-4A	Detention Basin	Unknown	N	Basin	14	summer, fall	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1			2	1	1	2	1	1	1
88	Day Creek Basin No 2	1-606-4B	Detention Basin	Interim	N	Basin	15	summer, fall	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1			2	1	1	2	1	1	1
89	Day Creek Dam [DSOD]	1-608-3A	Debris Basin	Ultimate	N	Basin	25	spring, summer, fall, winter	x	x	x	x	x	x	x			x			1	4	1	1	1	1	1		1	2		1	1	1	1	1
90	Day Creek Spreading Basin No 1	1-614-4A	Spreading Ground	Ultimate	N	Basin	12	fall	x	x	x	x	x	x	x	x		x				2			1	1	1			2	1	1	2		1	1
91	Day Creek Spreading Basin No 2	1-614-4B	Spreading Ground	Ultimate	N	Basin	12	fall	x	x	x	x	x	x	x	x		x				2			1	1	1			2	1	1	2		1	1

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92	Day Creek Spreading Basin No 3	1-614-4C	Spreading Ground	Ultimate	N	Basin	12	fall	x	x	x	x	x	x	x	x		x				2			1	1	1			2	1	1	2		1	1
93	Day Creek Spreading Basin No 4	1-614-4D	Spreading Ground	Ultimate	N	Basin	12	fall	x	x	x	x	x	x	x	x		x				2			1	1	1			2	1	1	2		1	1
94	Day Creek Spreading Basin No 5	1-614-4E	Spreading Ground	Ultimate	N	Basin	12	fall	x	x	x	x	x	x	x	x		x				2			1	1	1			2	1	1	2		1	1
95	Etiwanda Creek Channel	1-701-1C	Channel	Ultimate	N	Concrete	11	summer, fall		x	x	x	x	x	x			x	1			2			1	1	1			2	1	1	2		1	1
96	Etiwanda Creek Channel	1-701-1D	Channel	Ultimate	N	Concrete	11	summer, fall		x	x	x	x	x	x			x	1			2			1	1	1			2	1	1	2		1	1
97	Etiwanda Creek Channel	1-701-1E	Channel	Interim	N	Concrete	11	summer, fall		x	x	x	x	x	x			x	1			2			1	1	1			2	1	1	2		1	1
98	Lower Etiwanda Creek Channel	1-701-1H	Channel	Ultimate	N	Concrete	13	spring, summer, fall		x	x	x	x	x	x			x				2			1	1	1			2	1	1	1			1
99	Etiwanda Spreading Grounds	1-702-2A	Spreading Ground	Interim	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x			x				2			1					1			1			1
100	Victoria Basin	1-703-4A	Detention Basin	Interim	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x			x				2			1	1	1			2	1	1			1	1
101	24th Street Storm Drain	1-705-6A	Storm Drain	Interim	N	Storm Drain	12	spring, summer, fall, winter		x	x			x	x			x				2			1	1	1			1	1	1	1	1	1	1
102	Etiwanda Debris Basin (Etiwanda Creek Dam)	1-707-3A	Debris Basin	Ultimate	N	Basin	13	fall	x	x	x	x	x	x	x			x	1	1	1	4	1	1	1	1	1		2	2	1	1	2	1	1	1
103	San Sevaine Channel	1-801-1G	Channel	Ultimate	N	Concrete	12	summer, fall		x	x	x	x	x	x			x				1			1	1	1			1	1	1	1	1	1	1
104	San Sevaine Channel	1-801-1H	Channel	Ultimate	N	Concrete	12	summer, fall		x	x	x	x	x	x			x				1			1	1	1			1	1	1	1	1	1	1
105	San Sevaine Channel	1-801-1I	Channel	Ultimate	N	Concrete	12	summer, fall		x	x	x	x	x	x			x				1			1	1	1			1	1	1	1	1	1	1
106	San Sevaine Channel	1-801-1J	Channel	Ultimate	N	Concrete	12	summer, fall		x	x	x	x	x	x			x				1			1	1	1			1	1	1	1	1	1	1

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107	San Sevaine Channel	1-801-1K	Channel	Ultimate	N	Concrete	12	summer, fall		x	x	x	x	x	x			x				1			1	1	1			1	1	1	1	1	1	1
108	San Sevaine Spreading Grounds	1-802-2A	Spreading Ground	Ultimate	N	Basin	14	spring, summer, fall		x		x	x	x	x			x				2			1	1	1			2		1	1			1
109	San Sevaine Basin No 5 (DSOD)	1-802-3E	Detention Basin	Ultimate	N	Basin	17	spring, summer		x	x	x	x	x	x	x		x				2		1	1	1	1			1	1	1	1		1	1
110	San Sevaine Basin No 1	1-802-4A	Detention Basin	Ultimate	N	Basin	17	spring, summer		x	x	x	x	x	x	x		x				2		1	1	1	1			1	1	1	1		1	1
111	San Sevaine Basin No 2	1-802-4B	Detention Basin	Ultimate	N	Basin	17	spring, summer		x	x	x	x	x	x	x		x				2	1	1	1		1	1		1	1	1	1		1	1
112	San Sevaine Basin No 3	1-802-4C	Detention Basin	Ultimate	N	Basin	17	spring, summer		x	x	x	x	x	x	x		x				2	1	1	1		1	1		1	1	1	1		1	1
113	San Sevaine Basin No 4	1-802-4D	Detention Basin	Ultimate	N	Basin	17	spring, summer		x	x	x	x	x	x	x		x	1	1		2	1	1	1		1	1		1	1	1	1		1	1
114	San Sevaine Sprdg Grounds -West Levee	1-802-5B	Spreading Ground	Ultimate	N	Basin	12	spring, summer		x	x	x	x	x	x			x				2	1	1	1	1	1			2		1	2		1	1
115	San Sevaine Sprdg Grounds-West Levee	1-802-5C	Spreading Ground	Ultimate	N	Basin	12	spring, summer		x	x	x	x	x	x			x				2	1	1	1	1	1			2		1	2		1	1
116	San Sevaine Sprdg Grounds-East Levee	1-802-5D	Spreading Ground	Ultimate	N	Basin	12	spring, summer		x	x	x	x	x	x			x				2	1	1	1	1	1			2		1	2		1	1
117	Banana Basin	1-803-4A	Detention Basin	Ultimate	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x			x			1		1	1	1	1	1			2	1	1	1	1	1	1
118	Jurupa Basin (DSOD)	1-804-3A	Detention Basin	Ultimate	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x			x			1		1	1	1	1	1			2	1	1	1	1	1	1
119	Hawker-Crawford Channel	1-806-1A	Channel	Interim	N	Interim Facility	11	spring, summer, fall	x	x	x	x	x	x	x			x	1	1	1	2		1	1	1	1			2	1	1	1		1	1
120	Hawker-Crawford Channel	1-806-1B	Channel	Ultimate	N	Concrete	11	spring, summer, fall	x	x	x	x	x	x	x			x	1	1	1	4			1	1	1						2	1	1	1
121	Rich Basin	1-807-4A	Detention Basin	Ultimate	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x			x	1		1	4	1	1	1	1	1			2	1	1	2	1	1	1
122	Henderson Channel	1-808-1A	Channel	Ultimate	N	Concrete	12	summer, fall		x	x	x	x	x	x			x		1		2			1	1	1			2	1	1	2			1

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123	Henderson Channel	1-808-1B	Channel	Interim	N	Interim Facility	13	fall	x	x	x	x	x	x	x			x				2			1	1	1			2	1	1	2			1
124	Henderson Channel (Wardman Channel)	1-808-1C	Channel	Ultimate	N	Concrete	13	fall	x	x	x	x	x	x	x			x	1	1		4			1	1	1			2	1	1	2			1
125	West Fontana Channel	1-809-6A	Channel	Interim	N	Low Resource Value	13	fall	x	x	x	x	x	x	x			x				1		1	1	1	1			2	1	1	1		1	1
126	West Fontana Channel	1-809-6B	Channel	Interim	N	Low Resource Value	13	fall	x	x	x	x	x	x	x			x				1		1	1	1	1			2	1	1	1		1	1
127	Mulberry Channel	1-810-1A	Channel	Interim	N	Concrete	12	summer, fall	x	x	x	x	x	x	x			x				2			1	1	1			2	1	1	1		1	1
128	Hickory Basin [DSOD]	1-811-3A	Detention Basin	Ultimate	N	Basin	12	spring, summer, fall	x	x	x	x	x	x	x			x				2			1	1	1			2	1	1	1		1	1
129	Highland Channel (San Sevaine Ditch)	1-812-1A	Channel	Unknown	N	Concrete	11	spring, summer, fall		x	x	x	x	x	x			x	1	1		2			1	1	1			2	1	1	1		1	1
130	Highland Channel	1-812-1B	Channel	Unknown	N	Concrete	11	spring, summer, fall		x	x	x	x	x	x			x	1	1		2			1	1	1			2	1	1	1		1	1
131	Declez Channel	1-813-1B	Channel	Ultimate	N	Concrete	13	spring, summer, fall		x	x	x	x	x	x			x				2			1	1	1			2		1	2		1	1
132	Declez Basin[DSOD]	1-814-3A	Detention Basin	Ultimate	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x			x				2			1	1	1			2		1	2		1	1
133	Cypress Channel	1-901-1A	Channel	Interim	N	Concrete	13	spring, summer, fall	x	x	x	x	x	x	x			x				2			1	1	1			2		1	1	1	1	1
134	Cypress Channel	1-901-1C	Channel	Interim	N	Concrete	13	spring, summer, fall	x	x	x	x	x	x	x			x				2			1	1	1			2		1	1	1	1	1
135	Sultana-Cypress Storm Drain	1-905-6A	Storm Drain	Ultimate	N	Concrete	11	spring, summer, fall		x	x	x	x	x	x			x	1			2			1	1	1			1	1	1	1			1
136	Sultana-Cypress Storm Drain	1-905-6B	Storm Drain	Ultimate	N	Concrete	11	spring, summer, fall		x	x	x	x	x	x			x	1			2			1	1	1			1	1	1	1			1
137	Grove Avenue Basin	1-910-4A	Detention Basin	Ultimate	N	Basin	12	spring, summer, fall	x	x	x	x	x	x	x			x				2			1	1	1			2					1	1
138	East Fontana Storm Drain	2-101-6A	Storm Drain	Interim	N	Concrete	13	spring, summer, fall		x	x	x	x	x	x			x		1		3	1	1	1	1	1			1	1	1	1	1	1	1
139	Merrill Basin	2-102-4A	Detention Basin	Interim	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x			x		1		3	1	1	1	1	1			1	1	1	1	1	1	1
140	Linden Basin	2-103-4A	Detention Basin	Interim	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x			x		1		5	1	1	1	1	1			1	1	1	1	1	1	1
141	Cactus Basin No 1	2-104-4A	Detention Basin	Ultimate	N	Basin	12	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	5	1	1	1	1	1			1	1	1	1	1	1	1
142	Cactus Basin No 2	2-104-4B	Detention Basin	Ultimate	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	5	1	1	1	1	1			1	1	1	1	1	1	1
143	East Rialto Storm Drain	2-105-6A	Storm Drain	Interim	N	Concrete	15	spring, summer		x	x	x	x	x	x			x		1		2		1	1	1	1			1	1	1	1		1	1

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144	East Rialto Storm Drain	2-105-6D	Storm Drain	Interim	N	Concrete	12	spring, summer	x	x	x	x	x	x	x			x		1		3		1	1	1	1			1	1	1	1		1	1
145	Pepper Basin	2-106-4A	Detention Basin	Interim	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x			x		1		3	1	1	1	1	1			1	1	1	1	1	1	1
146	Mill Basin	2-107-4A	Detention Basin	Interim	N	Basin	14	spring, summer	x	x	x	x	x	x	x			x		1	1	3	1	1	1	1	1			1	1	1	1	1	1	1
147	West Fontana Channel	2-109-6A	Channel	Interim	N	Low Resource Value	17	spring, summer, fall	x	x	x	x	x	x	x			x		1		6	1	1	1	1	1			1	1	1	1			1
148	Randall Basin	2-113-4A	Detention Basin	Interim	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	5	1	1	1	1	1	1		1	1	1	1	1	1	1
149	Rialto Channel	2-120-1A	Channel	Interim	N	Low Resource Value	14	spring, summer, fall	x	x	x	x	x	x	x			x				6	1	1	1	1	1			1	1	1	1		1	1
150	Rialto Channel	2-120-1B	Channel	Interim	N	Concrete	15	spring, summer, fall	x	x	x	x	x	x	x			x				6	1	1	1	1	1			1	1	1	1		1	1
151	Rialto Channel	2-120-1C	Channel	Interim	N	Concrete	12	spring, summer, fall					x		x							x				x	x			x			x		x	x
152	Rialto Channel	2-120-1D	Channel	Interim	N	Low Resource Value	12	spring, summer	x	x	x	x	x	x	x			x		1		6	1	1	1	1	1			1	1	1	1			
153	Declez Channel	2-124-1A	Channel	Ultimate	N	Concrete	17	spring, summer, fall	x	x	x	x	x	x	x			x	1	1		4		1	1	1	1	1		1	1	1	1		1	1
154	Lytle Creek Channel (USACE)	2-203-1A	Channel	Ultimate	N	Concrete	17	spring, summer, fall	x	x	x	x	x	x	x			x	1	1		4		1	1	1	1	1		1	1	1	1		1	1
155	Lytle Creek Channel (USACE)	2-203-1B	Channel	Ultimate	N	Concrete	17	spring, summer, fall	x	x	x	x	x	x	x			x		1		3		1	1	1	1			1	1	1	1	1		1
156	Lytle Creek Channel (USACE)	2-203-1C	Channel	Ultimate	N	Concrete	17	spring, summer, fall	x	x	x	x	x	x	x			x		1		3		1	1	1	1			1	1	1	1	1		1
157	Lytle-Cajon Channel (USACE)	2-204-1A	Channel	Ultimate	N	Concrete	17	spring, summer, fall	x	x	x	x	x	x	x			x		1		5	1	1	1	1				1	1	1	1			1
158	Riverside Groin No 1 (USACE)	2-205-5A	Groin	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x		1		3		1	1	1	1			1	1	1	1			1

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									Bank Repair	Concrete Structure Repair	Graffiti Removal	Herbicide and Rodenticide	Ingress/Egress	Mechanized Land Clearing/Excavation	Mowing, Hand Tools, and Related Vegetation Removal	Stockpile Maintenance	Stream Gage Maintenance	Vector Control	Broom	Cement Truck	Dozer	Dump Truck	Excavator	Gradall	Grader	Loader	Non-mechanized Equipment (Hand-held)	Pneumatic Roller	Scraper	Service Truck	Skidsteer Loader	Speed Loader	Sprayer Trucks/Equipment	Tractor and Disc	Tractor/Boom Mower	Water Truck
159	Riverside Groin No 2 (USACE)	2-205-5B	Groin	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x		1		3		1	1	1	1			1	1	1	1			1
160	Riverside Groin No 3 (USACE)	2-205-5C	Groin	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x		1		3		1	1	1	1			1	1	1	1			1
161	Riverside Groin No 4 (USACE)	2-205-5D	Groin	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x		1		3		1	1	1	1			1	1	1	1			1
162	Riverside Groin No 5 (USACE)	2-205-5E	Groin	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x		1		3		1	1	1	1			1	1	1	1			1
163	Lytle Creek Levee (USACE)	2-206-5A	Channel	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				3		1	1	1	1			1	1	1	1			1
164	Island Levee (USACE)	2-207-5A	Channel	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				3		1	1	1	1			1	1	1	1			1
165	Island Levee (USACE)	2-207-5B	Channel	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				3		1	1	1	1			1	1	1	1			1
166	Upper Devore Levee (USACE)	2-208-5A	Channel	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				3	1	1	1	1	1			1	1	1	1			1
167	Lower Devore Levee (USACE)	2-208-5B	Levee	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x		x			x				1	1	1	1	1					1	1	1			1
168	Muscoy Groin No 1 (USACE)	2-209-5A	Groin	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				3	1	1	1	1	1			1	1	1	1			1
169	Muscoy Groin No 2 (USACE)	2-209-5B	Groin	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				X	X	X	X	X			X							X
170	Muscoy Groin No 3 (USACE)	2-209-5C	Groin	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				X	X	X	X	X			X							X
171	Muscoy Groin No 4 (USACE)	2-209-5D	Groin	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				X	X	X	X	X			X							X
172	Muscoy Groin No 5 (USACE)	2-209-5E	Groin	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				X	X	X	X	X			X							X

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	FCD	FCD							Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column
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173	Muscoy Levee (USACE)	2-210-5A	Levee	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				X	X	X	X	X			X							X
174	Muscoy Levee (USACE)	2-210-5B	Levee	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				X	X	X	X	X			X							X
175	Muscoy Levee (USACE)	2-210-5C	Levee	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				X	X	X	X	X			X							X
176	Lytle Creek Gatehouse (USACE)	2-211-5A	Channel	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x		x	x		x				X	X	X	X	X			X							X
177	Warm Creek Levee (USACE)	2-212-5A	Levee	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x		x	x		x	1	1		1		1	1	1	1	1		1	1	1	1			1
178	Baseline Basin No 1	2-214-4A	Detention Basin	Interim	N	Basin	11	spring, summer, fall	x	x	x	x	x	x	x	x		x					1			1	1	1			1	1	1	1		1
179	Baseline Basin No 2	2-214-4B	Detention Basin	Interim	N	Basin	12	spring, summer, fall	x	x	x	x	x	x	x	x		x		1		3	1	1	1	1	1			1	1	1	1	1		1
180	Baseline Basin No 3	2-214-4C	Detention Basin	Interim	N	Basin	12	spring, summer, fall	x	x	x	x	x	x	x	x		x		1		3	1	1	1	1	1			1	1	1	1	1		1
181	Macy Basin	2-216-4A	Detention Basin	Interim	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	5	1	1	1	1	1		2	1	1	1	1	1	1	1
182	Macy Storm Drain	2-217-6A	Storm Drain	Interim	N	Storm Drain	14	spring, summer, fall	x		x	x	x	x	x			x		1	1	3		1	1	1	1			1	1	1	1		1	1
183	Nealey's Corner Drain	2-222-6A	Storm Drain	Interim	N	Storm Drain	12	spring, summer, fall				x		x	x			x							1		1					1	1			1
184	Duffy Street Storm Drain	2-223-6A	Storm Drain	Interim	N	Storm Drain	13	spring, summer, fall				x		x	x			x							1		1					1	1			1
185	Cucamonga Connector (formerly 1-312-1B)	1-312-6B	Channel	Unknown	N	No vegetation management or sediment removal proposed.	11	fall, winter			x	x	x		x			x									1									
186	Devil Canyon Dam (Basin No 1) (DSOD)	2-303-3A	Detention Basin	Interim	N	Basin	12	spring, fall	x	x	x	x	x	x	x			x			1	8	1	1	1	1	1		2	1	1	1	1		1	1
187	Devil Basin No 2	2-304-4A	Detention Basin	Interim	N	Basin	11	spring, fall	x	x	x	x	x	x	x			x			1	8	1	1	1	1	1		2	1	1	1	1		1	1

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									Bank Repair	Concrete Structure Repair	Graffiti Removal	Herbicide and Rodenticide	Ingress/Egress	Mechanized Land Clearing/Excavation	Mowing, Hand Tools, and Related Vegetation Removal	Stockpile Maintenance	Stream Gage Maintenance	Vector Control	Broom	Cement Truck	Dozer	Dump Truck	Excavator	Gradall	Grader	Loader	Non-mechanized Equipment (Hand-held)	Pneumatic Roller	Scraper	Service Truck	Skidsteer Loader	Speed Loader	Sprayer Trucks/Equipment	Tractor and Disc	Tractor/Boom Mower	Water Truck
188	Devil Basin No 3	2-304-4B	Detention Basin	Interim	N	Basin	11	spring, fall	x	x	x	x	x	x	x			x			1	8	1	1	1	1	1		2	1	1	1	1		1	1
189	Devil Basin No 5	2-304-4D	Detention Basin	Interim	N	Basin	11	spring, fall	x	x	x	x	x	x	x			x			1	8	1	1	1	1	1		2	1	1	1	1		1	1
190	Devil Basin No 6	2-304-4E	Detention Basin	Interim	N	Basin	11	spring, fall	x	x	x	x	x	x	x			x			1	8	1	1	1	1	1		2	1	1	1	1		1	1
191	Devil Basin No 7	2-304-4F	Detention Basin	Interim	N	Basin	11	spring, fall				x	x	x	x	x		x			1	8	1	1	1	1	1		2	1	1	1	1		1	1
192	Wiggins Basin No 1	2-305-4A	Detention Basin	Interim	N	Basin	11	spring, summer, fall	x	x	x	x	x	x	x			x			1	8	1	1	1	1	1		2	1	1	1	1	1	1	1
193	Devil Creek Levee (USACE)	2-306-5A	Levee	Ultimate	N	Concrete	14	spring, summer, fall	x	x	x	x	x	x	x			x		1		3	1	1	1	1	1			1	1	1	1			1
194	Devil Creek Diversion Channel (USACE)	2-307-1A	Channel	Ultimate	N	Concrete	15	spring, summer, fall		x	x	x	x	x	x			x			3	1	1	1	1	1	1			1	1	1	1	1		
195	Devil Creek Diversion Channel (USACE)	2-307-1B	Levee	Ultimate	N	Concrete	15	spring, summer, fall	x	x	x	x	x	x	x			x		1		5			1	1	1			1	1	1	1			1
196	Cable Creek Channel	2-309-1A	Channel	Interim	N	Interim Facility	15	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	5	2	1	1	2	1			1	1	1	1		1	1
197	Cable Creek Channel	2-309-1B	Channel	Interim	N	Low Resource Value	15	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	5	2	1	1	2	1			1	1	1	1		1	1
198	MacQuiddy-Severance Diversion Channel	2-351-1A	Channel	Interim	N	Low Resource Value	15	spring, summer, fall	x	x	x	x	x	x	x			x		1		3	1	1	1	1	1			1	1	1	1		1	1
199	Sycamore Basin	2-352-4A	Detention Basin	Interim	N	Basin	12	spring, summer, fall	x	x	x	x	x	x	x			x		1		1			1	1	1		2	1	1	1	1	1		1
200	Sycamore Diversion Channel	2-353-1A	Channel	Interim	N	Low Resource Value	12	spring, summer, fall	x	x	x	x	x	x	x			x		1	1				1	1	1		2	1	1	1	1	1		1
201	East Badger Basin	2-354-4A	Detention Basin	Interim	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	3	1	1	1	1	1		2	1	1	1	1	1		1
202	Badger Spreading Grounds	2-355-2A	Spreading Ground	Interim	N	Basin	13	spring, fall	x	x	x	x	x	x	x			x			1	6	1	1	1	1	1		2	1	1	1	1	1	1	1
203	Lower Badger Spreading Grounds	2-355-2B	Spreading Ground	Interim	N	Basin	13	spring, fall	x	x	x	x	x	x	x			x			1	6	1	1	1	1	1		2	1	1	1	1	1	1	1
204	South Badger Basin	2-356-4A	Detention Basin	Interim	N	Basin	13	spring, fall	x	x	x	x	x	x	x			x			1	6	1	1	1	1	1		2	1	1	1	1	1	1	1
205	Western Avenue Channel	2-357-1A	Channel	Interim	N	Concrete	14	spring, summer, fall	x	x	x	x	x	x	x			x		1				1	1	1	1			1	1	1	1			1

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									Bank Repair	Concrete Structure Repair	Graffiti Removal	Herbicide and Rodenticide	Ingress/Egress	Mechanized Land Clearing/Excavation	Mowing, Hand Tools, and Related Vegetation Removal	Stockpile Maintenance	Stream Gage Maintenance	Vector Control	Broom	Cement Truck	Dozer	Dump Truck	Excavator	Gradall	Grader	Loader	Non-mechanized Equipment (Hand-held)	Pneumatic Roller	Scraper	Service Truck	Skidsteer Loader	Speed Loader	Sprayer Trucks/Equipment	Tractor and Disc	Tractor/Boom Mower	Water Truck
206	North Badger Basin	2-358-4A	Detention Basin	Interim	N	Basin	12	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	3	1	1	1	1	1			1	1	1	1	1		1
207	Badger Channel	2-359-1A	Channel	Interim	N	Concrete	11	spring, summer, fall	x	x	x	x	x		x			x				1			1	1										1
208	Badger Channel	2-359-1B	Channel	Interim	N	Interim Facility	15	summer, fall	x	x	x	x	x	x	x			x		1	1	2		1	1	1	1			1	1	1	1			1
209	Badger Channel	2-359-1C	Channel	Interim	N	Interim Facility	15	spring, summer, fall		x	x	x	x	x	x			x		1	1	2		1	1	1	1			1	1	1	1		1	1
210	West Badger Basin	2-360-4A	Detention Basin	Interim	N	Basin	12	spring, summer, fall	x	x	x	x	x	x	x			x			1	4		1	1	1	1			1	1	1	1	1	1	1
211	Sweetwater Channel	2-361-1A	Channel	Interim	N	Interim Facility	13	spring, summer, fall	x	x	x	x	x	x	x			x			1	3	1	1	1	1	1			1	1	1	1	1	1	1
212	Sweetwater Basin	2-362-4A	Detention Basin	Interim	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x			x			1	3	1	1	1	1	1			1	1	1	1	1	1	1
213	Devil Creek Channel	2-364-1A	Channel	Interim	N	Concrete	17	spring, summer, fall	x	x	x	x	x	x	x			x		1		5	1	1	1	1	1			1	1	1	1			1
214	Little Mountain Dam (DSOD)	2-365-3A	Detention Basin	Ultimate	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	4	1	1	1	1	1		1	1	1	1	1	1	1	1
215	Little Mountain Channel	2-366-1A	Channel	Interim	N	Concrete	14	spring, summer, fall		x	x	x	x	x	x			x		1		2		1	1	1	1			1	1	1	1			1
216	MacQuiddy Basin No 4	2-368-4D	Detention Basin	Ultimate	N	Basin	12	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	1	1	1	1	1	1		1	1	1	1	1		1	1
217	29th Street Basin No 1	2-371-4A	Detention Basin	Interim	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x			x		1		4	1	1	1	1	1			1	1	1	1	1	1	1
218	29th Street Basin No 2	2-371-4B	Detention Basin	Interim	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x			x		1		4	1	1	1	1	1			1	1	1	1	1	1	1
219	29th Street Basin No 3	2-371-4C	Detention Basin	Interim	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x			x		1		4	1	1	1	1	1			1	1	1	1	1	1	1
220	Waterman Creek	2-401-1B	Channel	Unknown	N	Low Resource Value	11	spring, summer, fall	x	x	x	x	x	x	x			x			1						1						1			1
221	Waterman Basin No 1	2-403-4A	Detention Basin	Interim	N	Basin	15	spring, summer, fall	x	x	x	x	x	x	x			x		1	2	6	2	2	2	2	1		2	1	1	1	1	1	1	1
222	Waterman Basin No 2	2-403-4B	Detention Basin	Interim	N	Basin	15	spring, summer, fall	x	x	x	x	x	x	x			x		1	2	6	2	2	2	2	1		2	1	1	1	1	1	1	1
223	Waterman Basin No 3	2-403-4C	Detention Basin	Interim	N	Basin	15	spring, summer, fall	x	x	x	x	x	x	x			x		1	2	6	2	2	2	2	1		2	1	1	1	1	1	1	1
224	Waterman Basin No 4	2-403-4D	Detention Basin	Interim	N	Basin	15	spring, summer, fall	x	x	x	x	x	x	x			x		1	2	6	2	2	2	2	1		2	1	1	1	1	1	1	1
225	Twin Creek	2-405-1A	Levee	Interim	N	Levee/Dam/Groin	14	spring, summer, fall	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1			1	1	1	1			1

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	FCD	FCD							Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column
									Bank Repair	Concrete Structure Repair	Graffiti Removal	Herbicide and Rodenticide	Ingress/Egress	Mechanized Land Clearing/Excavation	Mowing, Hand Tools, and Related Vegetation Removal	Stockpile Maintenance	Stream Gage Maintenance	Vector Control	Broom	Cement Truck	Dozer	Dump Truck	Excavator	Gradall	Grader	Loader	Non-mechanized Equipment (Hand-held)	Pneumatic Roller	Scraper	Service Truck	Skidsteer Loader	Speed Loader	Sprayer Trucks/Equipment	Tractor and Disc	Tractor/Boom Mower	Water Truck
226	Twin Creek Spreading Grounds	2-406-2A	Spreading Ground	Interim	N	Basin	20	spring, summer, fall	x	x	x	x	x	x	x	x		x		1	1	8	1	1	1	1	1		2	1		1	1	1	1	1
227	Waterman Levee (USACE)	2-408-5A	Levee	Ultimate	N	Levee/Dam/Groin	14	spring, summer, fall	x	x	x	x	x	x	x			x				2		1	1	1	1			1		1	1			1
228	Twin Creek Levees (USACE)	2-408-5B	Levee	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				5	1	1	1	1	1			1	1	1	1			1
229	Twin Creek Levees (USACE)	2-408-5C	Levee	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				5	1	1	1	1	1			1	1	1	1			1
230	Twin Creek Levees (USACE)	2-408-5D	Levee	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x				5	1	1	1	1	1			1	1	1	1			1
231	Waterman Levee, North (USACE)	2-408-5E	Levee	Ultimate	N	Levee/Dam/Groin	14	spring, summer, fall	x	x	x	x	x	x	x			x				2		1	1	1	1			1		1	1			1
232	Twin Creek Channel Improved (USACE)	2-409-1A	Channel	Ultimate	N	Concrete	14	spring, summer, fall	x	x	x	x	x	x	x			x	1	1		2		1	1	1	1			1	1	1	1			1
233	Twin Creek Channel Improved (USACE)	2-409-1B	Channel	Ultimate	N	Concrete	14	spring, summer, fall	x	x	x	x	x	x	x			x	1	1		2		1	1	1	1			1	1	1	1			1
234	Twin Creek Channel Improved (USACE)	2-409-1C	Channel	Ultimate	N	Concrete	14	spring, summer, fall	x	x	x	x	x	x	x			x	1	1		2		1	1	1	1			1	1	1	1			1
235	Twin Creek Channel Improved (USACE)	2-409-1D	Levee	Ultimate	N	Levee/Dam/Groin	13	spring, summer, fall	x	x	x	x	x	x	x			x			5	1	1	1	1	1	1			1	1	1	1	1	1	1
236	Warm Creek By-Pass (USACE)	2-410-6A	Channel	Interim	N	Concrete	16	spring, summer, fall	x	x	x	x	x	x	x			x				6	1	1	1	1	1			1	1	1	1			1
237	Warm Creek Channel	2-411-1A	Channel	Interim	N	Low Resource Value	14	spring, summer, fall	x	x	x	x	x	x	x			x				2	1	1	1	1	1			1	1	1	1		1	1
238	Warm Creek (USACE)	2-411-1B	Levee	Ultimate	N	Concrete	14	spring, summer, fall		x	x	x	x	x	x			x	1	1		5	1	1	1	1	1			1	1	1	1			1
239	Brush Canyon Basin	2-412-4A	Detention Basin	Interim	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x			x		1		4	1	1	1	1	1			1	1	1	1	1	1	1
240	Brush Canyon Storm Drain	2-413-6A	Storm Drain	Interim	N	Storm Drain	12	spring, summer, fall	x	x	x	x	x	x	x			x				2		1	1	1	1			1	1	1	1		1	1

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241	Harrison Basin	2-414-4A	Debris Basin	Interim	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	5	1	1	1	1	1		1	1	1	1	1	1	1	1
242	Lynwood Basin No 1	2-420-4A	Detention Basin	Interim	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	5	1	1	1	1	1		1	1	1	1	1	1	1	1
243	Lynwood Basin No 2	2-420-4B	Detention Basin	Interim	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	5	1	1	1	1	1		1	1	1	1	1	1	1	1
244	Lynwood Basin No 3	2-420-4C	Detention Basin	Interim	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	5	1	1	1	1	1		1	1	1	1	1	1	1	1
245	Lynwood Basin No 4	2-420-4D	Detention Basin	Interim	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	5	1	1	1	1	1		1	1	1	1	1	1	1	1
246	Warm Creek Conservation Basin No 2	2-421-4B	Detention Basin	Interim	N	Basin	30	spring, summer, fall	x	x	x	x	x	x	x			x			1	10	1			2		1		1			1			1
247	Warm Creek Conservation Basin No 3	2-421-4C	Detention Basin	Interim	N	Basin	30	spring, summer, fall	x	x	x	x	x	x	x			x			1	10	1			2		1		1			1			1
248	Warm Creek Conservation Basin No 4	2-421-4D	Detention Basin	Interim	N	Basin	30	spring, summer, fall			X							x			1	10	1			2		1		1			1			1
249	Upper Warm Creek Channel	2-501-1A	Channel	Interim	N	Low Resource Value	13	spring, summer, fall	x	x	x	x	x	x	x			x		1		5	1	1	1	1	1			1	1	1	1			1
250	Sand Creek	2-502-1B	Channel	Interim	N	Low Resource Value	14	spring, summer, fall	x	x	x	x	x	x	x	x		x	1	1		4		1	1	1	1	1		1	1	1	1	1		1
251	Sand Creek	2-502-1C	Channel	Interim	N	Concrete	14	spring, summer, fall	x	x	x	x	x	x	x	x		x		1		5	1	1	1	1	1			1	1	1	1			1
252	Sand Canyon Basin	2-503-4A	Debris Basin	Interim	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x	x		x		1		5	1	1	1	1	1			1	1	1	1	1	1	1
253	Patton Basin	2-504-4A	Detention Basin	Interim	N	Basin	14	spring, summer, fall	x	x	x	x	x	x	x	x		x		1		5	1	1	1	1	1		2	1	1	1	1	1	1	1
254	Daley Basin	2-506-4A	Debris Basin	Interim	N	Basin	15	spring, summer, fall	x	x	x	x	x	x	x	x		x		1	1	5	1	1	1	1	1		2	1	1	1	1	1	1	1
255	Del Rosa Channel (Daley Channel)	2-507-1A	Channel	Ultimate	N	Concrete	13	spring, summer, fall	x	x	x	x	x	x	x			x		1		4	1	1	1	1	1			1	1	1	1			1
256	Del Rosa Channel (Daley Channel)	2-507-1B	Channel	Interim	N	Low Resource Value	14	spring, summer, fall	x	x	x	x	x	x	x			x		1		4	1	1	1	1	1			1	1	1	1			1
257	Perris Hill Basin	2-508-4A	Detention Basin	Interim	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x			x				4	1	1	1	1	1			1			1			1

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		FCD	FCD						Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column
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258	Little Sand Creek	2-509-1B	Channel	Interim	N	Concrete	15	spring, summer, fall	x	x	x	x	x	x	x			x			2	1	1	1	1	1	1	1		1	1	1	1	1		1
259	Little Sand Creek	2-509-1C	Channel	Interim	N	Low Resource Value	12	spring, summer, fall	x	x	x	x	x	x	x			x				3	1	1	1	1	1		1	1	1	1	1		1	1
260	Little Sand Canyon Basin	2-510-4A	Debris Basin	Interim	N	Basin	24	spring, summer, fall	x	x	x	x	x	x	x	x		x			1	6	1	1	1	1	1	1		1	1	1	1	1	1	1
261	Lemon Basin	2-511-4A	Detention Basin	Interim	N	Basin	13	spring, summer, fall	x	x	x	x	x	x	x	x		x	1	1		5	1	1	1	1	1			1	1	1	1		1	1
262	Elm Storm Drain	2-512-6A	Storm Drain	Interim	N	Concrete	13	spring, summer, fall						x	x			x									1					1				
263	McGlothlen Storm Drain	2-513-6A	Storm Drain	Interim	N	Concrete	12	spring, summer, fall	x			x			x			x				1		1		1	1					1		1	1
264	Demens Creek Channel	1-401-1A	Channel	Ultimate	N	Facility is adjacent to property and must be maintained to fullest extent.	11	spring, summer, fall, winter	x	x	x	x	x	x	x	x		x				2			1	1	1			2		1	2		1	1
265	Deer Creek Channel	1-501-1A	Natural Channel	Ultimate	N	No vegetation management or sediment removal proposed.	13	fall, winter						x											1					1						
266	Randall Channel Turnout	2-105-6C	Channel	Interim	N	Interim Facility	14	spring, summer	x	x	x	x	x	x	x			x		1		3	1	1	1	1	1			1	1	1	1		1	1
267	Devil Creek	2-301-1B	Channel	Interim	N	Interim Facility	12	fall, winter	x	x	x	x	x	x				x		1	1	6	1	1	1	1				1	1	1	1			1
268	City Creek Channel	2-601-1A	Channel	Interim	Y	N/A	40	spring, summer, fall	x	x	x	x	x	x	x	x		x			2	10	2	2	2	2	1		2	1	1	1	1		1	1
269	City Creek Channel	2-601-1B	Channel	Interim	Y	N/A	40	spring, summer, fall	x	x	x	x	x	x	x	x		x			2	10	2	2	2	2	1		2	1	1	1	1		1	1
270	City Creek Levee (USACE)	2-601-5A	Levee	Ultimate	Y	N/A	20	spring, summer, fall	x	x	x	x	x	x	x			x		1	2	6	1	1	1	1	1		1	1	1	1	1		1	1
271	Bledsoe Creek	2-604-1A	Channel	Interim	N	Concrete	12	spring, summer, fall	x	x	x	x	x	x	x			x		1		3	1	1	1	1	1		1	1	1		1			1
272	City Creek Levee (USACE)	2-601-5B	Levee	Ultimate	Y	N/A	40	spring, summer, fall	x	x	x	x	x	x	x			x			2	4	2	1	1	1	1			1	1	1	1		1	1
273	City Creek Levee (USACE)	2-601-5C	Levee	Ultimate	N	Historic modeling completed	40	spring, summer, fall	x	x	x	x	x	x	x			x			2	4	2	1	1	1	1			1	1	1	1		1	1
274	City Creek Levee (USACE)	2-601-5D	Levee	Ultimate	N	Historic modeling completed	40	spring, summer, fall	x	x	x	x	x	x	x			x			2	4	2	1	1	1	1			1	1	1	1		1	1
275	City Creek Channel	2-603-1A	Channel	Interim	Y	N/A	40	spring, summer, fall	x	x	x	x	x	x	x			x				6	1	1	1	1	1			1	1	1	1			1
276	Reche Canyon Creek	2-702-1A	Channel	Interim	N	Low Resource Value	24	spring, summer, fall	x	x	x	x	x	x	x			x	1	1	1	10	1	1	1	1	1	1		1	1	1	1		1	1

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277	Reche Canyon Creek	2-702-1B	Channel	Interim	N	Low Resource Value	24	spring, summer, fall	x	x	x	x	x	x	x			x	1	1	1	10	1	1	1	1	1	1		1	1	1	1		1	1
278	Reche Canyon Creek	2-702-1C	Channel	Interim	N	Interim Facility	24	spring, summer, fall	x	x	x	x	x	x	x			x	1	1	1	10	1	1	1	1	1	1		1	1	1	1		1	1
279	Rancho Avenue Storm Drain	2-703-6A	Storm Drain	Unknown	N	Concrete	16	spring, summer, fall	x	x	x	x	x	x	x			x	1	1		3		1	1	1	1			1	1	1	1			1
280	Grand Terrace Storm Drain	2-803-6A	Storm Drain	Interim	N	Concrete	16	spring, summer, fall	x	x	x	x	x	x	x			x	1	1		3		1	1	1	1			1	1	1	1			1
281	Plunge Creek	2-605-1A	Natural Channel	Unknown	N	No vegetation management or sediment removal proposed.	12	spring, summer, fall				x	x					x				3				1					1				X	1
282	Santa Ana River (Incl. USACE)	2-701-1A	Levee	Interim	Y	N/A	30	spring, summer, fall	x	x	x	x	x	x	x	x	x	x	1	1	1	1	1	1	1	1	1		1	1	1	1	1		1	1
283	Santa Ana River (Incl. USACE)	2-701-1B	Levee	Ultimate	Y	N/A	30	spring, summer, fall	x	x	x	x	x	x	x	x	x	x	1	1	1	1	1	1	1	1	1		1	1	1	1	1		1	1
284	Santa Ana River	2-701-1C	Channel	Ultimate	Y	N/A	30	spring, summer, fall	x	x	x	x	x	x	x	x	x	x	1	1	1	1	1	1	1	1	1		1	1	1	1	1		1	1
285	Santa Ana River	3-101-1A	Natural Channel	Interim	N	Interim Facility	11	summer, fall		x	x	x	x	x	x	x		x		1	1	1			1	1	1									1
286	Santa Ana River	3-101-1B	Natural Channel	Interim	N	Interim Facility	16	fall, winter	x	x	x	x	x	x	x			x			1	1			1	1	1			1		1	1			1
287	Santa Ana River	3-101-1C	Natural Channel	Interim	N	Interim Facility	12	fall, winter	x	x	x	x	x	x	x			x			1	1			1	1	1			1		1	1			1
288	Santa Ana River	3-101-1D	Natural Channel	Interim	N	Interim Facility	20	fall, winter	x	x	x	x	x	x	x			x			1	2			1	1	1		1	1			1			1
289	Santa Ana River	3-101-1E	Channel	Interim	Y	N/A	30	fall, winter	x	x	x	x	x	x	x			x			1	2			1	1	1		1	1			1			1
290	Plunge Creek Sprdg. Grnds.	3-202-2A	Spreading Ground	Unknown	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x																		
291	Plunge Creek Sprdg. Grnds.	3-202-2B	Spreading Ground	Unknown	N	Basin	11	spring, summer, fall, winter					x			x		x							1											1
292	Oak Creek	3-204-1B	Channel	Interim	N	Concrete	12	summer, fall, winter	x	x	x	x	x	x	x	x		x		1	1	6	1	1	1	1	1			2		1	1		1	1
293	Oak Creek Basin	3-204-4A	Debris Basin	Interim	N	Basin	12	summer, fall, winter	x	x	x	x	x	x	x			x		1		2	1	1		1	1			1	1	1	1			1
294	Santa Ana River (Incl. USACE)	3-101-1F	Levee	Ultimate	Y	N/A	30	fall, winter	x	x	x	x	x	x	x			x	1	1	1	5	1	1	1	1	1	1	1	1	1	1	1			1

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Line Number	Facility Name	Flood Control Facility System Index Number	Facility Type	Interim/Ultimate	Hydraulic Analysis Conducted?	Rational for Not Conducting Hydraulic Analysis	Estimated Duration of Work	Maintenance Occurrence (Spring: Mar-May; Summer: Jun-Aug; Fall: *Sep-Nov*; Winter: *Dec-Feb*)	Type of Maintenance Activity										Type of Equipment Used and Number of Equipment																					
		FCD	FCD						Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column	Ops/ EMD - Mich: Column
									Bank Repair	Concrete Structure Repair	Graffiti Removal	Herbicide and Rodenticide	Ingress/Egress	Mechanized Land Clearing/Excavation	Mowing, Hand Tools, and Related Vegetation Removal	Stockpile Maintenance	Stream Gage Maintenance	Vector Control	Broom	Cement Truck	Dozer	Dump Truck	Excavator	Gradall	Grader	Loader	Non-mechanized Equipment (Hand-held)	Pneumatic Roller	Scraper	Service Truck	Skidsteer Loader	Speed Loader	Sprayer Trucks/Equipment	Tractor and Disc	Tractor/Boom Mower	Water Truck
295	Elder Creek	3-205-1C	Channel	Interim	N	Low Resource Value	12	spring, summer, fall	x	x	x	x	x	x	x	x		x		1	1	6	1	1	1	1	1			2	1		1		1	1
296	Elder Creek Basin	3-205-4A	Debris Basin	Ultimate	N	Basin	12	spring, summer, fall	x	x	x	x	x	x	x	x		x		1	1	6	1	1	1	1	1			2	1		1		1	1
297	East Highland Storm Drain	3-206-1A	Storm Drain	Interim	N	Storm Drain	12	spring, summer, fall	x	x	x	x	x	x	x			x		1		1	1	1	1	1	1			1	1		1		1	1
298	Seven Oaks Dam (USACE (DSOD))	3-104-3A	Dam	Ultimate	N	Maintenance requirements determined by Seven Oaks Dam	11	spring, summer, fall, winter										x																		
299	Plunge Creek	3-201-1B	Channel	Unknown	N	Historic flooding and adjacent to homes requires full maintenance	12	summer, fall	x	x	x	x	x	x	x	x		x		1	2	6	1		1	1	1			2	1	1	1		1	1
300	Plunge Creek	3-201-1C	Channel	Unknown	N	Previously modeled	25	summer, fall, winter	x	x	x	x	x	x	x			x			2	6	1		1	1										1
301	Elder Creek	3-205-1A	Channel	Unknown	N	No vegetation management or sediment removal	12	spring, summer, fall	x	x	x	x	x	x	x			x		1		2		1	1	1	1			1		1		1		1
302	City Creek	3-301-1B	Channel	Unknown	N	Historic modeling completed	12	spring, summer, fall	x	x	x		x		x			x			1	2	1	1	1	1	1			1	1		1		1	1
303	City Creek	3-301-1C	Natural Channel	Unknown	Y	N/A	12	spring, summer, fall	x	x	x	x	x	x	x	x		x		1	2	6	1	1	1	2	1		1	1	1	1	1		1	1
304	Small Canyon Dam	3-302-3A	Debris Basin	Ultimate	N	Basin	20	fall, winter	x	x	x	x	x	x	x			x		1		1	1	1	1	1	1			1		1	1			1
305	Small Canyon Diversion Channel	3-303-1A	Channel	Unknown	N	Low Resource Value	15	fall, winter		x	x	x	x	x				x				1		1	1	1	1			1			1			1
306	Dynamite Basin	3-304-4A	Debris Basin	Interim	N	Basin	20	fall, winter	x	x	x	x	x	x	x			x			1	5	1	1	1	1	1			1			1		1	1
307	Cook Canyon Basin	3-305-4A	Debris Basin	Interim	N	Basin	15	fall, winter	x	x	x	x	x	x	x			x				4	1	1	1	1	1			1		1	1			1
308	Bledsoe Creek	3-307-1A	Channel	Ultimate	N	Concrete	15	fall, winter			x	x	x	x				x				2	1	1	1	1	1			1		1	1			1
309	Small Canyon Channel	3-309-1B	Channel	Unknown	N	Concrete	13	spring, summer, fall, winter				x	x		x			x				1					1						1		1	1
310	City Creek Levee - West Bank (USACE)	3-301-5A	Levee	Ultimate	Y	N/A	25	fall, winter	x	x	x	x	x	x	x			x		1	1	1	1	1	1	1	1			1	1	1	1			1
311	San Timoteo Creek (USACE)	3-401-1C	Channel	#N/A	N	Concrete	15	spring, summer, fall, winter	x	x	x	x	x	x				x				8	1			1				1	1	1				1
312	San Timoteo Creek (USACE)	3-401-1D	Channel	#N/A	N	Concrete	15	spring, summer, fall, winter	x	x	x	x	x	x				x				8	1			1				1	1	1				1
313	San Timoteo Creek (USACE)	3-401-1E	Channel	#N/A	N	Concrete	15	spring, summer, fall, winter	x	x	x	x	x	x				x				8	1			1				1	1	1				1
314	San Timoteo Creek (USACE)	3-401-1F	Channel	#N/A	N	Concrete	15	spring, summer, fall, winter	x	x	x	x	x	x	x			x				8	1			1	1			1	1	1				1

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315	San Timoteo Sediment Basin No 1 (USACE)	3-401-4A	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
316	San Timoteo Sediment Basin No 2 (USACE)	3-401-4B	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
317	San Timoteo Sediment Basin No 3 (USACE)	3-401-4C	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
318	San Timoteo Sediment Basin No 4 (USACE)	3-401-4D	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
319	San Timoteo Sediment Basin No 5 (USACE)	3-401-4E	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
320	San Timoteo Sediment Basin No 6 (USACE)	3-401-4F	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
321	San Timoteo Sediment Basin No 7 (USACE)	3-401-4G	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
322	San Timoteo Sediment Basin No 8 (USACE)	3-401-4H	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
323	San Timoteo Sediment Basin No 9 (USACE)	3-401-4I	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
324	San Timoteo Sediment Basin No 10 (USACE)	3-401-4J	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
325	San Timoteo Sediment Basin No 11 (USACE)	3-401-4K	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
326	San Timoteo Sediment Basin No 12 (USACE)	3-401-4L	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1

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327	San Timoteo Sediment Basin No 13 (USACE)	3-401-4M	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
328	San Timoteo Sediment Basin No 14 (USACE)	3-401-4N	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
329	San Timoteo Sediment Basin No 15 (USACE)	3-401-4O	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
330	San Timoteo Sediment Basin No 16 (USACE)	3-401-4P	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
331	San Timoteo Sediment Basin No 17 (USACE)	3-401-4Q	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
332	San Timoteo Sediment Basin No 18 (USACE)	3-401-4R	Debris Basin	#N/A	N	Basin	25	fall, winter	x	x	x	x	x	x	x			x				8	2			1	1			1	1	1	1			1
333	Loma Linda Storm Drain	3-402-6A	Storm Drain	Interim	N	Storm Drain	11	spring, summer, fall, winter	x	x	x	x	x	x	x			x				1		1			1					1	1			1
334	Loma Linda Storm Drain	3-402-6B	Storm Drain	Interim	N	Storm Drain	20	spring, summer, fall, winter	x	x	x	x	x	x	x			x				1		1	1	1	1			1		1	1		1	1
335	San Bernardino Avenue Storm Drain	3-403-6A	Storm Drain	Interim	N	Storm Drain	15	spring, summer, fall, winter	x	x	x	x	x	x	x			x				1		1	1	1	1			1		1	1		1	1
336	Brown Ditch (Basin) (previously 3-404-6A)	3-404-4A	Detention Basin	Interim	N	Basin	12	spring, summer, fall, winter	x			x		x	x			x				3		1		1	1			1		1	1			1
337	Mission Channel	3-501-1A	Channel	Interim	N	Low Resource Value	25	fall, winter	x	x	x	x	x	x	x			x		1		6	1	1	1	1	1			1		1	1		1	1
338	Mission Channel	3-501-1B	Channel	Interim	N	Low Resource Value	25	fall, winter	x	x	x	x	x	x	x			x		1		6	1	1	1	1	1			1		1	1		1	1
339	Mission Channel	3-501-1C	Channel	Interim	N	Interim Facility	13	spring, fall	x	x		x	x	x	x			x				3		1		1	1			1		1	1			1

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340	Zanja Creek	3-501-1E	Channel	Interim	N	Low Resource Value	12	summer, fall, winter	x	x	x	x	x	x	x			x				1		1	1	1	1			1		1	1			1
341	Zanja Creek	3-501-1F	Natural Channel	Interim	N	Low Resource Value	13	summer, fall, winter	x	x	x	x	x	x	x			x				1		1	1	1	1			1		1	1			1
342	Zanja Creek	3-501-1G	Channel	Interim	N	Low Resource Value	13	summer, fall, winter	x	x	x	x	x	x	x			x				1		1	1	1	1			1		1	1			1
343	Morrey Arroyo	3-502-1A	Channel	Interim	N	Low Resource Value	13	summer, fall, winter	x	x	x	x	x	x	x			x				3		1	1	1	1			1	1		1	1		1
344	Morrey Arroyo	3-502-1B	Channel	Interim	N	Low Resource Value	13	summer, fall, winter	x	x	x	x	x	x	x			x				3		1	1	1	1			1	1		1	1		1
345	Wilson Creek	3-601-1A	Channel	Interim	N	Low Resource Value	11	summer, fall, winter			x	x	x					x							1	1				1						1
346	Wilson Creek	3-601-1B	Channel	Ultimate	N	Concrete	11	summer, fall, winter				x	x		x			x				1			1	1	1			1		1	1			1
347	Wilson Creek	3-601-1C	Channel	Interim	N	Low Resource Value	12	summer, fall, winter	x	x	x	x	x	x	x			x		1		4	1	1	1	1	1			1		1	1		1	1
348	Wilson Creek Spreading Grounds	3-602-2E	Spreading Ground	Interim	N	Basin	12	summer, fall, winter	x	x	x	x	x	x	x			x				2		1	1	1	1			1		1	1	1		1
349	Wilson Creek Basin No 1	3-602-4A	Detention Basin	Interim	N	Basin	12	summer, fall, winter	x	x	x	x	x	x	x			x		1	1	6	1		1	1			1	1	1	1	1	1		1
350	Wilson Creek Basin No 2	3-602-4B	Detention Basin	Interim	N	Basin	12	summer, fall, winter	x	x	x	x	x	x	x			x			1	6	1		1	1			1	1	1	1	1	1		1
351	Wilson Creek Basin No 3	3-602-4C	Detention Basin	Interim	N	Basin	12	summer, fall, winter	x	x	x	x	x	x	x			x			1	6	1		1	1			1	1	1	1	1	1		1
352	Wilson Creek Basin No 4	3-602-4D	Detention Basin	Interim	N	Basin	12	summer, fall, winter	x	x	x	x	x	x	x			x			1	6	1		1	1			1	1	1	1	1	1		1
353	Oak Glen Creek	3-603-1A	Channel	Interim	N	Low Resource Value	12	summer, fall, winter				x	x					x								1				1						1
354	Oak Glen Creek	3-603-1B	Channel	Interim	N	Low Resource Value	12	summer, fall, winter	x	x	x	x	x	x	x			x				2		1	1		1			1		1	1		1	1
355	Oak Glen Creek Basin No 1	3-603-4A	Detention Basin	Interim	N	Basin	12	summer, fall, winter	x	x	x	x	x	x		x		x		1	1	6	1	1	1	1				1			1			1
356	Oak Glen Creek Basin No 2	3-603-4B	Detention Basin	Interim	N	Basin	12	summer, fall, winter	x	x	x	x	x	x		x		x		1	1	6	1	1	1	1				1			1			1
357	Oak Glen Creek Basin No 3	3-603-4C	Detention Basin	Interim	N	Basin	12	spring, summer, fall, winter	x	x	x	x	x	x	x	x		x			1	5	1	1	1	1	1			1	1		1			1
358	Potato Creek	3-604-1A	Channel	Interim	N	Concrete	12	summer, fall	x	x	x	x	x	x	x			x				1			1	1	1			1	1	1	1	1	1	1
359	Potato Creek Sprdg. Grnds.	3-605-2A	Spreading Ground	Interim	N	Basin	15	summer, fall						x	x							1			1	1	1			1	1	1	1	1	1	1
360	Wildwood Creek	3-608-1B	Channel	Interim	N	Low Resource Value	60	fall, winter	x	x	x	x	x	x	x			x			1	6	1	1	1	1	1			1	1		1		1	1
361	Wildwood Creek	3-608-1D	Channel	Interim	N	Low Resource Value	13	fall, winter	x	x	x	x	x	x				x			1	6	1	1	1	1	1			1	1	1				1

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362	Water Canyon Creek (Wildwood tributary)	3-608-1F	Channel	Interim	N	Interim Facility	12	summer, fall	x			x	x	x	x			x				2		1		1	1			1			1		1	1
363	Wildwood Debris Basin	3-608-4A	Debris Basin	Interim	N	Basin	20	summer, fall, winter	x	x	x	x	x	x	x			x			1	5	1	1	1	1	1			1	1		1			1
364	Wildwood Basin No 1	3-608-4B	Detention Basin	Interim	N	Basin	20	summer, fall, winter	x	x	x	x	x	x	x			x			1	5	1	1	1	1	1			1	1		1			1
365	Wildwood Basin No 2	3-608-4C	Detention Basin	Interim	N	Basin	20	summer, fall, winter	x	x	x	x	x	x	x			x			1	5	1	1	1	1	1			1	1		1			1
366	Birch Creek	3-612-1A	Channel	Interim	N	Low Resource Value	12	summer, fall	x	x	x	x	x	x	x			x				2				1	1			1			1			1
367	Yucaipa Creek - Mountain View	3-613-1A	Channel	Interim	N	Interim Facility	12	spring, summer, fall	x		x	x	x	x	x							1		1		1	1			1			1			1
368	Yucaipa Creek - 4th Street	3-613-1B	Channel	Interim	N	Interim Facility	12	spring, summer, fall	x		x	x	x	x	x							1		1		1	1			1			1			1
369	Yucaipa Creek - Velardo	3-613-1C	Channel	Interim	N	Interim Facility	12	spring, summer, fall	x		x	x	x	x	x							1		1		1	1			1			1			1
370	City Creek Levee - West Bank	3-301-5B	Levee	Ultimate	Y	N/A	25	fall, winter	x	x	x	x	x	x	x			x		1	1	1	1	1	1	1	1			1	1	1	1			1
371	Gateway Wash	3-615-1A	Channel	Ultimate	N	Low Resource Value	11	summer, fall		x	x	x	x	x	x			x				2			1	1	1			1		1				1
372	Gateway Wash	3-615-1C	Channel	Ultimate	N	Concrete	11	summer, fall	x	x	x	x	x	x	x			x				2		1	1	1	1		1							1
373	Baldridge Creek	3-701-1B	Channel	Interim	N	Low Resource Value	12	spring, fall	x	x	x	x	x	x	x			x				1		1		1	1			1	1	1	1		1	1
374	City Creek Levee - East Bank (USACE)	3-301-5C	Levee	Ultimate	Y	N/A	25	fall, winter	x	x	x	x	x	x	x			x		1	1	1	1	1	1	1	1			1	1	1	1			1
375	City Creek Levee - East Bank	3-301-5D	Levee	Ultimate	Y	N/A	25	fall, winter	x	x	x	x	x	x	x			x		1	1	1	1	1	1	1	1			1	1	1	1			1
376	San Timoteo Creek	3-401-1A	Channel	#N/A	N	Historic modeling completed	25	winter, spring	x	x	x	x	x	x	x			x				8	1			1				1	1	1				**1**
377	Mill Creek Levee (USACE)	3-802-5A	Levee	Ultimate	N	Concrete	13	spring, summer	x	x	x	x	x	x	x			x		1		1				1	1			1		1	1			1
378	Mill Creek Levee (USACE)	3-802-5B	Levee	Ultimate	N	Concrete	13	spring, summer	x	x	x	x	x	x	x			x		1		1				1	1			1		1	1			1
379	San Timoteo Channel	3-401-1B	Natural Channel	#N/A	N	Historic modeling completed	15	spring, summer, fall, winter																												
380	San Timoteo Creek (USACE)	3-401-1B	Channel	#N/A	N	Historic modeling completed	25	winter, spring	x	x	x	x	x	x	x			x				8	1			1				1	1	1				**1**

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									Bank Repair	Concrete Structure Repair	Graffiti Removal	Herbicide and Rodenticide	Ingress/Egress	Mechanized Land Clearing/Excavation	Mowing, Hand Tools, and Related Vegetation Removal	Stockpile Maintenance	Stream Gage Maintenance	Vector Control	Broom	Cement Truck	Dozer	Dump Truck	Excavator	Gradall	Grader	Loader	Non-mechanized Equipment (Hand-held)	Pneumatic Roller	Scraper	Service Truck	Skidsteer Loader	Speed Loader	Sprayer Trucks/Equipment	Tractor and Disc	Tractor/Boom Mower	Water Truck
381	Morrey Arroyo	3-502-1C	Channel	Interim	N	Interim Facility	12	summer, fall, winter	x	x	x	x	x	x	x			x				3		1	1	1	1			1	1		1	1		1
382	Chicken Springs - Avenue B	3-614-1A	Channel	Unknown	N	Facility is adjacent to property and must be maintained to fullest extent.	12	spring, summer, fall	x		x	x	x	x	x							1		1		1	1			1			1			1
383	Mill Creek	3-801-1A	Natural Channel	Unknown	N	Maintenance is only bank repair.	12	spring, summer, fall	x			x	x					x			1		1												
384	Mill Creek	3-801-1C	Natural Channel	Unknown	N	Maintenance had been reduced to maximum extent.	12	fall						x				x			1		1			1	1			1					1
385	Mill Creek	3-801-1D	Natural Channel	Unknown	N	Maintenance had been reduced to maximum extent.	15	fall	x	x	x	x	x	x	x			x			1		1		1		1			1					1
386	Mojave River - Forks Dam	4-101-1C	Natural Channel	Ultimate	N	Historic knowledge reduced maintenance	30	summer, fall	x	x	x	x	x	x	x	x		x		2	4	10	2	2	4	2	1		4	4		1	1		2	2
387	Mojave River	4-101-1D	Natural Channel	Unknown	Y	N/A	50	spring, summer, fall	x	x	x	x	x	x	x	x		x		2	4	10	2	2	4	2	1		4	4		1	1		2	2
388	Mojave River	4-101-1E	Natural Channel	Unknown	Y	N/A	50	spring, summer, fall	x	x	x	x	x	x	x	x		x		2	4	10	2	2	4	2	1		4	4		1	1		2	2
389	Mojave River	4-101-1F	Natural Channel	Unknown	Y	N/A	50	spring, summer, fall	x	x	x	x	x	x	x	x		x		2	4	10	2	2	4	2	1		4	4		1	1		2	2
390	Mojave River	4-101-1G	Natural Channel	Unknown	Y	N/A	30	summer, fall	x	x	x	x	x	x	x	x		x			2	4	1	1	2	1	1		2	2		1	1			1
391	Antelope Creek Wash	4-103-1A	Channel	Interim	N	Interim Facility	14	spring, summer, fall	x	x	x	x	x	x	x	x		x		1	1	2	1	1	1	1	1			1			1			1
392	Oro Grande Wash (USACE)	4-104-1A	Levee	Ultimate	N	Concrete	14	spring, summer, fall	x	x	x	x	x	x	x	x		x		1	1	2	1	1	1	1	1			1			1		1	1
393	Oro Grande Wash	4-106-1A	Levee	Interim	N	Levee/Dam/Groin	14	spring, summer, fall	x	x	x	x	x	x	x	x		x		1	1	2	1	1	1	1	1			1			1		1	1
394	Oro Grande Wash	4-106-1B	Channel	Interim	N	Concrete	14	spring, summer, fall	x	x	x	x	x	x	x	x		x		1	1	2	1	1	1	1	1			1			1		1	1
395	Buckthorn Wash	4-107-1A	Channel	Interim	N	Interim Facility	14	summer, fall	x	x	x	x	x	x	x			x		1	2	1	1	1	1	1	1			1			1		1	1
396	Mojave River	4-101-1H	Natural Channel	Unknown	N	No vegetation management or	14	summer, fall	x									x			1	2	1	1	1	1			1	2					1	1
397	Buckthorn Wash	4-107-1C	Channel	Interim	N	Interim Facility	14	summer, fall	x	x	x	x	x	x	x			x		1	2	1	1	1	1	1	1			1			1		1	1
398	Fremont Wash	4-108-1A	Channel	Interim	N	Interim Facility	14	summer, fall	x	x	x	x	x	x	x			x		1	2	1	1	1	1	1	1			1			1		1	1
399	Fremont Wash	4-108-1B	Channel	Interim	N	Interim Facility	14	summer, fall	x	x	x	x	x	x	x			x		1	2	1	1	1	1	1	1			1			1		1	1
400	Mojave River	4-101-1I	Natural Channel	Unknown	Y	N/A	30	summer, fall	x	x	x	x	x	x	x	x		x			2	4	1	1	2	1	1		2	2	1	1	1		1	1
401	Desert Knolls Wash	4-201-1A	Channel	Interim	N	Concrete	14	summer, fall	x	x	x	x	x	x	x	x		x		1	1	3	1	1	1	1	1			1	1	1	1		1	1

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									Bank Repair	Concrete Structure Repair	Graffiti Removal	Herbicide and Rodenticide	Ingress/Egress	Mechanized Land Clearing/Excavation	Mowing, Hand Tools, and Related Vegetation Removal	Stockpile Maintenance	Stream Gage Maintenance	Vector Control	Broom	Cement Truck	Dozer	Dump Truck	Excavator	Gradall	Grader	Loader	Non-mechanized Equipment (Hand-held)	Pneumatic Roller	Scraper	Service Truck	Skidsteer Loader	Speed Loader	Sprayer Trucks/Equipment	Tractor and Disc	Tractor/Boom Mower	Water Truck
402	Desert Knolls Wash	4-201-1B	Channel	Interim	N	Concrete	14	summer, fall	x	x	x	x	x	x	x			x				3	1	1	1	1	1			1	1	1	1		1	1
403	Swarthout Creek	4-351-1A	Channel	Interim	N	Interim Facility	14	summer, fall	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1			1			1		1	1
404	Flume Creek	4-352-1A	Channel	Interim	N	Interim Facility	14	summer, fall	x	x	x	x	x	x	x			x				1				1	1			1					1	1
405	Heath Creek	4-353-1A	Channel	Interim	N	Interim Facility	14	summer, fall	x	x	x	x	x	x	x	x		x			1	2	1	1	1	1	1		2	1					1	1
406	Sheep Creek	4-354-1A	Channel	Interim	N	Interim Facility	15	summer, fall	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1			1		1	1		1	1
407	Sheep Creek	4-354-1B	Channel	Interim	N	Interim Facility	15	summer, fall	x	x	x	x	x	x	x	x		x			1	2	1	1	1	1	1		2	1					1	1
408	Adelanto East Channel	4-355-1A	Natural Channel	Interim	N	Interim Facility	15	summer, fall, winter					x	x	x							3			1	1	1									1
409	D Street SD	4-401-6A	Storm Drain	Interim	N	Storm Drain	15	summer, fall, winter	x	x	x	x	x	x	x			x				1	1	1	1	1	1			1					1	1
410	Mojave Drive Channel	4-402-1A	Channel	Interim	N	Interim Facility	15	summer, fall, winter	x	x	x	x	x	x	x	x		x		1		2	1	1	1	1				1			1		1	1
411	Mojave Drive Channel	4-402-1B	Channel	Interim	N	Interim Facility	16	summer, fall, winter	x	x	x	x	x	x	x			x	1	1		2	1	1	1	1				1			1		1	1
412	El Evado Channel	4-405-1A	Channel	Interim	N	Interim Facility	15	summer, fall, winter	x	x	x	x	x	x				x			1	2	1	1		1				1					1	1
413	Hesperia East Channel	4-452-1A	Channel	Interim	N	Interim Facility	15	summer, fall, winter	x	x	x	x	x	x	x			x				2	1	1	1	1	1			1			1		1	1
414	Mojave River	4-101-1J	Natural Channel	Unknown	Y	N/A	30	summer, fall	x						x	x		x			2	4	1	1	2	1	1		2	4		1	1		1	1
415	Southwest Barstow Channel	4-501-1A	Channel	Interim	N	Interim Facility	15	summer, fall, winter	x	x	x	x	x	x	x			x				2	1	1	1	1	1			1			1		1	1
416	Southwest Barstow Channel	4-501-1C	Channel	Interim	N	Interim Facility	15	summer, fall, winter	x	x	x	x	x	x	x	x		x				2	1	1	1	1	1			1			1		1	1
417	Southwest Barstow Channel	4-501-1D	Channel	Interim	N	Interim Facility	15	summer, fall, winter	x	x	x	x	x	x	x			x				2	1	1	1	1	1			1			1		1	1
418	Southwest Barstow Channel	4-501-1E	Channel	Interim	N	Interim Facility	15	summer, fall, winter	x	x	x	x	x	x	x			x				2	1	1	1	1	1			1			1		1	1
419	North Barstow Channel	4-502-1A	Channel	Interim	N	Interim Facility	15	summer, fall, winter	x	x	x	x	x	x	x			x		1	2	1	1	1	1	1	1		2	1			1		1	1
420	Arrowhead Channel	4-503-1A	Channel	Interim	N	Interim Facility	15	summer, fall, winter	x	x	x	x	x	x	x			x		1	2	1	1	1	1	1	1		2	1			1			1
421	Waterman Road Channel	4-507-1A	Channel	Interim	N	Interim Facility	15	summer, fall, winter	x	x	x	x	x	x	x			x		1	2	1	1	1	1	1	1		2	1			1			1

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422	Waterman Road Basin	4-507-4A	Detention Basin	Interim	N	Basin	15	summer, fall, winter	x	x	x	x	x	x	x			x			2		1	1	1	1	1			1			1			1
423	Lenwood Channel	4-601-1A	Channel	Interim	N	Interim Facility	15	summer, fall, winter	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1		2	1			1		1	1
424	Lenwood Channel	4-601-1B	Channel	Interim	N	Interim Facility	15	summer, fall, winter	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1		2	1			1		1	1
425	Lenwood Sprdg. Grnds.	4-602-2A	Spreading Ground	Interim	N	Basin	25	spring, summer, fall, winter	x	x	x	x	x	x	x	x		x			1	4	1	1	1	1	1		2	1			1		1	1
426	Yermo Flood Channel	4-701-1B	Channel	Interim	N	Interim Facility	15	spring, summer, fall, winter	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1		2	1			1		1	1
427	Yermo Flood Channel	4-701-1C	Channel	Interim	N	Interim Facility	15	spring, summer, fall, winter	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1		2	1			1		1	1
428	Daggett Channel, East	4-710-1A	Channel	Interim	N	Interim Facility	15	spring, summer, fall, winter	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1		2	1			1		1	1
429	Daggett Channel, West	4-710-1B	Channel	Interim	N	Interim Facility	15	spring, summer, fall, winter	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1		2	1			1		1	1
430	East Baker Channel	4-801-1A	Channel	Interim	N	Interim Facility	15	summer, fall	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1		2	1			1		1	1
431	Baker Levee	4-802-5A	Channel	Interim	N	Interim Facility	15	summer, fall	x	x	x	x	x	x	x	x		x			1	2	1	1	1	1	1		2	1			1		1	1
432	Green Valley Creek	5-211-1A	Natural Channel	Interim	N	Interim Facility	14	spring, summer, fall		x	x			x	x			x		1	1	4			1		1			1		1				1
433	Mojave River	4-101-1K	Natural Channel	Unknown	N	No vegetation management or sediment removal proposed	40	summer, fall	x	x	x	x	x	x	x	x		x		2	2	6	1	1	1	1	1		4	4		1	1		1	1
434	Mojave River	4-101-1L	Natural Channel	Unknown	N	No vegetation to influence hydraulic condition; centerflow is	50	spring, summer, fall	x	x	x	x	x	x	x	x		x		2	2	6	1	1	1	1	1		4	4		1	1		1	1
435	Mojave River	4-101-1M	Natural Channel	Unknown	N	No vegetation management proposed	50	spring, summer, fall	x	x	x	x	x	x	x	x		x		2	2	6	1	1	1	1	1		4	4		1	1		1	1
436	Mojave River	4-101-1N	Natural Channel	Unknown	N	Facility is road crossing only	30	spring, summer, fall	x	x	x	x		x	x	x		x			2	4	1	1	2	1	1		2	4		1	1		1	1
437	Lucerne Valley Channel (formerly LV Storm Drain)	6-301-1B	Channel	Interim	N	Interim Facility	12	spring, summer	x	x	x	x	x	x	x	x		x			1	3	1	1	1	1	1			1	1		1			1
438	Buckthorn Wash	4-107-1B	Channel	#N/A	N	This facility is artificially watered from a golf course and must be fully maintained.	12	spring				x	x	x	x							1			1	1				1					1	1
439	Juanita Drainage Ditch	6-401-1A	Channel	Interim	N	Interim Facility	12	summer, fall	x	x	x	x	x	x	x			x			1	4		1	1	1				1		1	1			1

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440	49 Palms Sprdg. Grnds.	6-401-2A	Spreading Ground	Interim	N	Basin	20	summer, fall	x	x	x	x	x	x	x	x		x			1	6	1	1	1	1	1		1	1	1	1	1		1	1
441	29 Palms Flood Channel	6-402-1A	Channel	Interim	N	Interim Facility	15	summer, fall	x	x	x	x	x	x	x			x			1	6	1	1	1	1	1	1	1		1	1			1
442	29 Palms Flood Channel	6-402-1B	Channel	Interim	N	Interim Facility	20	summer, fall	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			1		1	1		1	1
443	29 Palms Flood Channel	6-402-1C	Channel	Interim	N	Interim Facility	20	summer, fall	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			1		1	1		1	1
444	29 Palms Flood Channel	6-402-1D	Channel	Interim	N	Interim Facility	20	summer, fall	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			1		1	1		1	1
445	29 Palms Flood Channel	6-402-1E	Channel	Interim	N	Interim Facility	20	summer, fall	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			1		1	1		1	1
446	Donnell Basin	6-402-4A	Detention Basin	Interim	N	Basin	25	summer, fall	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1		1	1		1	1			1
447	Pinto Cove Creek	6-403-1B	Channel	Interim	N	Interim Facility	15	summer, fall	x	x	x	x	x	x	x			x			1	6	1	1	1	1	1			1		1	1			1
448	Turner Ditch	4-109-6A	Channel	Unknown	N	This facility only acts as a stockpile location; No vegetation management or sediment removal	14	spring, summer, fall, winter							x	x		x				4			1	1	1			1						1
449	Yucca Creek	6-451-1A	Channel	Interim	N	Interim Facility	15	spring, summer, fall	x	x	x	x	x	x	x			x				6	1	1	1	1	1			1	1	1	1		1	1
450	Yucca Creek	6-451-1B	Channel	Interim	N	Interim Facility	15	spring, summer, fall	x	x	x	x	x	x	x			x				6	1	1	1	1	1			1	1	1	1		1	1
451	Yucca Creek	6-451-1C	Channel	Interim	N	Interim Facility	25	spring, summer, fall	x	x	x	x	x	x	x			x				6	1	1	1	1	1			1	1	1	1		1	1
452	Quail Wash	6-452-1A	Channel	Interim	N	Interim Facility	25	spring, summer, fall	x	x	x	x	x	x	x			x			1	6	1	1	1	1	1		1	1	1	1	1			1
453	Sheep Creek	4-354-1D	Channel	Interim	N	Interim Facility	30	summer, fall	x	x	x	x	x	x	x			x			2	5	1	1	1	1	1		1	1	1	1	1			1
454	Quail Wash Levee (USACE)	6-453-5A	Levee	Interim	N	Levee/Dam/Groin	15	spring, summer, fall	x	x	x	x	x	x	x	x		x		1		3	1	1	1	1	1	1		1		1	1			1
455	Old Woman Springs Creek	6-454-1A	Channel	Interim	N	Interim Facility	15	spring, summer, fall	x	x	x	x	x	x	x			x		x		2	1		1	1	1			1		1	1			1
456	Old Woman Springs Creek	6-454-1B	Channel	Interim	N	Concrete	15	spring, summer, fall	x	x	x	x	x	x	x			x		x		2	1		1	1	1			1		1	1			1
457	Old Woman Springs Basin	6-454-4A	Debris/Detention Basin	Interim	N	Basin	15	spring, summer, fall	x	x	x	x	x	x	x			x		x		6	1	1	1	1	1			1		1	1			1
458	Long Canyon Channel	6-456-1A	Channel	Interim	N	Interim Facility	11	spring, summer, fall	x	x	x	x	x	x	x			x				1		1	1	1	1			1		1	1			1
459	Long Canyon Channel	6-456-1B	Channel	Interim	N	Concrete	15	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			1		1	1			1
460	Covington Wash Channel	6-457-1A	Channel	Interim	N	Interim Facility	13	spring, summer, fall	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			1		1	1			1
461	Hospital Channel	6-458-1A	Channel	Interim	N	Interim Facility	15	spring, summer, fall	x	x	x	x	x	x	x			x			1	6	1	1	1	1	1			1	1	1	1			1
462	High School Channel	6-458-1B	Channel	Interim	N	Interim Facility	13	spring, summer, fall	x	x	x	x	x	x	x			x		1		4	1	1	1	1	1			1	1	1	1			1

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									Bank Repair	Concrete Structure Repair	Graffiti Removal	Herbicide and Rodenticide	Ingress/Egress	Mechanized Land Clearing/Excavation	Mowing, Hand Tools, and Related Vegetation Removal	Stockpile Maintenance	Stream Gage Maintenance	Vector Control	Broom	Cement Truck	Dozer	Dump Truck	Excavator	Gradall	Grader	Loader	Non-mechanized Equipment (Hand-held)	Pneumatic Roller	Scraper	Service Truck	Skidsteer Loader	Speed Loader	Sprayer Trucks/Equipment	Tractor and Disc	Tractor/Boom Mower	Water Truck
463	Burnt Mountain Wash	6-459-1A	Channel	Interim	N	Interim Facility	15	spring, summer, fall	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1			1		1	1			1
464	Hesperia East Channel	4-452-1B	Channel	#N/A	N	Facility is adjacent to property and must be maintained to fullest extent.	15	summer, fall, winter	x	x	x	x	x	x	x			x				2	1	1	1	1	1			1			1		1	1
465	Burnt Mountain Wash	6-459-1D	Channel	Interim	N	Interim Facility	15	spring, summer, fall	x	x	x	x	x	x	x			x			1	2	1	1	1	1	1			1		1	1			1
466	Long Canyon Basin	6-485-4A	Detention Basin	Interim	N	Basin	15	spring, summer, fall	x	x	x	x	x	x	x			x				6		1	1	1	1			1		1				1
467	Church Street Channel	6-486-1A	Channel	Interim	N	Interim Facility	20	spring, summer, fall	x	x	x	x	x	x	x			x				2		1		1	1			1	1	1	1			1
468	Little Morongo Creek	6-501-1A	Channel	Interim	N	Interim Facility	15	spring, summer, fall	x	x	x	x	x	x	x			x			1	3		1	1	1	1			1			1			1
469	Needles Flood Channel	6-601-1A	Channel	Interim	N	Interim Facility	15	summer, fall, winter	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			2	1	1	1	1	1	1
470	Needles Basin No 1	6-602-4A	Detention Basin	Interim	N	Basin	20	summer, fall, winter	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			2	1	1	1	1	1	1
471	Needles Basin No 2	6-602-4B	Detention Basin	Interim	N	Basin	20	summer, fall, winter	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			2	1	1	1	1	1	1
472	Needles Basin No 3	6-602-4C	Detention Basin	Interim	N	Basin	20	summer, fall, winter	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			2	1	1	1	1	1	1
473	Needles Basin No 4	6-602-4D	Detention Basin	Interim	N	Basin	20	summer, fall, winter	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			2	1	1	1	1	1	1
474	Needles Basin No 5	6-602-4E	Detention Basin	Interim	N	Basin	20	summer, fall, winter	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			2	1	1	1	1	1	1
475	Needles S Street Channel (USACE)	6-603-1A	Levee	Interim	N	Concrete	20	summer, fall, winter	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			2	1	1	1	1	1	1
476	Eagle Pass Levee (USACE)	6-603-5A	Levee	Interim	N	Levee/Dam/Groin	20	summer, fall, winter	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			2	1	1	1	1	1	1
477	S Street Channel Inlet Levee	6-603-5B	Levee	Interim	N	Levee/Dam/Groin	12	summer, fall, winter	x	x	x	x	x	x	x			x		1	1	6	1	1	1	1	1			2	1		1	1		1
478	Needles Riverview Levee	6-608-5A	Channel	Interim	N	Interim Facility	12	summer, fall, winter	x	x	x	x	x	x	x			x				6		1	1	1	1			2	1	1	1	1	1	1
479	North Needles Basin	6-609-4A	Detention Basin	Interim	N	Basin	20	summer, fall, winter	x	x	x	x	x	x	x			x			1	6	1	1	1	1	1		2	2		1	1	1	1	1
480	Knickerbocker Creek	6-701-1A	Channel	Interim	N	Interim Facility	20	summer, fall, winter	x	x	x	x	x	x	x			x				1			1	1	1			1		1	1			1
481	Ski Creek Culvert	6-701-6A	Channel	Interim	N	Concrete	11	spring, summer, fall							x			x									1									

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482	Grout Creek	6-703-1A	Natural Channel	Interim	N	Interim Facility	11	spring, summer, fall							x			x									1									
483	Rathbone Creek	6-704-1A	Channel	Interim	N	Interim Facility	12	spring, summer, fall	x	x	x		x	x	x			x				1			1	1	1			1		1	1			1
484	Rathbone Creek	6-704-1B	Channel	Interim	N	Interim Facility	12	spring, summer, fall	x	x	x		x	x	x			x				1			1	1	1			1		1	1			1
485	Sand Canyon Creek	6-704-1D	Channel	Interim	N	Interim Facility	12	fall	x			x	x	x	x							2		1	1	1	1			1		1				1
486	Sand Canyon Creek	6-704-1D	Channel	Interim	N	Interim Facility	20	fall	x	x	x	x	x	x	x	x		x		1		2		1	1	1	1			1		1			1	1
487	Van Dusen Creek (Low Flow)	6-705-1B	Channel	Interim	N	Interim Facility	20	summer, fall	x	x	x	x	x	x	x	x		x				2		1	1	1	1			1		1	1		1	1
488	South Trona Channel	6-801-1A	Channel	Interim	N	Interim Facility	14	spring, fall	x			x	x	x	x	x		x				2				1	1			1						
489	Argus Channel	6-802-1A	Channel	Interim	N	Interim Facility	14	spring, fall	x	x	x	x	x	x	x	x		x				2	1	1	1	1	1			1						
490	Argus Channel (previously 6-802-1A)	6-802-1B	Channel	Interim	N	Interim Facility	14	spring, fall	x	x	x	x	x	x	x	x		x				2	1	1	1	1	1			1						
491	Trona Flood Channel	6-803-1A	Channel	Interim	N	Interim Facility	14	spring, fall	x	x	x	x	x	x	x	x		x				2	1	1	1	1	1			1						
492	Trona Flood Channel	6-803-1B	Channel	Interim	N	Interim Facility	14	spring, fall	x	x	x	x	x	x	x	x		x				2	1	1	1	1	1			1						
493	Rockcrusher Channel	6-804-1A	Channel	Interim	N	Interim Facility	20	spring, fall	x	x	x	x	x	x	x			x				2	1	1	1	1	1			1						1
494	Borosolvay Channel	6-805-1A	Channel	Interim	N	Interim Facility	20	spring, fall	x	x	x	x	x	x	x			x				2	1	1	1	1	1			1						1
495	Borosolvay Channel	6-805-1B	Channel	Interim	N	Interim Facility	20	spring, fall	x	x	x	x	x	x	x			x				2	1	1	1	1	1			1						1
496	Green Valley Creek	5-211-1B	Channel	Unknown	N	Facility is adjacent to property and must be maintained to fullest extent.	11	spring, summer, fall										x																		
497	Seeley Creek	5-312-1B	Natural Channel	Unknown	N	Facility is adjacent to property and must be maintained to fullest extent.	11	summer	x	x					x			x		1		2		1		1	1			1						

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498	**Sequoia Drain**	**5-314-1A**	**Channel**	**Unknown**	N	Only bank repair at this facility.	11	spring, summer, fall										x																				
499	**Hunsaker Drain**	**5-510-1A**	**Channel**	**Unknown**	N	Facility is adjacent to property and must be maintained to fullest extent.	11	summer				x			x												1			1			1				
500	**Lucerne Valley Channel**	**6-301-1D**	**Channel**	**#N/A**	N	No vegetation to influence hydraulic condition; centerflow is required to keep flows away from embankment to prevent erosion.	15	spring, summer	x	x	x	x	x	x	x	x		x			1	1	1	1	1	1	1			1	1		1			**1**
501	**Oasis Creek Channel**	**6-406-1A**	**Channel**	**#N/A**	N	No vegetation to influence hydraulic condition; centerflow is required to keep flows away from embankment	15	spring, fall	x	x		x	x	x	x			x		1	1	2	1	1	1	1	1			1		1	1		1	**1**
502	**Joshua Tree Wash**	**6-452-1B**	**Natural Channel**	**Unknown**	N	No vegetation to influence hydraulic condition; centerflow is required to keep flows away from embankment	10	spring, summer, fall	x	x	x	x	x	x	x			x			1	6	1	1	1	1	1		1	1	1	1	1			1
503	**Burnt Mountain Wash**	**6-459-1B**	**Channel**	**#N/A**	N	No vegetation management or sediment removal proposed.	11	summer, fall, winter	x			x	x	x	x						1	2	1	1	1	1	1			1		1	1			**1**
504	**Cemetery Channel**	**6-806-1A**	**Channel**	**#N/A**	N	No vegetation to influence hydraulic condition; centerflow is	11	spring, fall	x					x								1	1	1	1	1	1			1						

USACE = U.S. Army Corps of Engineers; FLOD = First Line of Defense Basins; DSOD = Department of Safety of Dams.

APPENDIX B

Vegetation Management Plan

VEGETATION MANAGEMENT PLAN

Prepared by

San Bernardino County Flood Control District

Environmental Management Division

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1.0 Introduction

The San Bernardino County Flood Control District (District) was established under State legislation, which was enacted in 1939. The District has developed an extensive system of facilities, including dams, basins, channels, and storm drains. The purpose of these facilities is to intercept and convey flows through and away from major developed areas of the County. The principle function of the District and its facilities are for flood protection of major streams, water conservation, and construction of storm drains.

The purpose of this Vegetation Management Plan is to outline the District's long term plan for managing vegetation in compliance with regulatory permits authorizing maintenance activities. Vegetation management activities reduce the risk of flooding by maintaining flow conveyance and capacity of the flood control facilities. In addition vegetation management is essential to maintaining access, as well as visibility for inspections and maintenance activities is needed to ensure proper function of each facility. Vegetation, in many forms, can help to improve flood control facilities through soil conservation and erosion control. Vegetation also can be aesthetically pleasing while providing habitat and ecological value for a variety of native wildlife species. Vegetation Management activities can include maintaining in-stream vegetation, removing non-native weeds, removal of vegetation on stockpiles and adjacent properties, removing hazardous trees, herbicide applications, selective clearing operations, and in some cases, vegetation establishment and promotion.

The District partners with San Bernardino County Department of Agriculture (County Ag) to apply herbicide within flood control facilities, for vegetation control. County Ag has developed a plan to allow District staff to assist in non-native species eradication and control activities, including herbicide application.

2.0 Goals and Objectives

The primary goal of this vegetation management plan is to outline the standard operating procedures for all vegetation management operations;

1. Control and manage undesirable plant species;
2. Control sediment deposits;
3. Maintain channel banks, slopes, access roads, fence lines, and stockpiles;
4. Ensure inspection visibility and meet federal guidelines;
5. Reduce maintenance costs; and
6. Reduce soil erosion.

Vegetation within flowlines will be a management focus to assure the conveyance of water through the facilities. Target vegetation may include trees, shrubs, vines, aquatic plants, and grasses. Non-native vegetation such as Russian thistle (*Salsola tragus*), yellow star thistle (*Centaurea solstitialis*), mustards (*Brassica* sp.), and non-native annual and perennial grasses will be managed within channel and basins as well as levee slopes, levee tops, and fence lines to prevent establishment and spread.

Excessive aquatic vegetation will also be a focus, as it has the potential to damage flood control facilities. This vegetation can impede water flow, clog pipes, culverts, and water intakes which can lead to flooding, property damage and threat to life. In addition, aquatic vegetation can allow for vector control problems by enabling mosquito breeding.

Several of the facilities maintained by the District have a federal nexus and are therefore linked to specific federal requirements. This nexus occurs when a facility is either constructed and/or funded by a federal agency, or included in a federal program. As a result of the nexus between some flood control facilities and a federal agency, the District must comply with federal maintenance requirements for those specific facilities, which include specific vegetation management requirements under ACOE Guidelines of Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures (Corps ETL 1110-2-583 dated April 30, 2014). Under these guidelines, vegetation free zones are required, and applies to all vegetation accept grasses, for the purposes of erosion control, within 15 feet from the toe (base) of levee structures, and 50 feet from the downstream toe (base) of embankment dams. For additional information on vegetation management of applicable structures with federal oversight, refer to attached ETL 1110-2-583).

3.0 Definition, Identification and Treatment of Sensitive Areas

Sensitive areas include:

- Critical habitat for species listed as endangered or threatened by the United States Fish and Wildlife Service (USFWS) under the Federal Endangered Species Act (FESA);
- Habitat occupied by species listed as endangered or threatened by the USFWS or the California Department of Fish and Wildlife (CDFW) under the California State Endangered Species Act (CESA); and
- Any areas containing suitable or occupied habitat for additional special-status species.

In defined sensitive areas, herbicide use will be limited to ensure no impacts to sensitive species and their habitat.

4.0 Vegetation Management Control Methods

- Hand Crews
    - Vegetation management completed by hand crews involves the cutting of vegetation using chain saws, loppers, rakes, shovels, hoes, weed whips, and/or hand pruners.
- Mechanical Control
    - Mowing and disking involves the mechanical cutting of vegetation using a disc-trailer mounted on rubber-tired tractor or mower heads mounted on the arm of an excavator.
- Chemical Control
    - Herbicide is the use of chemical controls to manage vegetation. Critical factors to be considered in an herbicide program are: efficacy, environmental and operator safety, soil residual activity, application timing, and cost-effectiveness. Applications of herbicide can increase water conveyance and decrease maintenance costs. Under specific guidelines, herbicides can control undesirable plant species in a manner, which reduces channel disturbance much more than mechanical clearing.
        - Pre-emergent herbicides prevent seed germination and are used in situations where seed growth within the soil is problematic.
        - Foliar, post-emergent herbicide is applied to the leaves of the targeted plant and interferes with photosynthesis and other plant functions which result in mortality. There are specific herbicides approved for aquatic sites.

- Broad-spectrum post-emergent herbicides control broadleaved and grass species.
- Species specific post-emergent herbicides control a specific species or type of plant (i.e. grasses).

5.0 Herbicides Use

The District's intends to reduce the amount of herbicides used. This approach can be accomplished by using selective herbicides and application techniques, timing applications for maximum effect, avoiding fixed application schedules, using mechanical control techniques where appropriate, and encouraging natural controls. The District strives to balance the use of herbicides by ensuring all safety requirements are met or exceeded and by activity trying to increase the efficacy of herbicide use.

Herbicide use has several benefits to the District including:

1) Safety for District staff – Herbicide use can reduce the need for equipment and personnel to enter areas that are inaccessible or unsafe;

2) Cost savings – When used appropriately, herbicides substantially reduces the expense of other maintenance activities; and

3) Specificity – Selective use of herbicide allows for the targeting of specific species in a manner that mowing does not allow which reduces impacts to non-target species.

5.1 Aquatic Herbicides

On 12 March 2001, the Ninth Circuit Court of Appeals ruled that discharges of pollutants from the use of aquatic pesticides to waters of the United States require coverage under an NPDES permit. Consequently, the State Water Resources Control Board (SWRCB) developed an Emergency Aquatic Pesticide Permit (General Permit No. CAG990003) to cover short-term seasonal discharges by public entities of pollutants associated with the application of aquatic pesticide for resource or pest management to waters of the United States. An updated version of the Statewide General National Pollutant Discharge Elimination System (NPDES) Permit for Residual Aquatic Pesticide Discharges to Waters Of The United States From Algae and Aquatic Weed Control Applications, General Permit No. CAG990005, Order No. 2013-0002-DWQ (Permit) was completed in 2013, and became effective on December 1, 2013.

An Aquatic Pesticide Application Plan (APAP) is a comprehensive plan developed by the discharger that describes the pesticide application program, the need for the project, methods to reduce impacts to water quality, and how potential impacts will be monitored. The applicator must follow all Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) pesticide label instructions and any Restricted Material Use Permits issued by a County Agricultural Commissioner (CAC);

The APAP described in the following pages addresses all of the above-mentioned requirements. An APAP was originally prepared by the District in October 2005. This revised APAP was submitted to the SWRCB as one component of a Notice of Intent (NOI) application for coverage under the new Permit, and addresses Permit-required changes to the application and monitoring program determined through the annual reporting process. This revised APAP has been implemented upon receipt of a Notice of Applicability from the SWRCB.

All herbicides and surfactants used within District facilities are listed below in Tables 1 through 3. A copy of the APAP is available upon request.

Table 1 - Aquatic Herbicides

Active Compound	Product Trade Name	EPA Registration #	Target
Glyphosate	Rodeo®	92719-324	Emergent foliage of aquatic vegetation
Glyphosate	Habitat®	241-426	Aquatic vegetation
Imazapyr	Polaris® AC Complete	228-570	Emergent foliage of aquatic vegetation

5.2 Terrestrial Herbicides

Terrestrial herbicides are herbicides that are used outside of waterways and may not be applied near of surface water.

Table 2 - Terrestrial Herbicides

Active Compound	Product Trade Name	EPA Registration #	Target
Imazapyr	EsplAnade® 200 SC	432-1516	Pre-emergent for control of annual grasses and broadleaf weeds
Sulfentrazone	Portfolio® 4F California	279-3452-2935	Pre-emergent
Aminopyralid and Triclopyr	Milestone® VM	62719-537	Pre-emergent
Sulfometuron-methyl	Landmark® XP	352-645	Pre-emergent
Glyphosate	Rodeo®	62719-324	Post-emergent
Aminopyralid + triclopyr amine 57213-69-1, 566191-89-7	Capstone®	62719-572	Post-emergent broadleaf weed control, especially legumes
Imazapyr	Polaris® AC Complete	228-570	Post-emergent

5.3 Surfactants

Surfactants are used to increase the effectiveness of the herbicides by reducing the surface tension of the water, increasing the conveyance of the chemicals to target plants and reduce foaming.

Table 3 - Surfactants and Additives

Active Compound	Product Trade Name	Registration #	Purpose
Paraffinic petroleum oil	Brandt Crop Oil	05005	Adjuvant
Amine salts of organic acids and modified seed oils	Crosshair	2935-50186	Drift Control agent
Polyvinyl polymer (polyacrylamide)	Reign	34704-50048-AA	Drift Control agent
Heavy range paraffinic oil, polyol fatty acid esters	Agri-Dex	5905-50094-AA	Adjuvant

6.0 Vegetation Management and Operation Guidelines

These guidelines are subject to periodic review and based on future experience and discussion with regulatory agencies.

6.1 Seasonal Timing

Seasonal timing is an important factor when determining appropriate vegetation controls. Herbicide application at appropriate stages in a plant's life cycle can increase effectiveness and provide greater species control. Proper timing can reduce rates of herbicide use and frequency of application.

Pre-emergent herbicides are designed to prevent weed seeds from germinating by releasing enzymes that inhibit seeds from germinating. Pre-emergent herbicide will be sprayed prior to anticipated seedling germination in the fall and early winter months prior to the first significant predicted rainfall to ensure pre-emergent herbicide is "watered-in". Watering activates the herbicide, creating a barrier to germination.

Foliar herbicides will be used throughout the growing season, prior to seeding to prevent further spread. They are only applied to target species minimizing drift and non-target application.

6.2 Operational Guidelines

Aquatic pesticide is applied using various methods. Blanket applications are performed either by using a mechanized spray truck with mounted spray boom, all-terrain vehicles (ATV) with herbicide spray platforms, or by using a hand hose sprayer attached to the spray truck or ATV. Sometimes the spray rigs are not able to spray close to fence lines or tight areas and spotty re-growth can occur and is required to be re-sprayed. Spot applications are made using backpack sprayers.

The herbicide application process has been approved by County Ag, and they have determined a California State Qualified Applicator License (QAL) or Qualified Applicator Certificate (QAC) per 3CCR section 6504 is not required. County Ag will monitor any District application of herbicide through random field monitoring inspections. When District staff applies herbicide, they will complete daily records of amount and location of herbicide use.

County Ag and the District restrict herbicide applications during certain adverse weather conditions, such as rain or wind. Further, herbicide applications (foliar and cut stump) will not be made during periods of measurable rainfall. Foliar applications are effective in light mist situations; however, any measurable rainfall that creates leaf runoff will wash the herbicide off the targeted plant. All postponed applications due to rainfall will resume once the targeted leaf or stump surfaces are dry. Excessive wind (>15 miles per hour) can create drift during foliar applications. Significant herbicide drift can cause damage to desirable vegetation adjacent to the application area. Cut stump treatments are much less affected by the wind, as they are applied directly to the cut stump, typically in close proximity to the ground.

To minimize off-target drift, the applicator will comply with the following restrictions: During periods of wind which are strong enough to bend the tops of the main stems of tree species on the roadside, the applicator will periodically observe the application of the foliar treatment to ensure that there is no significant movement of the herbicide. If the applicator can see the herbicide moving off target, the application will stop immediately.

All herbicide solutions to be used for a foliar application will contain drift control agents. Drift control agents will be added to the foliar herbicide mixture, as per the product label. Foliar treatments will not be made to target vegetation that exceeds twelve feet in height to reduce drift of herbicide to adjacent vegetation.

6.3 Avoidance and Minimization Measures

In defined sensitive areas, herbicide use will be limited to ensure no impacts to sensitive species and their habitat.

Prior to any vegetation management activities, District Ecological Resource Specialists and/or consultant will perform pre-maintenance surveys in an effort to further reduce and minimize all potential environmental impacts.

Direct application of herbicide to any unvegetated water surface will be avoided.

All mechanical and chemical practices utilized by the District and County Ag shall comply with federal, state, and local regulations.

Vegetation management will be scheduled outside of nesting bird season; if vegetation management is needed, a nesting bird survey will be conducted according to the District's Nesting Bird and Burrowing Owl Management Plan to ensure there are no impacts to nesting birds.

6.4 Remedial Spill and Emergency Plan

The District and County Ag will insure that all pesticides are properly labeled and stored at room temperature in a dry place until they are ready to be applied. All mixing and loading of herbicides will be conducted in a secondary container; mixing only the amount of herbicide necessary to carry out the vegetation control will ensure that there will be no waste and will minimize potential problems. The vehicle carrying out the spraying operation will be equipped with a bag of leak-proof containers, a broom, and a shovel in case of minor spills. Herbicide labels and fact sheets will be carried by the on-site applicator.

If a spill occurs, the following actions will take place:

- If it is a minor spill, defined as a small splash or drops, caught on the drip pan should be wiped up with paper towels or a gloved hand and contaminated paper towels stowed in an orange waste disposal bag.
- If it is a major spill, immediate action will take place to contain the spill and protect the spill area.
- The cause of the spill must be identified and secured.
- The spill will be contained to an area as small as possible and kept from spreading.
- Appropriate absorbent will be applied to soak up the liquid
- The used absorbent material will be swept up with a broom and shovel and placed in an orange waste disposal bag. Repeat this procedure, as needed to ensure that the area has been thoroughly decontaminated.
- The spill will be reported to the Weed Abatement Supervisor, who will report to County Ag.
- Splashes to the body will be washed with soap and rinsed thoroughly with water.
- Splashes to the eyes will be treated with the emergency eye wash.
- Any person experiencing effects of exposure will be transported for medical evaluation.
- All exposures to workers shall be reported as occupational injuries/illness in accordance with the Employee Health & Safety Manual.

ETL 1110-2-583
30 April 2014

US Army Corps
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ENGINEERING AND DESIGN

GUIDELINES FOR LANDSCAPE PLANTING AND VEGETATION MANAGEMENT AT LEVEES, FLOODWALLS, EMBANKMENT DAMS, AND APPURTENANT STRUCTURES

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DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
CECW-CE Washington, DC 20314-1000

Technical Letter
No. ETL 1110-2-583 30 April 2014

EXPIRES 30 APRIL 2019

Engineering and Design

GUIDELINES FOR LANDSCAPE PLANTING AND VEGETATION MANAGEMENT AT LEVEES, FLOODWALLS, EMBANKMENT DAMS, AND APPURTENANT STRUCTURES

1. Purpose. This ETL provides guidelines to assure that landscape planting and vegetation management provide aesthetic and environmental benefits without compromising the reliability of levees, floodwalls, embankment dams, and appurtenant structures. It is important to note that all minimum guidelines presented herein are just that—minimums. The dimensions of the vegetation-free and root-free zones defined in this document provide the minimum acceptable buffer between vegetation and flood damage reduction structures. For each individual project, the design team must consider whether these minimums are adequate to the specific needs and conditions of the project.

2. Applicability. This ETL applies to all USACE Commands having Civil Works responsibilities. This ETL is not applicable to determinations for eligibility in the Rehabilitation Program (previously called the Rehabilitation and Inspection Program) under ER 500-1-1 and the provisions of Public Law 84-99.

3. Distribution Statement. Approved for public release, distribution is unlimited.

4. References.

a. USACE Publications.

(1) EM 1110-2-38, Environmental Quality in Design of Civil Works Projects, 3 May 1971.

(2) EM 1110-2-1205, Environmental Engineering and Local Flood Control Channels, 15 November 1989 (Sections 4-8.d (4) and 5-1).

(3) EM 1110-2-1601, Hydraulic Design of Flood Control Channels, 1 July 1991, with Change 1, 30 June 1994 (Sections 3-3 and 3-5).

(4) EM 1110-2-1913, Design and Construction of Levees, 30 April 2000 (Sections 4-4 and 8-17).

(5) EM 1110-2-2300, General Design and Construction Considerations for Earth and Rock Fill Dams, 30 July 2004.

This ETL supersedes: ETL 1110-2-571, Guidelines for Landscape Planting and Vegetation Management at Levees, Floodwalls, Embankment Dams, and Appurtenant Structures, dated 30 April 2009.

(6) EM 1110-2-2502, Retaining Walls and Floodwalls, 29 September 1989 (Section 7-16).

(7) EP 500-1-1, Emergency Employment of Army and Other Resources. Civil Emergency Management Program – Procedures, 30 September 2001 (Section 5.8.k and Appendix E).

(8) ER 200-1-5, Policy for Integrated Application of U.S. Army Corps of Engineers (USACE) Environmental Operating Principles (EOP) and Doctrine, 30 October 2003.

(9) ER 1110-1-12, Quality Management, Change 1, 30 September 2006.

(10) ER 1110-2-1150, Engineering and Design for Civil Works Projects, 31 August 1999.

(11) ER 1130-2-530, Project Operations - Flood Control Operations and Maintenance Policies, 30 October 1996.

b. FEMA Publications.

(1) FEMA 473, FEMA (2005a), Technical Manual for Dam Owners, Impacts of Animals on Earthen Dams, FEMA 473, September 2005, http://www.fema.gov/plan/prevent/damfailure/publications.shtm

(2) FEMA 534, FEMA (2005b), Technical Manual for Dam Owners, Impacts of Plants on Earthen Dams, FEMA 534, September 2005, http://www.fema.gov/plan/prevent/damfailure/publications.shtm

(3) 44 CFR Chapter 65.10, "Mapping of Areas Protected by Levee Systems," 24 October 2012.

c. Other Publications.

(1) Association of State Dam Safety Officials (2002), Association of State Dam Safety Officials (ASDSO) (2002), A Technical Manual on the Effects of Tree and Woody Vegetation Root Penetrations on the Safety of Earthen Dams, December 2002.

5. General. Levees, floodwalls, embankment dams, and their appurtenant structures serve a common purpose in that they are designed to contain water and prevent flooding for varying lengths of time. They must also be readily accessible by equipment and personnel essential to reliable operation and maintenance. The possibility for long-term saturation of levee materials or levee and floodwall foundations, together with their specific operation and maintenance requirements, makes it necessary to exercise caution in the design of landscape planting and vegetation management at these structures. This ETL describes important characteristics of levees, floodwalls, embankment dams, and their appurtenant structures.

6. Future Guidance. Planned research will complement this guidance. Future editions will include field studies of vegetation impacts to flood damage reduction structures and helpful information on the root system characteristics of various plant species.

FOR THE COMMANDER:

2 Appendices
Appendix A-Illustrations
Appendix B-Acronyms, Abbreviations, and Glossary of Terms

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Engineering and Design

GUIDELINES FOR LANDSCAPE PLANTING AND VEGETATION MANAGEMENT AT LEVEES, FLOODWALLS, EMBANKMENT DAMS, AND APPURTENANT STRUCTURES

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CHAPTER 1

Introduction

1-1. Purpose.

This ETL provides guidelines to assure that landscape planting and vegetation management provide aesthetic and environmental benefits without compromising the reliability of levees, floodwalls, embankment dams, and appurtenant structures. It is intended as a guide for safe design and not as a restriction to the initiative of designers. These guidelines should be used with reasonable judgment and practicality, and should be tailored to the specific requirements and conditions of each individual project. A design that integrates landscape plantings and vegetation management into a system for flood damage reduction requires a coordinated, interdisciplinary effort that involves the local sponsor and the following disciplines: civil engineer, landscape architect, levee and/or dam safety engineer, environmental engineer, geologist, biologist, and additional related disciplines, as appropriate.

1-2. Applications.

a. Where the safety of the structure is not compromised, and effective surveillance, monitoring, inspection, maintenance, and flood-fighting of the facility are not adversely impacted, appropriate landscape planting (trees, shrubs, vines, forbs, and grasses) may be incorporated into the design of all flood damage reduction projects, subject to the limitations set forth in this document. Because landscape plantings enhance the environment, with respect to both natural systems and human use, they are to be considered in all flood damage reduction project planning and design studies and will be fully presented in design documentation reports. For projects in which the maintenance of the completed facility will be the responsibility of the local sponsor, the landscape planting will be fully coordinated with the local sponsor during planning and design to determine the sponsor's desires and to obtain assurances that the sponsor is capable of, and committed to, the proper maintenance of the vegetation.

b. In certain instances, to further enhance environmental values or to meet state or Federal laws and/or regulations, the local sponsor may request a variance from the standard vegetation guidelines set forth in this ETL. Vegetation variances for either Federal or non-Federal flood damage reduction systems may be permitted. The vegetation variance must meet the following two criteria:

(1) The variance must be shown to be necessary, and the only feasible means, to: (1) preserve, protect, and enhance natural resources, and/or (2) protect the rights of Native Americans, pursuant to treaty and statute.

(2) With regard to flood damage reduction systems, the variance must retain: (1) safety, structural integrity, and functionality, and (2) accessibility for maintenance, inspection, monitoring, and flood-fighting. Note that, as used here, the term "retain" assumes a pre-variance condition that is fully consistent with the requirements set forth in this ETL, and any other applicable criteria.

(3) Some types of vegetation, both woody (trees, shrubs, and vines) and non-woody (grasses and forbs), will be periodically cleared, as needed, to maintain the conditions described in the second criterion. The variance will not be a substitute for poor maintenance practices. See the following references regarding variances to levee vegetation standards: ER 500-1-1, for policy; EP 500-1-1, for the request and approval process; and, any other applicable guidance issued subsequent to this document.

c. Any addition of landscape plantings to existing flood damage reduction systems must comply with the project's O&M manual. New plantings may not be approved without an appropriately detailed and documented engineering evaluation to ensure that design intent and safety criteria are maintained as originally authorized.

1-3. Environmental Quality and Aesthetics. Environmental quality and aesthetics are of special concern. The design and maintenance of flood damage reduction systems must fully consider the environmental implications of the proposed actions and must ensure that they are consistent with the doctrine outlined in the Corps' Environmental Operating Principles. Project design should respond appropriately to the visual character of the project context with respect to the characteristics of both the natural and built landscapes. Landscape planting design should consider both human use and the environmental processes and characteristics of the entire area influenced by the project. While it is seldom feasible to preserve the natural setting intact, design techniques and careful construction methods can protect and perhaps enhance local environmental and aesthetic values.

CHAPTER 2

Landscape Planting: Objectives and Engineering Requirements

2-1. Background.

a. In flood damage reduction projects, the goal of landscape planting is to minimize and/or mitigate negative impacts to aesthetic, environmental, and ecological conditions, such that post-project conditions are equal to, or better than, pre-project conditions. Landscape planting objectives should, minimally:

(1) Provide cover to prevent dust and erosion.

(2) Provide ecological benefits, such as improved water quality and wildlife habitat.

(3) Integrate the flood damage reduction system with the surrounding natural and human environment.

(4) Separate activities.

(5) Define zones of use.

(6) Provide privacy.

(7) Screen undesirable features or views.

(8) Accentuate positive features or views.

(9) Create a pleasant environment for human use and recreation.

b. These and any other project-specific landscape planting objectives must be consistent with both the policy set forth in Paragraph 1-3 and the engineering requirements detailed in this chapter.

2-2. Vegetation-Free Zone.

a. The vegetation-free zone is a three-dimensional corridor surrounding all levees, floodwalls, embankment dams, and critical appurtenant structures in all flood damage reduction systems. The vegetation-free zone applies to all vegetation except grass. Grass species are permitted, as described in Paragraph 4-8, for the purpose of erosion control.

b. The primary purpose of the vegetation-free zone is to provide a reliable corridor of access to, and along, levees, floodwalls, embankment dams, and appurtenant structures. This corridor must be free of obstructions to assure adequate access by personnel and equipment for surveillance, inspection, maintenance, monitoring, and flood-fighting. In the case of flood-fighting, this access corridor must also provide the unobstructed space needed for the construction of temporary flood-control structures. Access is typically by four-wheel-drive vehicle, but for some purposes, such as maintenance and flood-fighting, access is required for larger equipment, such as tractors, bulldozers, dump trucks, and helicopters. Accessibility is essential to the reliability of flood damage reduction systems.

c. The vegetation-free zone must be both wide and tall enough to accommodate all likely access requirements. The minimum allowable dimensions for a vegetation-free zone, for a variety of flood damage reduction system configurations, are based on lessons learned from flood-fighting experience and are illustrated in Chapter 6. The general rule is:

(1) The minimum height of the corridor shall be 8 ft, measured vertically from any point on the ground.

(2) The minimum width of the corridor shall be the width of the levee, floodwall, or embankment dam, including all critical appurtenant structures, plus 15 ft on each side, measured from the outer edge of the outermost critical structure. In the case of a planting berm (Figures A-13, A-14, and A-15), the 15 ft is measured from the point at which the top surface of the planting berm meets the levee section.

(3) No vegetation, other than approved grasses, may penetrate the vegetation-free zone, with two exceptions, as shown in Figure A-2:

(a) Tree trunks are measured to their centerline, so one half of the tree trunk may be within the vegetation-free zone.

(b) Newly planted trees, the crowns of which can be expected to grow or to be pruned clear of the vegetation-free zone within 10 years.

d. The minimum vegetation-free zone dimensions may not be diminished without a formal variance (see Paragraph 1-3b). Due to specific site conditions and project requirements, many levees, floodwalls, embankment dams, and appurtenant structures will be determined, by the project design team, to require a vegetation-free zone larger than the minimum described here.

e. This paragraph has established the minimum acceptable width of the vegetation-free zone at 15 ft. Other than by variance, as described above, the single exception to this 15-ft minimum requirement arises in the case of an existing project where the width of the existing real estate interest for the project is less than 15 ft. In such a case, the vegetation-free zone width shall be the maximum attainable within the existing real estate interest.

2-3. Vegetation-Management Zone.

A recommended alternative to enlarging the vegetation-free zone is adding an adjacent vegetation-management zone (see Figure A-22). A vegetation-management zone provides greater opportunity to include vegetation by reserving the option to manage it selectively, as needed. Two of many possible scenarios are:

a. Several trees, just outside the vegetation-free zone, are inhibiting grass growth, through light deprivation and/or the production of their own natural herbicides that limit competition for moisture and nutrients. These trees should be either removed or modified, as appropriate, to assure that grasses thrive and continue to provide effective erosion control.

b. A large tree, outside the vegetation-free zone, becomes a hazard tree when its root system is severely damaged by construction activity, thereby increasing its susceptibility to windthrow and the associated risk of damage to a floodwall. This tree should be removed.

2-4. Root Impacts.

As stated in Paragraph 2-2, the primary purpose of the vegetation-free zone is access. However, it also serves a secondary purpose: it provides distance between root systems and levees, floodwalls, embankment dams, and appurtenant structures, thereby moderating reliability risks associated with the following two situations: potential piping and seepage due to root penetration; and structural damage (a hole in the ground, surrounded by an area of disturbed earth) resulting from a wind-driven tree overturning. Though not adequate for all situations, this 15-ft zone does provide a measure of risk reduction, as follows:

a. Root size and numbers diminish with distance from the tree trunk.

b. The hole and its surrounding area of disturbed earth, created by a tree overturning, typically has a radius ranging from 6 to 12 ft. This secondary effect of the vegetation-free zone is important to the reliability of flood damage reduction systems; it is not a root-free zone, but it is a zone of reduced root impact.

2-5. Root-Free Zone. Planting design must consider the possible implications to foundation strength and performance. The integrity of the foundation could be compromised if potential seepage paths were created by root penetration and/or root decay. The root-free zone provides a margin of safety between the greatest expected extent of plant roots and the beginning face of any structure that is critical to the performance and reliability of the flood damage reduction system. The list of such structures includes levees, floodwalls, embankment dams, seepage berms, seepage drains, toe drains, pressure relief wells, and cut-off trenches. These critical structures must be root-free, as shown in Figures A-13, A-14, A-15, A-17, and A-19. The rooting habit of each plant selected for use near a root-free zone must be predictably understood with respect to its potential to invade the root-free zone and compromise the reliability of the flood damage reduction system. Landscape planting plans will reflect full recognition of the importance of selecting appropriate plant species and varieties. Root barriers may be used to provide an added measure of assurance, but they should not be a substitute for adequate distance between plantings and root-free zones. Root barriers shall not retard groundwater or seepage flow. Some root barriers include herbicides to enhance effectiveness; in every case, these shall be evaluated before use to prevent negative environmental impacts.

2-6. Water-Current and Wave-Action Barrier. The use of suitable vegetation, such as shrub forms of *Salix* (willow), riverward of the vegetation-free zone, is encouraged as an environmentally beneficial means to moderate the erosive potential of water currents and wave action.

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CHAPTER 3

Treatment of Levees, Floodwalls, Embankment Dams, and Appurtenant Structures

3-1. General.

a. The integrity of levees, floodwalls, embankment dams, and appurtenant structures is paramount to the public health, safety, and welfare. The presence of undesirable vegetation can undermine that integrity and lead to failure if not corrected.

b. Trees and other woody vegetation, such as shrubs and vines, can create both structural and seepage instabilities, prevent adequate inspection, and create obstacles to maintenance and flood-fighting/flood-control activities. Vegetation must be controlled for the following reasons:

(1) To allow proper inspection, surveillance, and monitoring of all structures and adjacent areas for seepage, cracking, sinkholes, settlement, displacement, and other signs of distress.

(2) To allow access for normal and emergency Operations and Maintenance (O&M) activities.

(3) To prevent root-related damage to structures, such as shortened seepage paths through embankments and/or foundations; voids in embankments and/or foundations due to decayed roots or fallen trees; clogged seepage collector systems; and expansion of cracks or joints in concrete walls, spillway floors, and canal linings.

(4) To limit those habitat characteristics that encourage the creation of animal burrows.

(5) To allow full design-discharge capability of waterways, spillway inlet and outlet channels, outlet-works discharge channels, and other open conveyance channels.

(6) To avoid any incidental growth and subsequent presence of endangered species that might prohibit activities necessary for O&M, or access.

c. This document establishes minimum dimensions for both vegetation-free zones and root-free zones; however, for any specific project, those minimum dimensions may be increased by levee and/or dam-safety engineering personnel due to site-specific considerations such as topography, phreatic surfaces within the structure and abutments, geological features, historical embankment and/or foundation seepage or issues, stability issues, and foundation characteristics.

3-2. Levees.

a. Levees are usually constructed of compacted earth fill. In some cases, internal drainage or under-seepage treatment is incorporated into the levee. When a planting berm is used to allow vegetation nearer to the levee centerline, the internal blanket drain and/or toe drain must be extended, as shown in Figures A-14 and A-15. Any such extension must be assessed by the design team for impact to the seepage control system.

b. All levees must have effective and reliable erosion protection. Paragraph 4-8 describes appropriate use of grasses. Where opportunities exist, environmental improvements should be considered. Project design shall address the following criteria:

(1) Urban Levees. Because levee projects have the potential to dominate these high-visibility landscapes, planting is often desirable, particularly in high-visibility locations, such as at and along major thoroughfares, parks, and waterfront developments.

(2) Rural or Agricultural Levees. Although these are typically not high-visibility areas, both human use and environmental needs should be considered during design. Plantings are particularly appropriate for the following areas, provided they are consistent with site-specific engineering requirements: high-visibility pumping installations, public road crossings, locations near residences, and at other project locations where landscape plantings could protect or restore valued environmental characteristics.

c. Minimum vegetation-free and minimum root-free zones are established for levees, as illustrated in Chapter 6.

3-3. Floodwalls.

a. Floodwalls are most often used in urban areas, where land or access is constrained. These walls are subject to hydraulic forces on one side, which may be resisted by little or no earth-loading forces on the other side. Landscape planting should be addressed in floodwall design, particularly where walls encroach on, or change, existing scenic values, e.g., where the wall becomes a visual barrier along a street or near dwellings, parks, and existing or anticipated commercial developments.

b. The minimum vegetation-free zone provides for access. However, two additional areas of concern with respect to floodwalls are:

(1) Large trees can be a threat to project reliability. Planting design and maintenance must take into account the potential for overturning trees to damage floodwalls. The following factors can be used, alone or in combination, to limit potential for such damage:

(a) Ensuring distance between a tree and the wall.

(b) Selecting tree species that have a low potential for breaking and overturning.

(c) Monitoring and performing maintenance to address hazard trees.

(d) Placing intervening obstacles, such as other trees, that would reliably restrain a falling tree. Where other factors are unreliable, the distance between a tree and the wall must be adequate: e.g., a minimum distance of one-half of the mature tree height.

(2) Planting design and maintenance must also take into account the three potential means by which tree roots may damage floodwalls:

(a) Large tree roots can damage concrete structures by jacking (lifting) them, which can cause cracking and separation at joints. Further, if a floodwall is lifted, a seepage path could form along the structure/foundation contact. Smaller (lighter) floodwalls are more susceptible than larger (heavier) structures.

(b) Roots may also grow into and through wall joints, loosening and eroding wall-joint seals, thus damaging the water-proof characteristics.

(c) A floodwall may have a toe drainage system to:

(1) Check and control piping and boils,

(2) Control seepage that may result from roofing, where piles are used, and

(3) Control uplift pressures. These drainage systems must be protected from invasion by roots, which could clog them.

c. Although there are several types of floodwalls, the two most common are the inverted-T type reinforced concrete wall and the cantilever-I type sheet piling wall. The vegetation impact concerns are similar for both types. For all the reasons cited above, minimum vegetation-free and minimum root-free zones are established for floodwalls, as shown in Figures A-16 through A-19.

3-4. Embankment Dams and Appurtenant Structures.

a. Purpose. “Tree and woody-vegetation penetrations of earthen dams and their appurtenances have been demonstrated to cause serious structural deterioration and distress that can result in failure of earthen dams” (Association of State Dam Safety Officials 2002). Proper establishment and control of vegetation is critical to dam safety. This Paragraph establishes minimum requirements for landscape planting and vegetation management at embankment dams (earth fill, rock fill, or earth and rock fill), including multipurpose projects with both concrete and embankment dam structures (wing dams) and perimeter saddle dams (dikes); abutments; and appurtenances, such as spillways, outlet works, and inlet and/or outlet channels.

b. Policy. The following five areas are vegetation-free zones:

(1) The dam or the dam-toe area.

(2) Areas in or around seepage monitoring systems, or critical downstream areas where seepage observation must be vigilant and continuous.

(3) Groin abutments and areas immediately adjacent to groin abutments.

(4) Spillways and spillway channels, including spillway slopes and approaches to spillways where vegetation could, in any way, impede the efficient operation of the spillway.

(5) The outlet-works discharge channel.

c. Vegetation-Free Zones. Vegetation-free zones shall, when dry, be mowed to a height of 3–6 in. at any time the grass reaches a height of 12 in.. Mowing shall be triggered by grass heights of less than 12 in. if important to the health maintenance of the particular grass species. The maximum height of grasses shall be 12 in. The minimum vegetation-free zone requirements for specific structures are:

(1) Embankment Dams. At a minimum, for “dry” reservoirs, the entire dam embankment surface, including upstream impervious blankets and the upstream and downstream areas within 50 ft of the embankment toe, shall be a vegetation-free zone (see Figure A-20). For “normal pool” conditions, the entire embankment surface from the upstream toe of the dam or from the upstream limit of the impervious blanket, as applicable, to a minimum distance of 50 ft from the downstream toe shall be a vegetation-free zone (see Figure A-21).

(2) Dam Abutments. The dam abutment is defined as the part of a natural valley side-wall against which a dam is constructed. At a minimum, the vegetation-free zone shall extend for a horizontal distance of 15 ft beyond the embankment/abutment contact line (i.e., groin).

(3) Spillways. The safety of embankment dams requires the unobstructed operation of spillways. The minimum vegetation-free zone shall include the spillways and spillway channels, including spillway slopes and approaches.

(4) Outlet-Works Discharge Channels. The minimum vegetation-free zone shall include the entire outlet channel, outlet structure headwalls and wingwalls, and surrounding areas to a distance of 50 ft from the top of the bank of the outlet channel.

CHAPTER 4

Design Considerations

4-1. Feasibility Analysis.

During design, an analysis shall be made of the flood damage reduction system to determine if and where landscape planting can be permitted. Not all projects will have a satisfactory combination of conditions to permit planting of trees, shrubs, vines, forbs, and grasses. In some cases, only shrub planting may be feasible. In other cases, planting may be limited to grasses. Site conditions, engineering design criteria, and O&M requirements should determine the appropriate planting scheme. However, environmental objectives shall be considered in all projects and the engineering design should seek to accommodate appropriate plantings. The following paragraphs describe some important site considerations.

a. Types of Construction Material. The type of construction material is an important factor in determining suitability for landscape planting. Rock, sand, and many types of compacted clay embankments are examples of poor plant-growing media. The roots of some plant species, under some conditions, may penetrate a great distance into a sand levee, potentially providing a path for piping through the structure. Plants must be selected very carefully with regard to the type of construction materials used to ensure survival of the plant and prevent damage to the structure.

b. Project Alignment. Project alignment can be a complex exercise involving multiple, often conflicting criteria and requiring a coordinated effort by the project delivery team. The role of the landscape architect is to identify opportunities and constraints to human use relative to project alignment. For example, in an urban area, a relatively minor adjustment to a proposed alignment might allow for plant screening between residences and the structure, or it might provide space for a park or other community green space. Often, those segments of the alignment that are otherwise arbitrary may be turned to advantage with respect to human use.

c. Environmental Factors. The types of vegetation suited to a site are a function of a number of environmental factors. Local climate (precipitation, temperature, dates of earliest and last frost, etc.) can limit the types of vegetation that survive in a particular region. Soil type, pH, nutrient character, exposure to sunlight, flood and drought duration, and depth to groundwater are additional conditions that can influence the potential for a site to support vegetation. Because one important functional characteristic of vegetative groundcovers is their ability to provide erosion control, it is necessary to confirm that the proposed cover can withstand the energy environment under flood conditions. This may require an assessment of local velocities and shear stresses and comparison of predicted values under flood conditions against thresholds for various types of vegetation.

4-2. Planting Berms.

a. Beyond the minimum section needed to satisfy stability requirements, it is sometimes desirable to add additional earth fill to a levee or embankment dam to create a planting berm to

better accommodate differing types of public use and related landscape planting approaches (see Figures A-13, A-14, and A-15). The appropriate dimensions of the planting berm should be determined by the landscape architect in consultation with the design team. Additional rights-of-way may be necessary to accommodate the additional fill material and flatter slopes. Except in approved planters, vegetation is not permitted on any overbuild that has a system-reliability function. Planting berms may be considered for use on the land side only.

b. Planting layout and plant material characteristics shall be coordinated with the design team to assure adequate access between the levee crown and the toe for two purposes: (1) visual access is required for inspection of the toe area, and (2) physical access is required for flood-fighting activities involving personnel and heavy equipment. In all cases, the planting berm must be of sufficient depth to accommodate any proposed vegetation while precluding root penetration into any root-free zone. Design must include adequate consideration of any internal drainage or seepage control system (see Figures A-14 and A-15).

c. Additional design requirements for planting berms include the following. For new projects, engineering and design shall be in accordance with ER 1110-2-1150, Engineering and Design for Civil Works Projects, and all related guidance. For existing projects, engineering and design shall be in accordance with CECW-PB memorandum dated 23 October 2006, Policy and Procedural Guidance for the Approval of Modification and Alteration of Corps of Engineers Projects.

4-3. Planters.

a. In overbuild areas, permanent plant containers, such as concrete planters, may be considered. Planters must not impact the designed dam or levee section, or appurtenant structures such as berms, drains, ditches and wells. Planter design and layout must allow for adequate access up and down the embankment as required for inspection and flood-fighting activities and must be approved by the Dam or Levee Safety Officer.

b. Planters and containerized plants should be used selectively and should be considered only when normal planting is not practical. The initial cost and the ability of the sponsor to maintain this type of planting should be considered during design. Plants selected for use in planters should have mature heights of not more than approximately 20 ft.

4-4. Irrigation Systems. Irrigation systems within the vegetation-free zone pose two potential threats to system reliability: (1) pressurized waterlines may fail, resulting in damage to the engineered embankment section, and (2) irrigation water may impair visual inspection by obscuring wet areas that are actually due to seepage. Any irrigation system that targets the vegetation-free zone shall be engineered so as to address these issues and meet the approval of the District dam or levee safety officer. Designs may include features such as double-walled piping and leakage detection systems.

4-5. Flood-Fighting and Structure Maintenance. Flood-fighting and maintenance operations for levees, floodwalls, embankment dams, and appurtenant structures can be complex. These

operations must not be impacted by the layout and physical characteristics of landscape plantings. Landscape plantings will be designed to permit inspection of structures from moving vehicles. Access requirements for emergency repair and replacement associated with flood-fighting efforts shall also be considered.

4-6. Maintenance of Plantings. Planting designs must be consistent with the capacity of the project sponsor to maintain them. Maintenance shall include the control and/or removal of invasive species. Low-maintenance plant materials are often the most appropriate choice.

4-7. Selection of Plant Material. Plants will be selected from approved plant lists prepared jointly by Division and District landscape architects in conjunction with the local sponsor or resource agencies. The list will include trees, shrubs, vines, forbs, sedges, and grasses that are native to the region and well adapted to the climactic, soil, and hydrologic conditions of the site. Plant lists should be appropriate to the specific structural conditions and requirements of each project. As the project site experiences fluctuations in various environmental conditions over time, such as water level, precipitation, and herbivory, some plants or species will not survive but others may thrive. A diverse array of plant species is essential to a riparian system's resiliency and its ability to provide and sustain a number of functions. A botanist familiar with local flora should be consulted to select those species from the approved list most likely to meet project objectives.

4-8. Appropriate Ground Cover in the Vegetation-Free Zone.

a. The only acceptable vegetative ground cover in the vegetation-free zone shall be perennial grasses. Their primary function shall be to reliably protect against erosion. They shall be maintained as necessary to ensure the health and vigor of the primary species providing erosion protection. The species selected for each project shall be appropriate to the local climate, conditions, and surrounding or adjacent land uses. Preference should be given to the use of native species. Invasive or weed species shall not be acceptable. The species selected must be able to tolerate mowing to heights as low as 3 in. as follows: at least once each year for inspection, and in anticipation of flood conditions and associated monitoring and flood-fighting activities.

b. If the local climate, hydraulic and hydrologic environment, soils, or other conditions will not support such grass species, then non-vegetative means of erosion control shall be employed, e.g., riprap, pavement, articulating concrete mats, or other engineered surface.

c. A maximum grass height is specified for embankment dams and their appurtenant structures (see Paragraph 3-4c, "Vegetation-Free Zones").

4-9. Borrow Sites and Spoil Sites. Borrow sites and spoil sites shall be restored through proper regrading and revegetation.

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CHAPTER 5

Vegetation-Related Maintenance and Repair

5-1. Maintenance of Ground Cover. As ground cover in a system designed to reduce flood damage, the primary purpose of grasses is to effectively prevent erosion. Therefore, maintenance must assure a healthy, vigorous stand of grass that is substantially free of weeds and bare spots. It will generally be necessary to periodically mow, graze, or burn grasses to permit proper inspection, manage pests, inhibit weed growth, or otherwise maintain the health and vigor of the plant stand. The appropriate time of year in which to conduct these maintenance activities will be a function of the species used and of the motivating factor for the maintenance activity itself. For example, mowing to prohibit weed establishment may best be timed to occur before the weed seeds become viable each year. The annual inspection may be scheduled to coincide with this period.

5-2. Operations and Maintenance Manual. For each project, it is important that the O&M manual include an annual maintenance program to control animal burrows and vegetative growth. It is also important that vegetation be managed in such a manner as to avoid the need for mechanized removal and associated embankment repair, and avoid any incidental growth and subsequent presence of endangered species that might prohibit access and activities necessary for O&M.

5-3. Removal of Non-Compliant Vegetation.

a. All vegetation not in compliance with this ETL shall be removed. A detailed removal plan shall be submitted to the local USACE District Levee Safety Officer for review and comment before removal of vegetation. The removal plan shall expand on the following basic requirements.

(1) By excavation, remove the trunk (or stem), stump, rootball, and all roots with diameters greater than ½ in. All such roots in, or within 15 ft of, the flood damage reduction structure shall be completely removed.

(2) Assure that the resulting void is free of organic debris.

(3) Fill and compact the void according to the original soil and compaction specifications: or, if no specifications exist, match adjacent soil and compaction.

b. Removal of non-compliant vegetation can create significant issues for the owner/operator, as maintenance may require environmental permits. The local sponsor must coordinate with the Corps and other appropriate agencies and obtain all the required environmental permits (including Corps of Engineers 404 permits) before conducting work within the levees. Mechanized land clearing below the plane of the “Ordinary High Water Mark” will normally require Clean Water Act permits before work can commence. (Note that “Ordinary High Water Mark” is defined in 33 CFR Part 328.3(e). In this document, see Figure A-23 in

Chapter 6 and the glossary in Chapter 7). In regions with endangered or threatened species, and/or their critical habitat, vegetation removal of any kind may require clearance through the U.S. Fish and Wildlife Service or the National Marine Fisheries Service under the Endangered Species Act.

5-4. Repair of Animal Burrows. For proper procedures for the repair of animal burrows, refer to the latest edition of FEMA Publication 473, *Technical Manual for Dam Owners, Impacts of Animals on Earthen Dams*.

APPENDIX A

Illustrations

A-1. General.

a. The figures presented here are cross-sections and are organized as follows:

(1) Figure A-1 shows the minimum vegetation-free zone required for a basic levee section and serves as an introductory example for use in Figure A-2.

(2) Figure A-2 shows the proper application of the vegetation-free zone with regard to various vegetation types and stages of development.

(3) Figures A-3 through A-23 give additional examples that show the minimum vegetation-free zone required for each of various flood damage reduction system configurations.

(4) Figures A-13, A-14, A-15, A-17, and A-19 show root-free zones.

(5) Figures A-20 and A-21 show vegetation-free zone requirements for embankment dams and their appurtenant structures (presented in greater detail in Paragraph 3-4).

(6) Figure A-22 shows the vegetation-management zone.

(7) Figure A-23 illustrates a levee section with the ordinary high water mark above the riverside toe.

b. For clarity, Figures A-1 through A-23 are not drawn to scale. However, Figures A-24 and A-25 are drawn to scale, using trees in the medium to large size range. The purpose of these two proportionally correct figures is to clearly illustrate realistic spatial relationships between trees (and their root systems) and levees.

c. Note that the minimum vegetation-free zone is not influenced by the type of erosion protection used, so figures are not specific in that regard, e.g., riprap is not shown.

A-2. Figures A-1 through A-25.

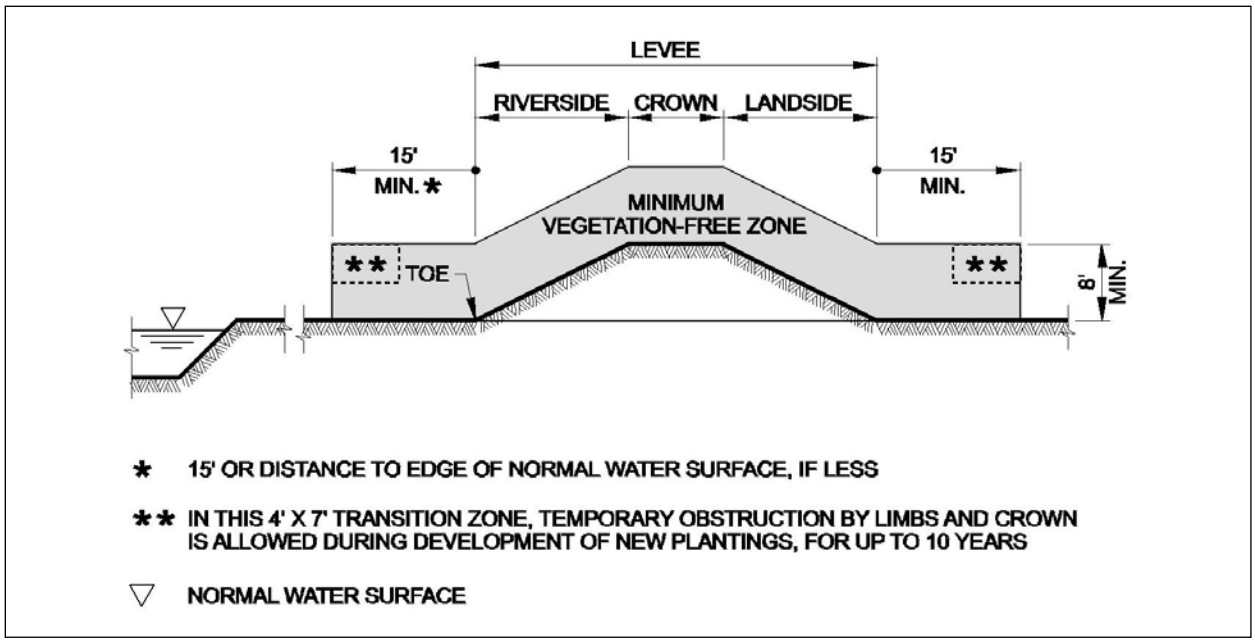


Figure A-1. Levee Section – Basic.

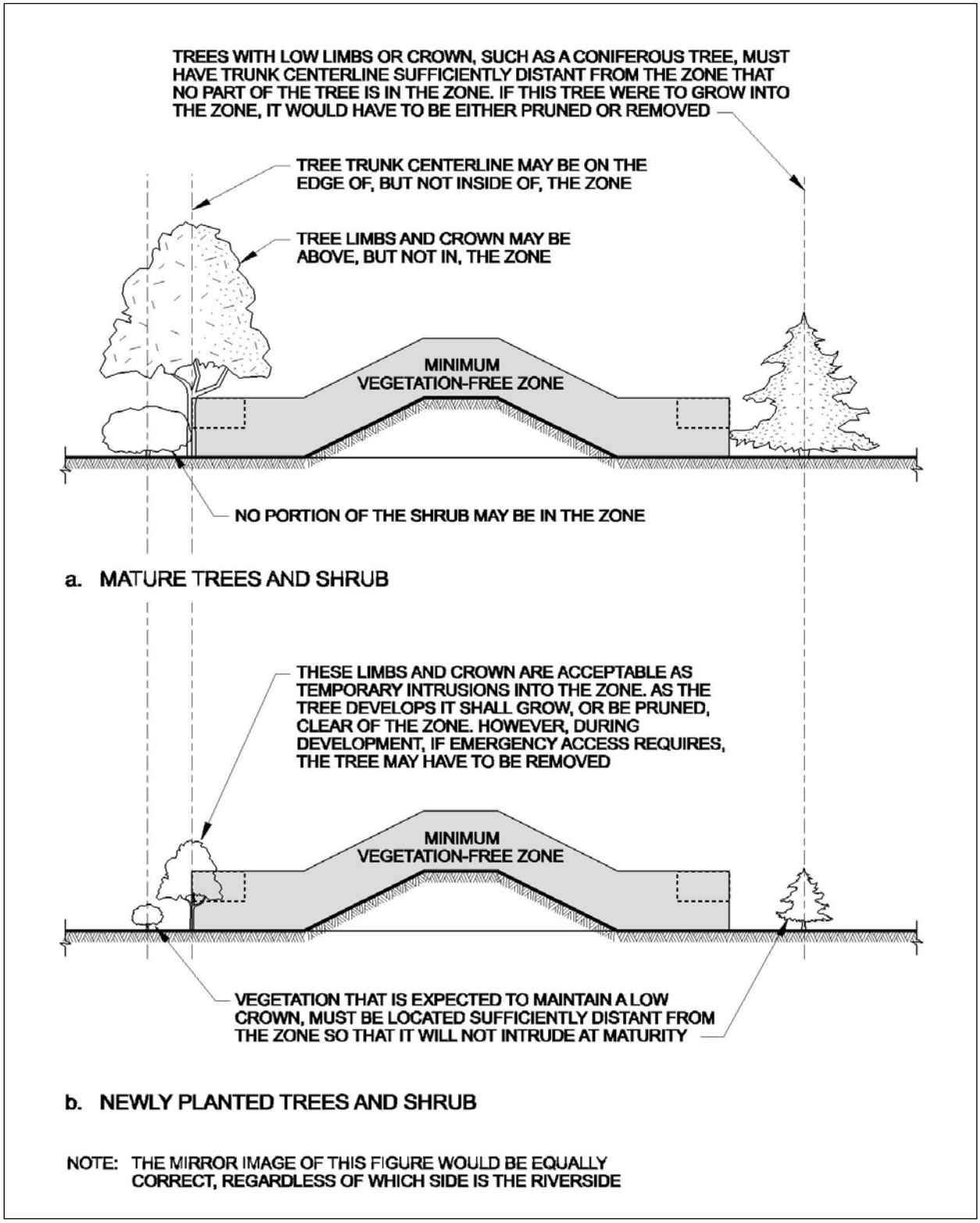


Figure A-2. Proper Application of the Vegetation-Free Zone.

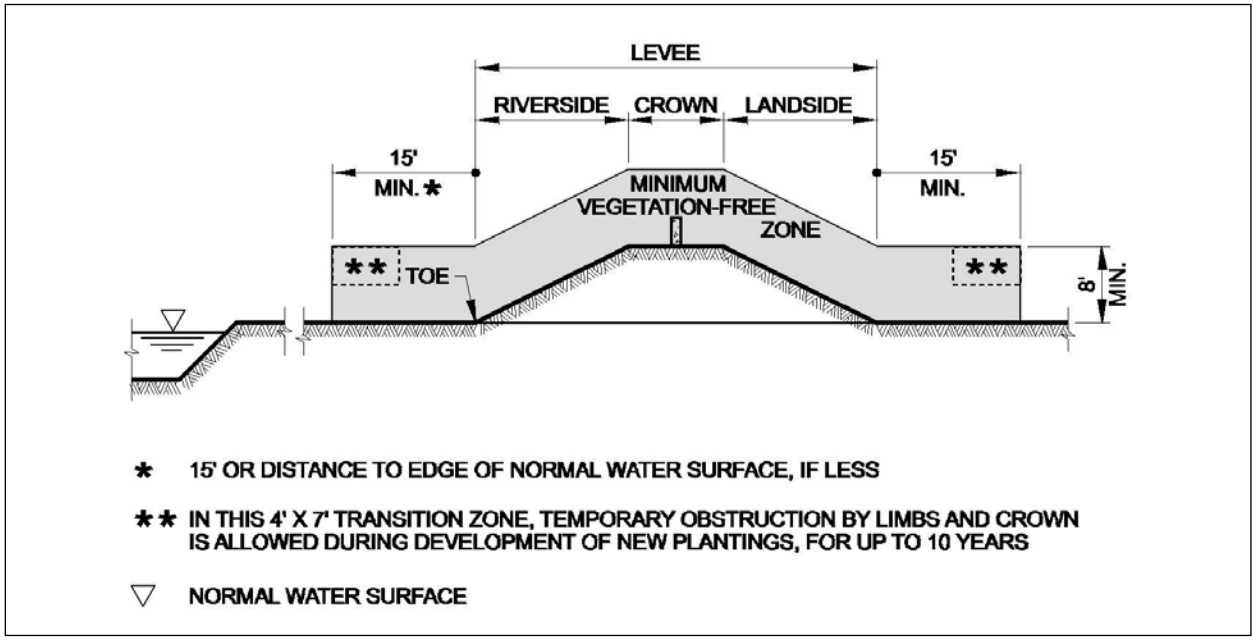


Figure A-3. Levee Section – Basic, with Floodwall on Crown.

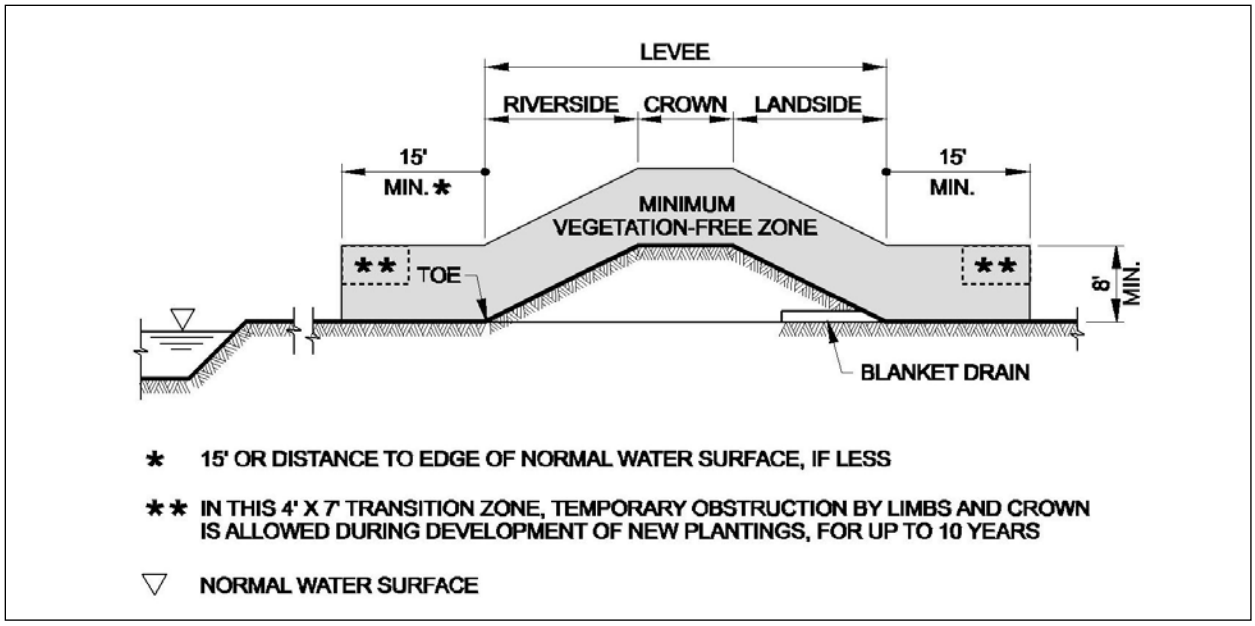


Figure A-4. Levee Section with Blanket Drain.

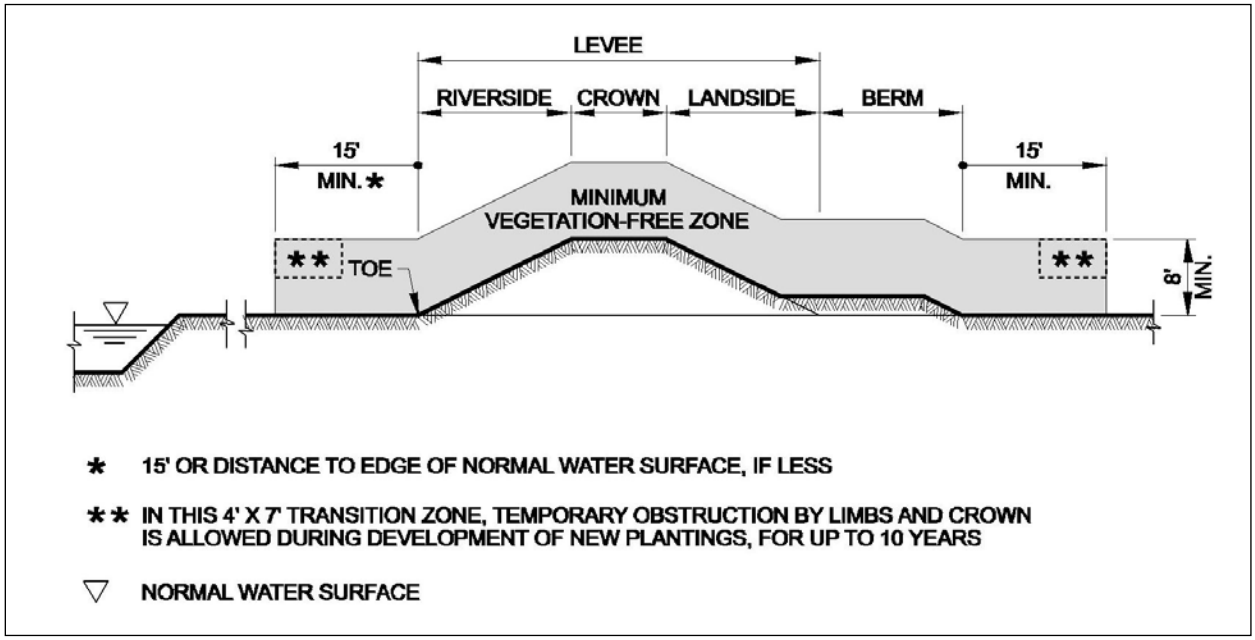


Figure A-5. Levee Section with Seepage or Stability Berm.

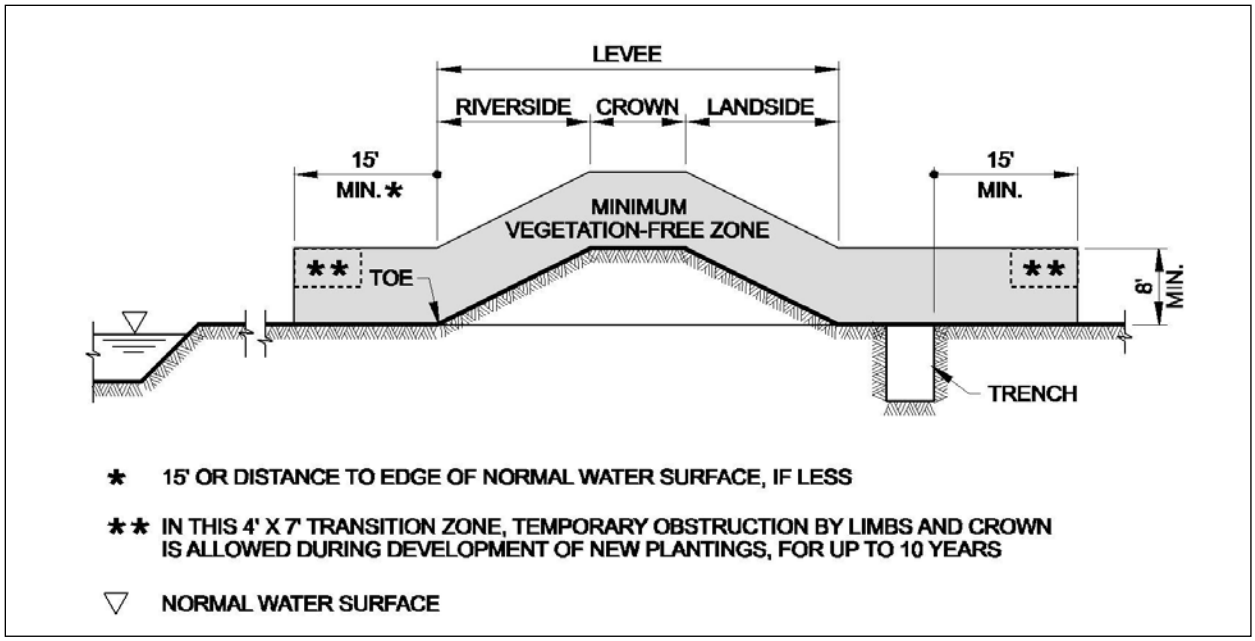


Figure A-6. Levee Section with Pervious Toe Trench.

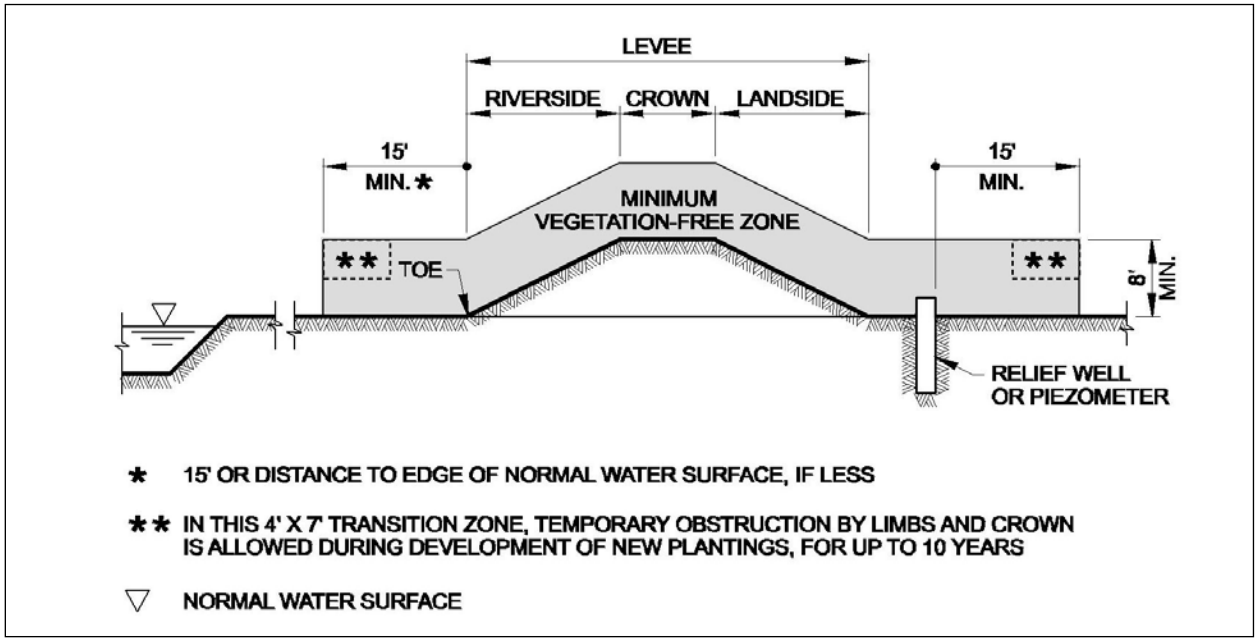


Figure A-7. Levee Section with Relief Well or Piezometer.

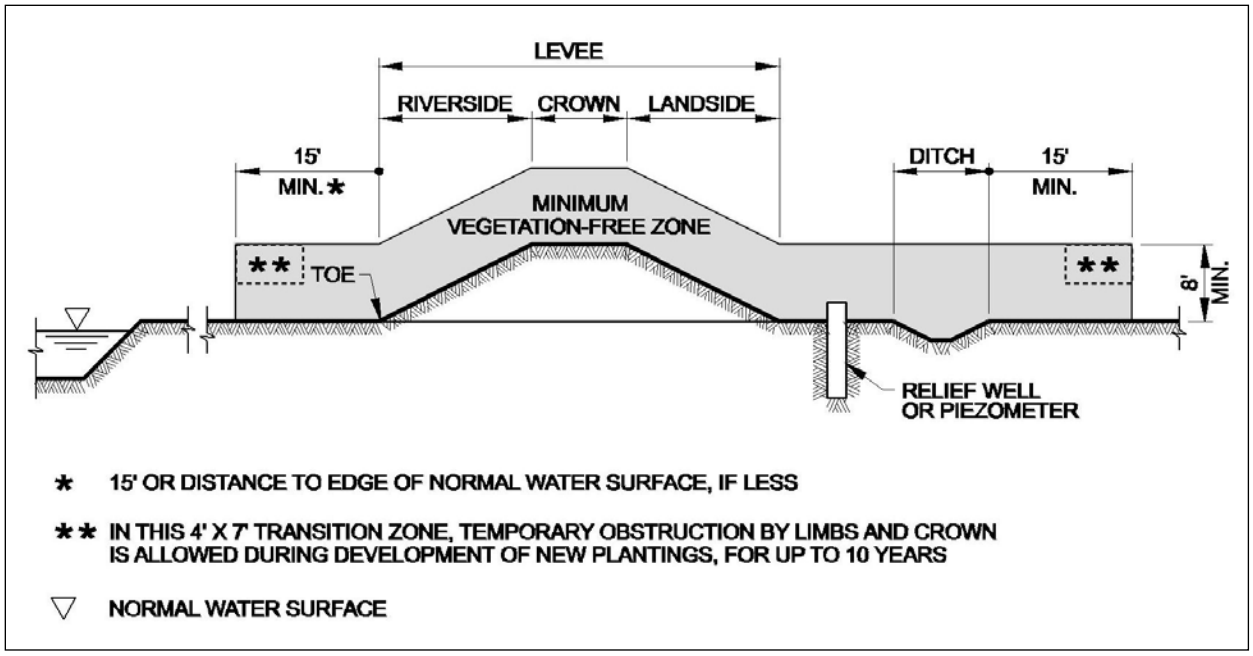


Figure A-8. Levee Section with Relief Well or Piezometer and Seepage Collector Ditch.

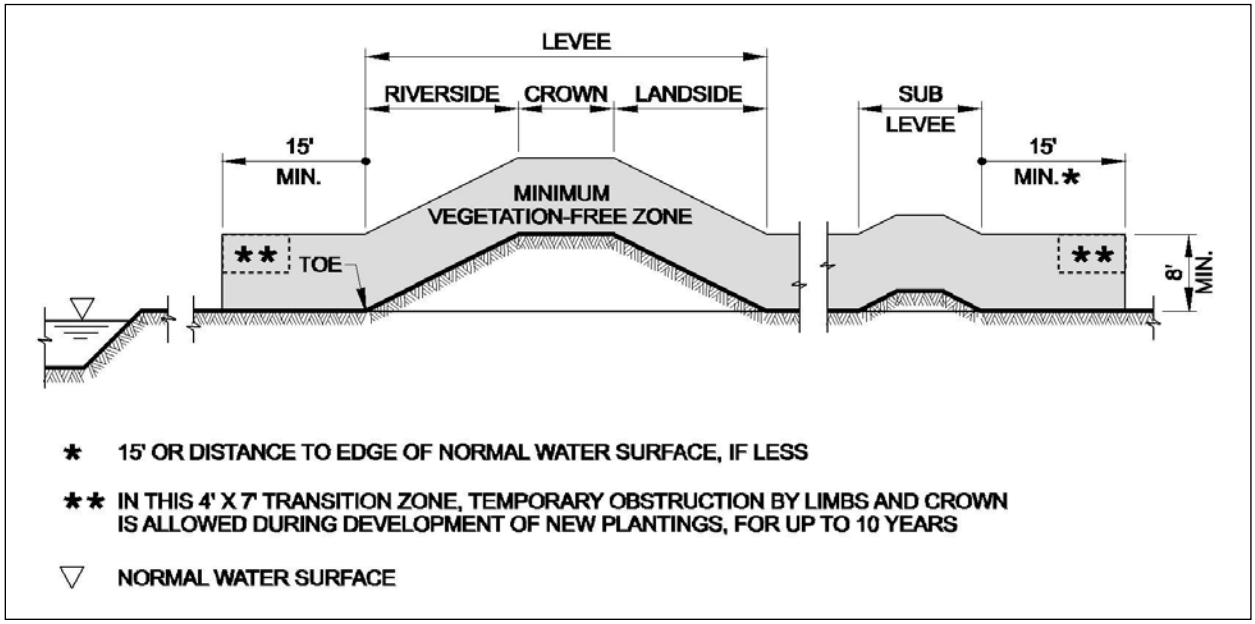


Figure A-9. Levee Section with Sub-Levee.

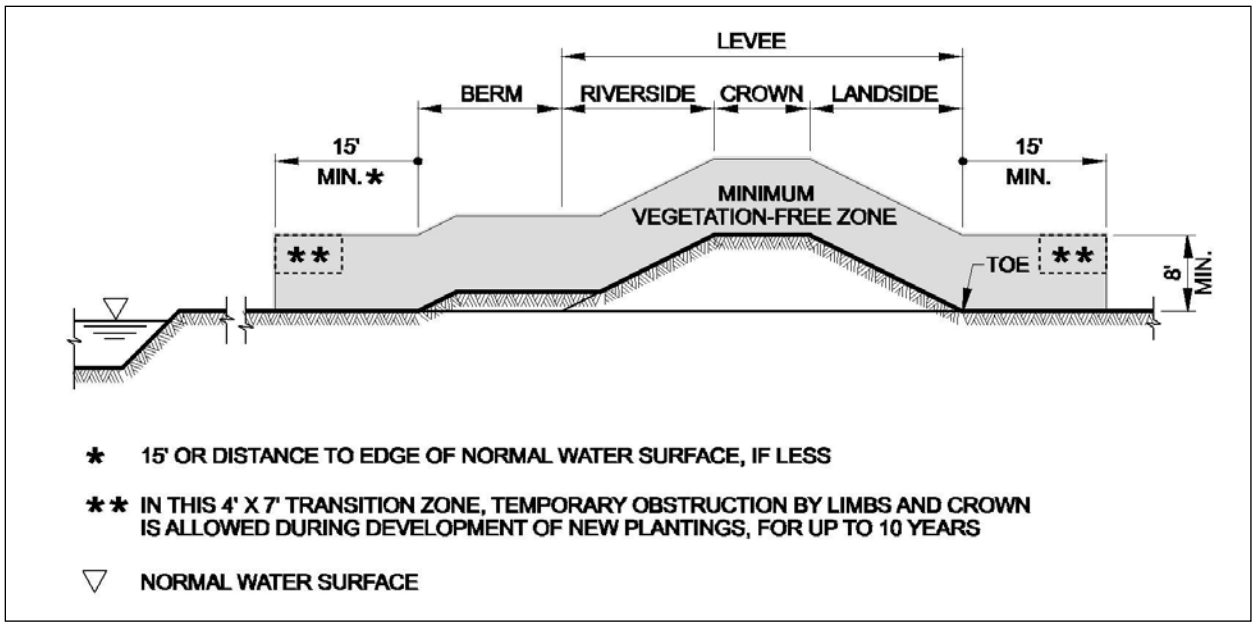


Figure A-10. Levee Section with Stability Berm.

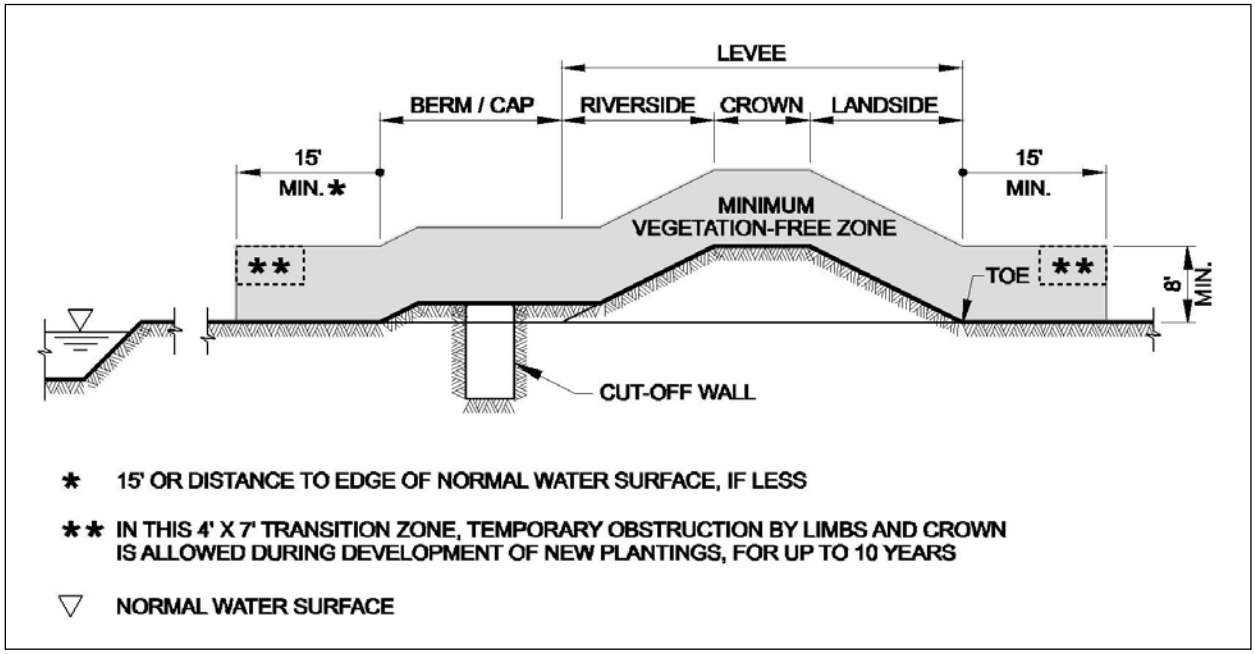


Figure A-11. Levee Section with Cut-Off Wall and Impervious Berm.

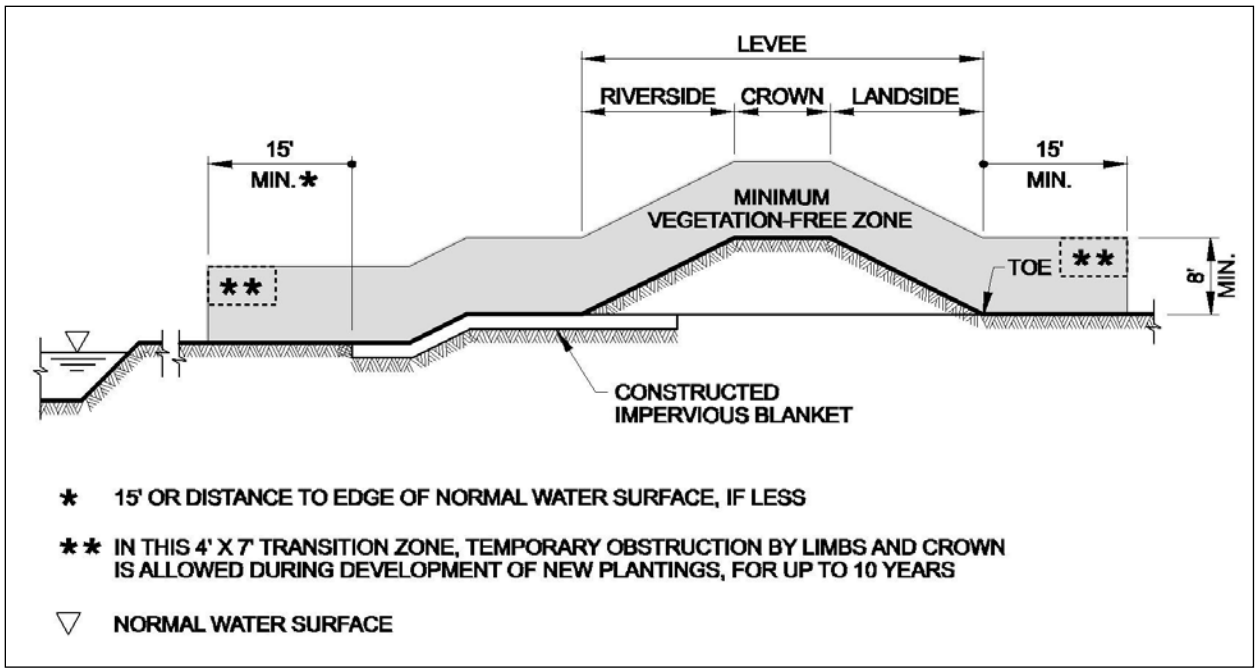


Figure A-12. Levee Section with Constructed Impervious Blanket.

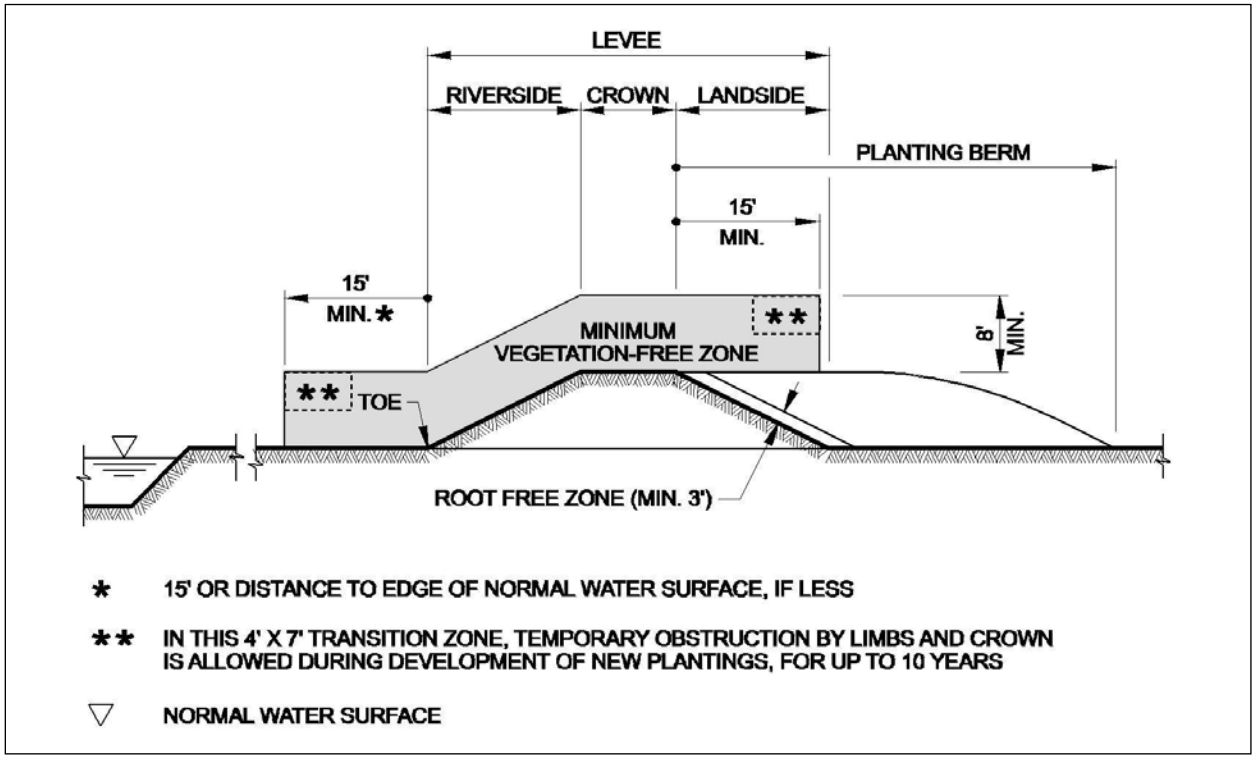


Figure A-13. Levee Section with Planting Berm.

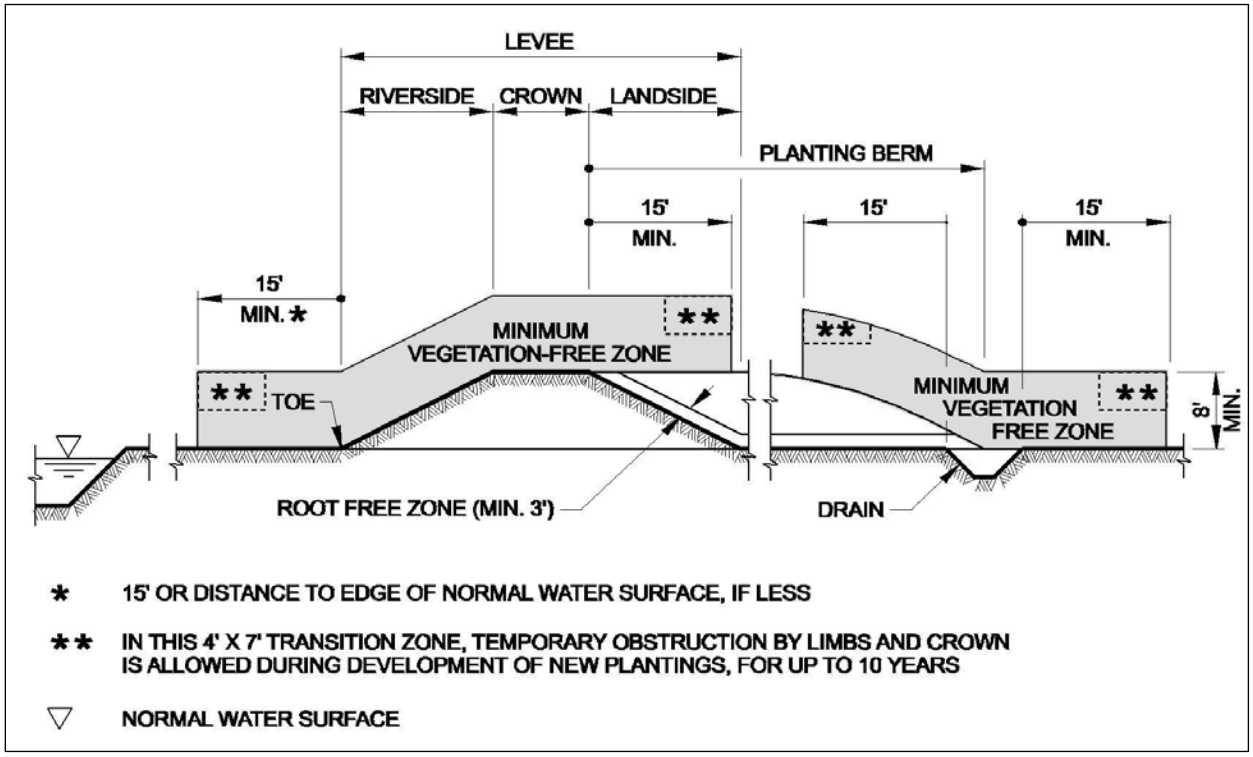


Figure A-14. Levee Section with Planting Berm and Collector Drain.

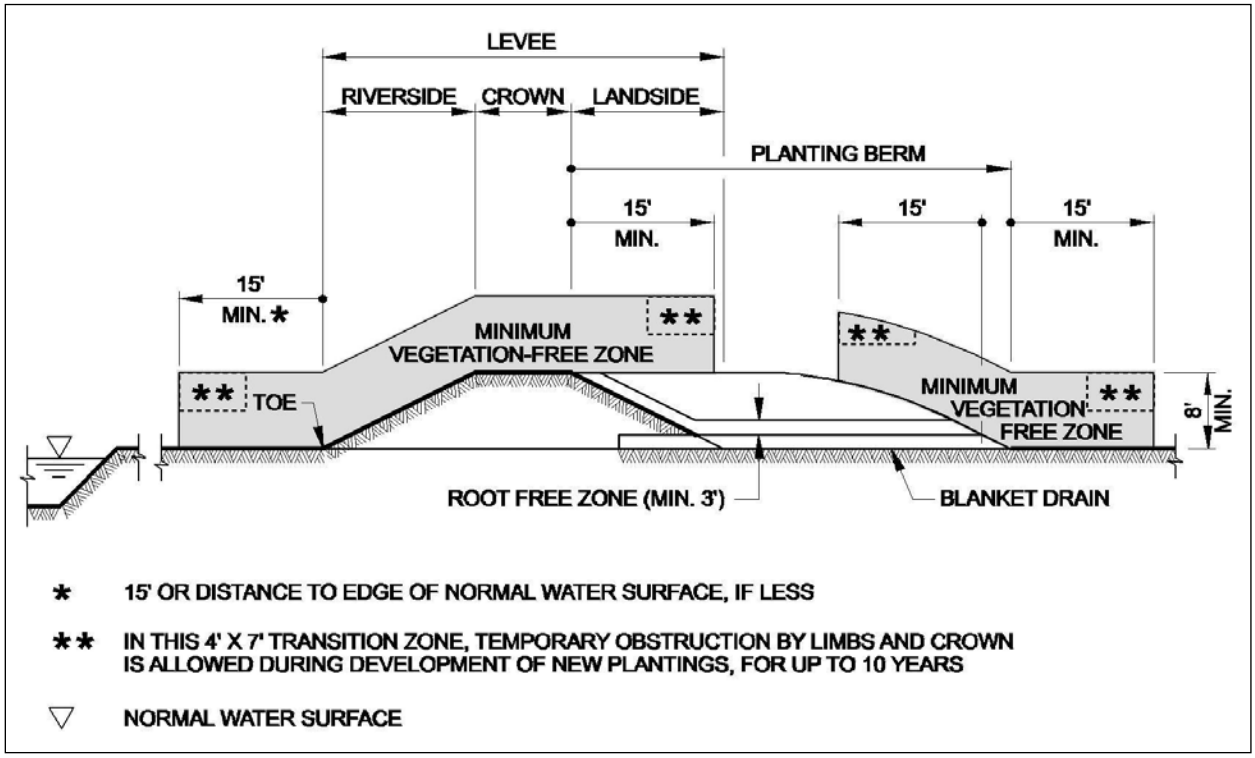


Figure A-15. Levee Section with Planting Berm and Blanket Drain.

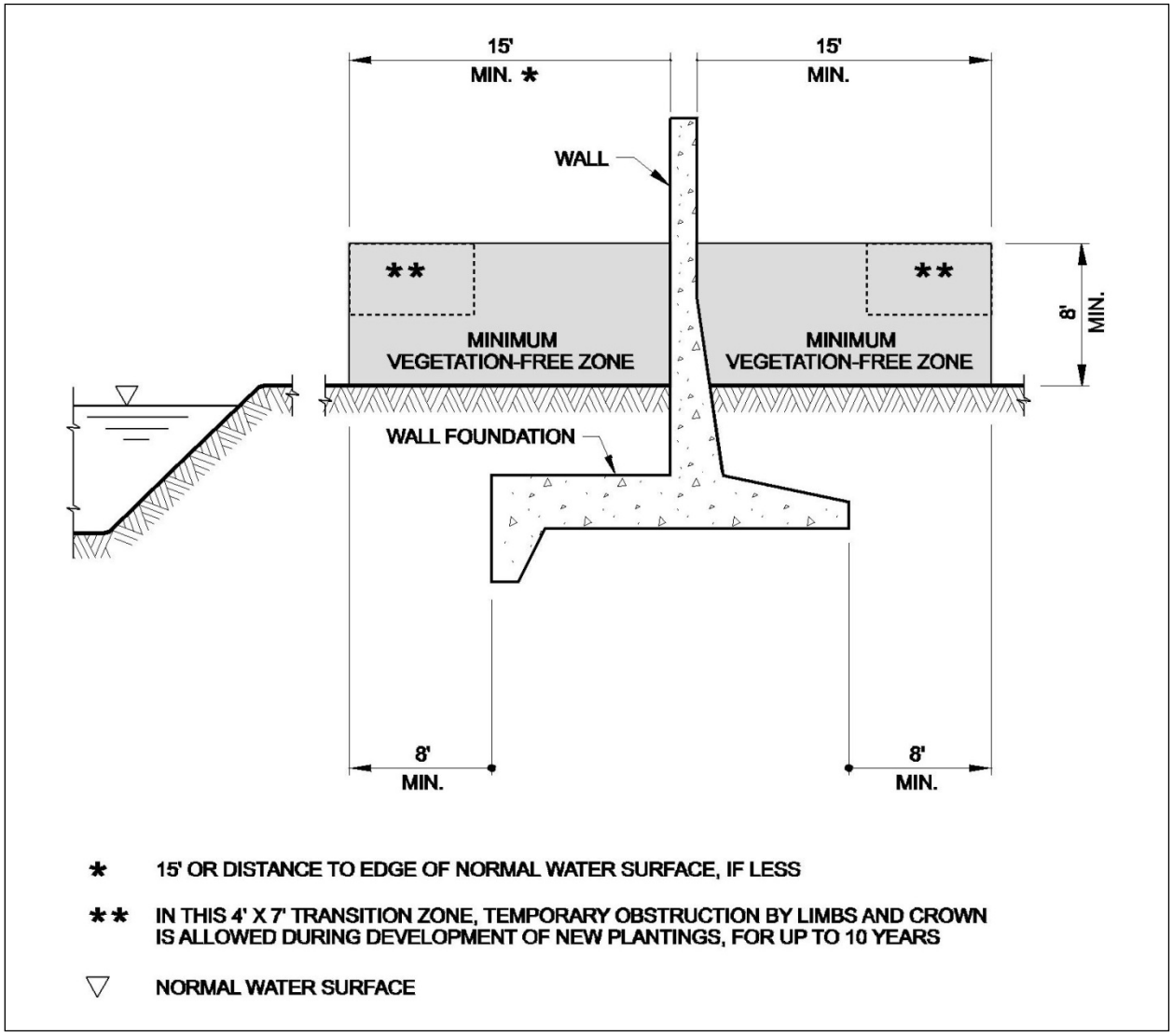
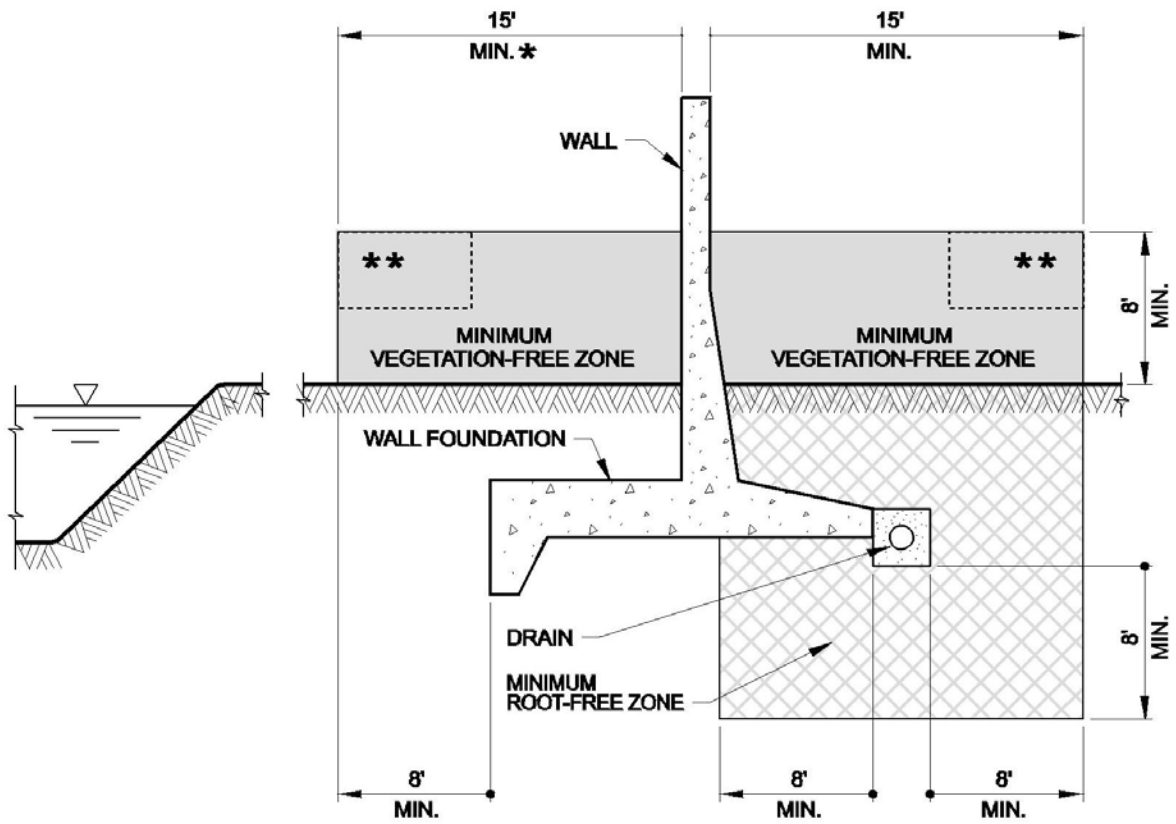


Figure A-16. Inverted-T Type Floodwall.



* 15' OR DISTANCE TO EDGE OF NORMAL WATER SURFACE, IF LESS

** IN THIS 4' X 7' TRANSITION ZONE, TEMPORARY OBSTRUCTION BY LIMBS AND CROWN IS ALLOWED DURING DEVELOPMENT OF NEW PLANTINGS, FOR UP TO 10 YEARS

▽ NORMAL WATER SURFACE

NOTE: THE HORIZONTAL DIMENSION OF THE MINIMUM VEGETATION-FREE ZONE SHALL BE THE GREATER OF:

(A) THE 15-FOOT MINIMUM, AS DIMENSIONED ABOVE GRADE; OR
(B) AS DIMENSIONED FROM THE BELOW-GRADE STRUCTURE

Figure A-17. Inverted-T Type Floodwall with Drain.

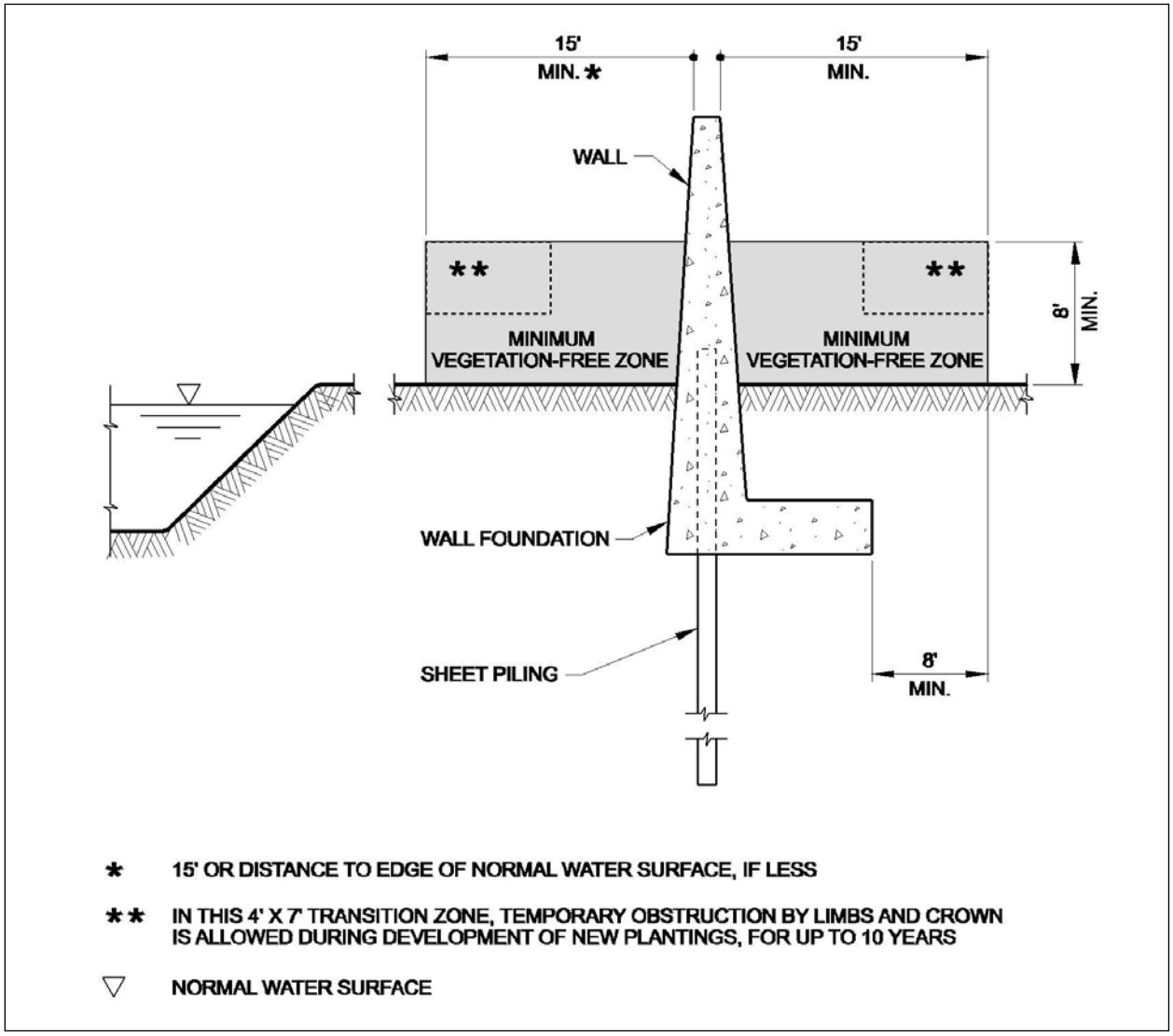
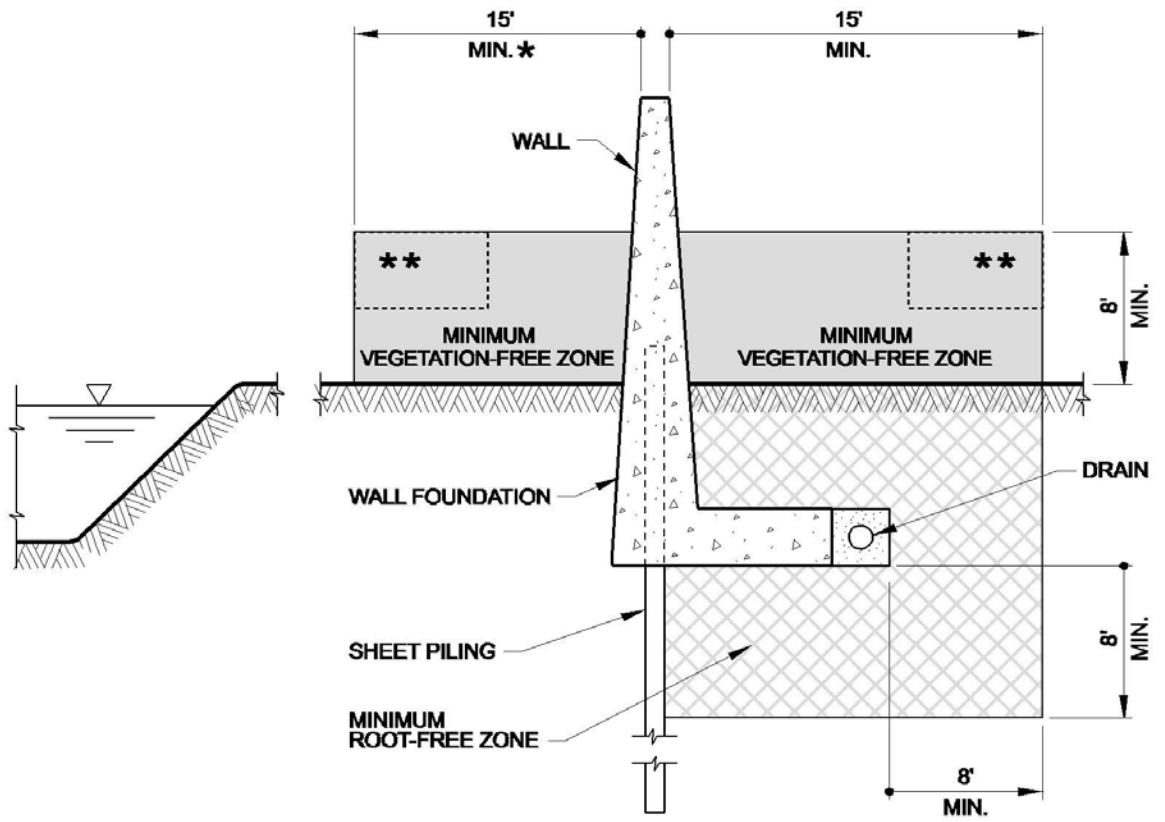


Figure A-18. Cantilever-I Type Sheet-Piling Floodwall.



* 15' OR DISTANCE TO EDGE OF NORMAL WATER SURFACE, IF LESS

** IN THIS 4' X 7' TRANSITION ZONE, TEMPORARY OBSTRUCTION BY LIMBS AND CROWN IS ALLOWED DURING DEVELOPMENT OF NEW PLANTINGS, FOR UP TO 10 YEARS

▽ NORMAL WATER SURFACE

NOTE: THE HORIZONTAL DIMENSION OF THE MINIMUM VEGETATION-FREE ZONE SHALL BE THE GREATER OF:

(A) THE 15-FOOT MINIMUM, AS DIMENSIONED ABOVE GRADE; OR
(B) AS DIMENSIONED FROM THE BELOW-GRADE STRUCTURE

Figure A-19. Cantilever-I Type Sheet-Piling Floodwall with Drain.

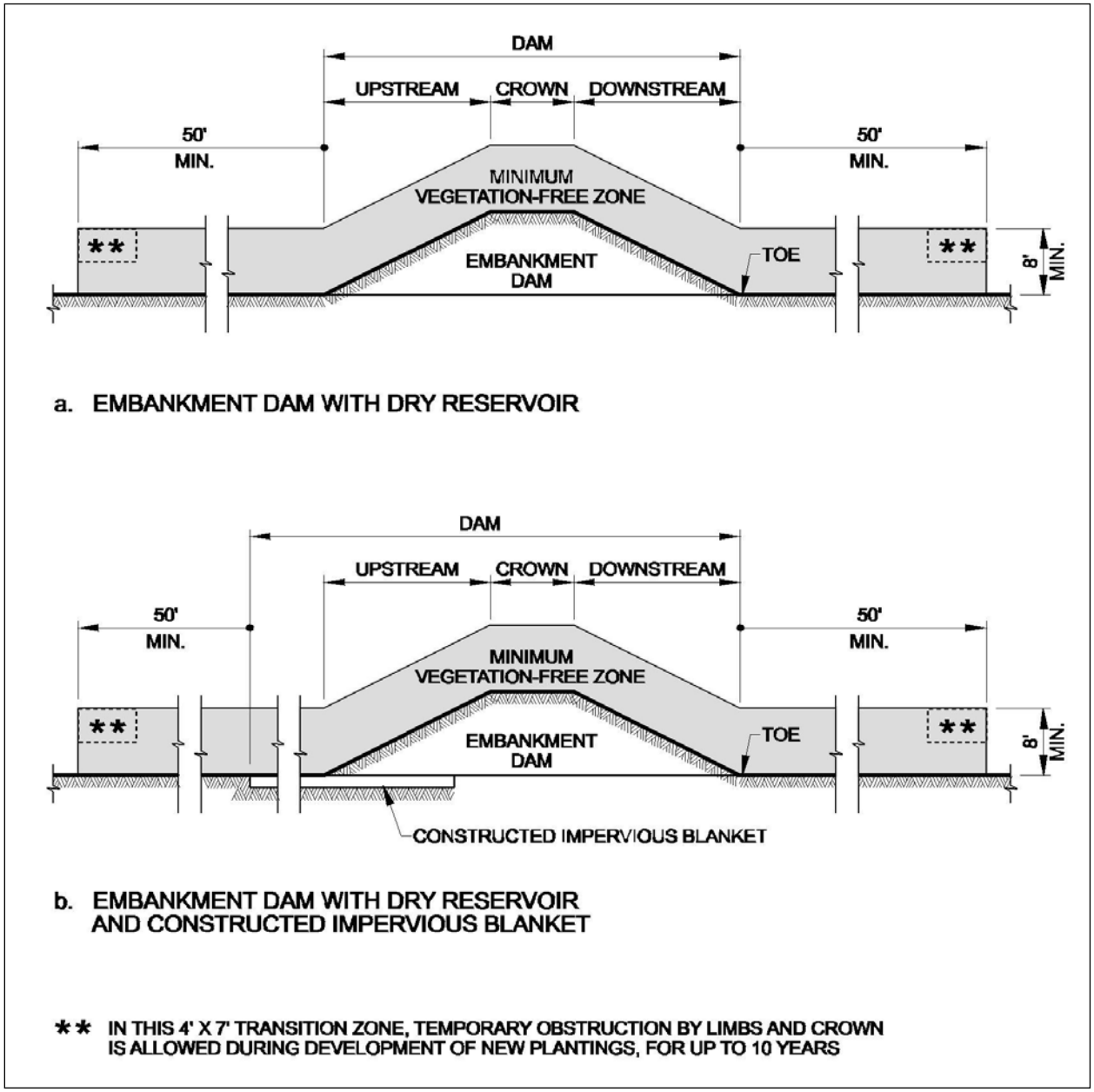


Figure A-20. Embankment Dam (Earth Fill, Rock Fill, or Earth and Rock Fill).

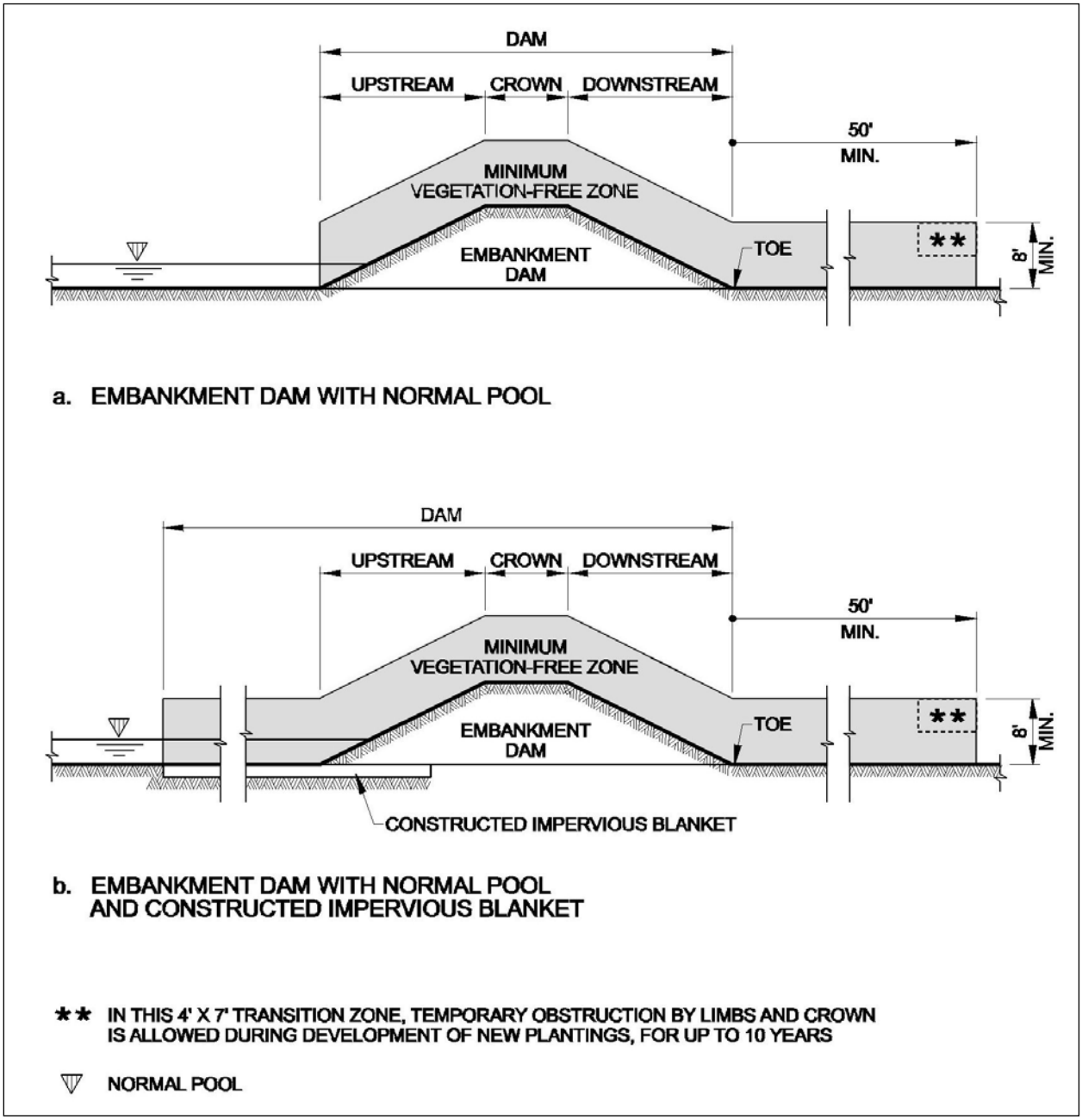
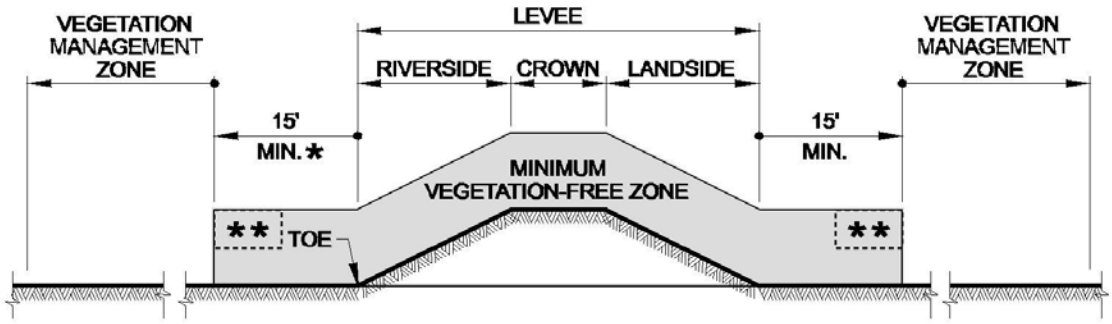


Figure A-21. Embankment Dam (Earth Fill, Rock Fill, or Earth and Rock Fill).



* 15' OR DISTANCE TO EDGE OF NORMAL WATER SURFACE, IF LESS

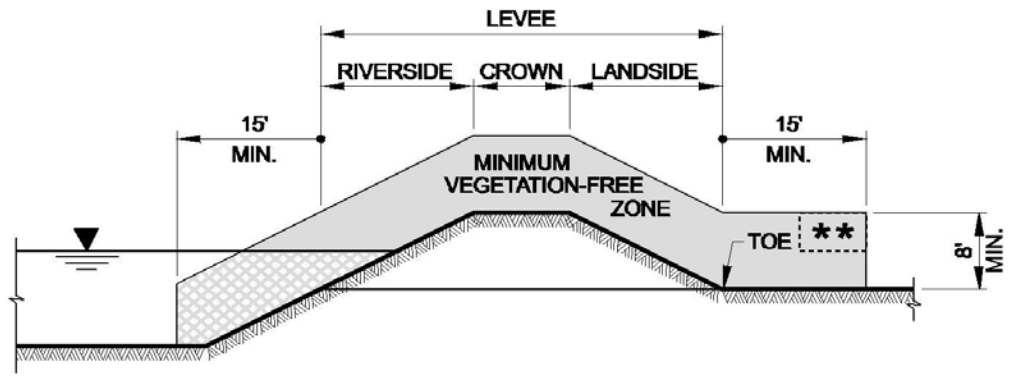
** IN THIS 4' X 7' TRANSITION ZONE, TEMPORARY OBSTRUCTION BY LIMBS AND CROWN IS ALLOWED DURING DEVELOPMENT OF NEW PLANTINGS, FOR UP TO 10 YEARS

▽ NORMAL WATER SURFACE

NOTES:

1. THE VEGETATION-MANAGEMENT ZONE ALLOWS FOR ACCESS, FOR THE PURPOSE OF INSPECTION, AND MODIFICATION OR REMOVAL OF ANY PLANT WHOSE LIMB, FOILAGE, OR ROOT BEHAVIORS BECOME A THREAT TO PROJECT RELIABILITY.
2. THE APPROPRIATE WIDTH OF THE VEGETATION-MANAGEMENT ZONE SHALL BE DETERMINED BY THE DESIGN TEAM: 35 FEET WILL BE SUFFICIENT IN MOST CASES.
3. THE VEGETATION-MANAGEMENT ZONE MAY BE ESTABLISHED BY EASEMENT.
4. THIS FIGURE SHOWS THE VEGETATION-MANAGEMENT ZONE IN THE CASE OF A LEVEE; HOWEVER, IT IS EQUALLY APPROPRIATE IN THE CASE OF ANY OTHER FLOOD DAMAGE REDUCTION STRUCTURE OR APPURTENANCE: IT'S USUAL RELATIONSHIP IS TO THE VEGETATION-FREE ZONE.

Figure A-22. Vegetation-Management Zone.



** IN THIS 4' X 7' TRANSITION ZONE, TEMPORARY OBSTRUCTION BY LIMBS AND CROWN IS ALLOWED DURING DEVELOPMENT OF NEW PLANTINGS, FOR UP TO 10 YEARS

▼ WATER SURFACE ELEVATION AT ORDINARY HIGH WATER MARK

VEGETATION-FREE ZONE BELOW THE ORDINARY HIGH WATER MARK

NOTE:

MECHANIZED LAND-CLEARING ACTIVITIES BY THE PROJECT SPONSOR, BELOW THE ORDINARY HIGH WATER MARK (OHWM), MUST BE PERMITTED IN ACCORDANCE WITH REGULATIONS UNDER SECTION 404 OF THE CLEAN WATER ACT. HOWEVER, SIMPLE CLEARING OF VEGETATION USING HAND TOOLS (CHAIN SAWS, ETC) AND REMOVAL OF TREES USING CRANES (OR OTHER TYPES OF HEAVY MACHINERY) WOULD NOT GENERALLY REQUIRE A SECTION 404 PERMIT, PROVIDED VEGETATION IS REMOVED IN SUCH A MANNER AS TO NOT DISTURB THE SOIL; BUT, THESE ACTIVITIES MAY REQUIRE CONSULTATION WITH THE US FISH AND WILDLIFE SERVICE OR NATIONAL MARINE FISHERIES SERVICE UNDER THE ENDANGERED SPECIES ACT REGULATIONS. THE CORPS RECOMMENDS THAT THE SPONSOR CONDUCT COORDINATION MEETINGS WITH THE CORPS AND OTHER APPROPRIATE AGENCIES BEFORE WORK IS CONDUCTED. SEE PARAGRAPH 5-3, REMOVAL OF NON-COMPLIANT VEGETATION.

Figure A-23. Levee Section with Ordinary High Water Mark above the Riverside Toe.

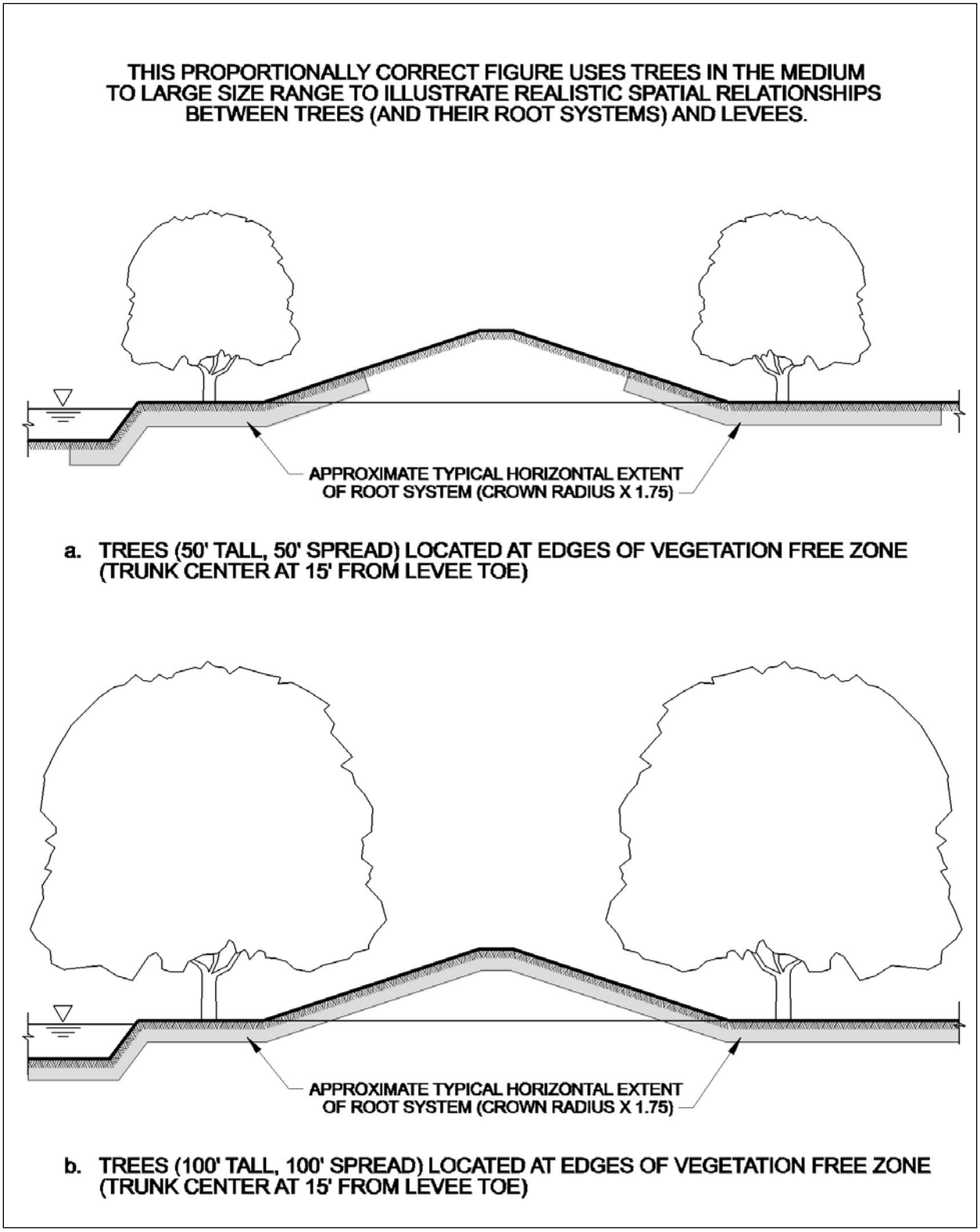


Figure A-24. Levee (20 ft tall, 3:1 side slopes) with Trees, as Noted Above.

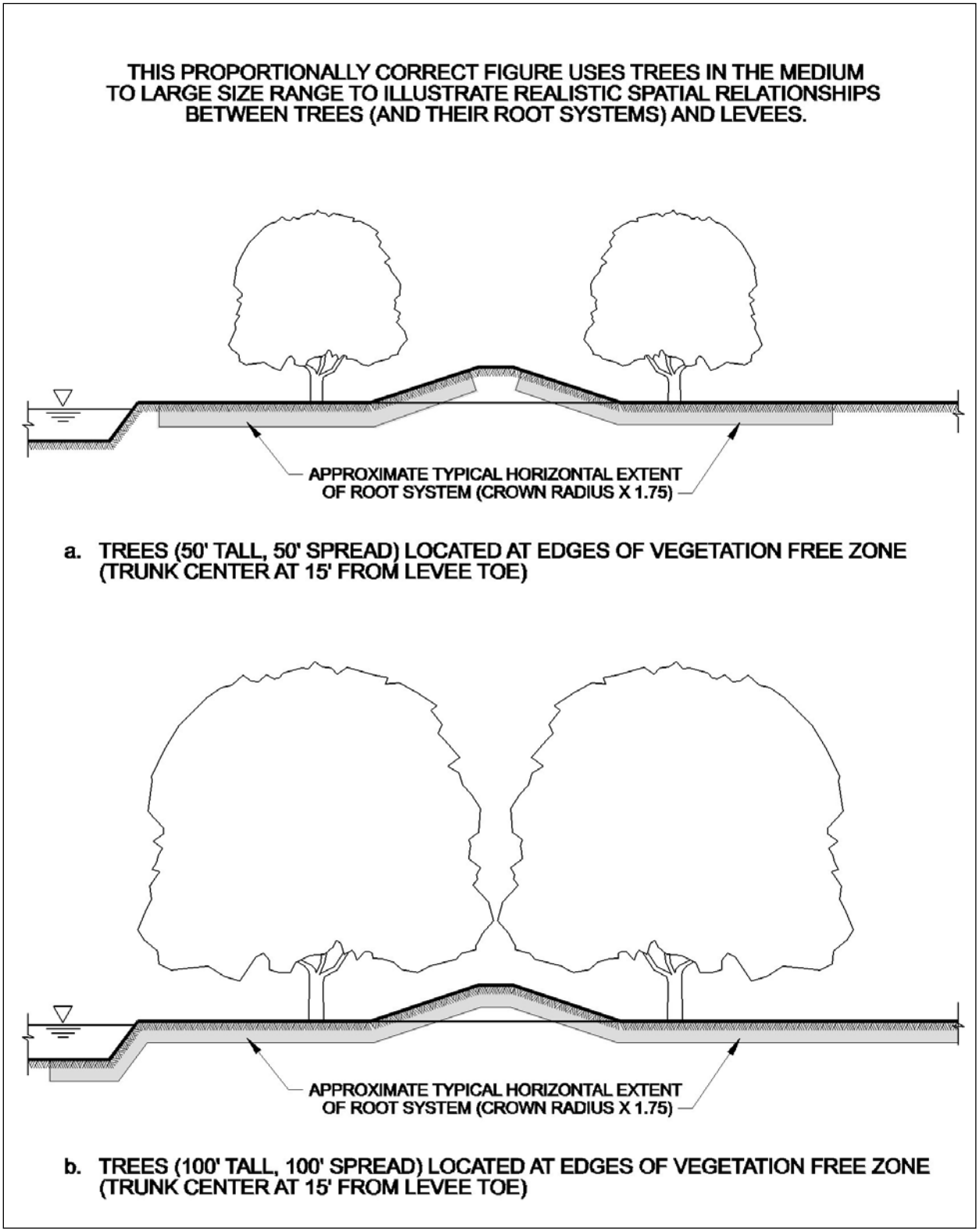


Figure A-25. Levee (10 ft tall, 3:1 side slopes) with Trees, as Noted Above.

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APPENDIX B

Acronyms, Abbreviations, and Glossary of Terms

B-1. Acronyms and Abbreviations.

Term	Definition
ASDSO	Association of State Dam Safety Officials
CECW	U.S. Army Corps of Engineers, Directorate of Civil Works
CFR	Code of the Federal Regulations
EC	Engineer Circular
EM	Engineer Manual
EOP	Environmental Operating Principles
EP	Engineer Pamphlet
ER	Engineer Regulation
ETL	Engineer Technical Letter
FEMA	Federal Emergency Management Agency
NFIP	National Flood Insurance Program
O&M	Operations and Maintenance (O&M)
SES	Senior Executive Service
USACE	U.S. Army Corps of Engineers

B-2. Glossary of Terms.

Critical Structure. A critical structure is any component of a flood damage reduction system that contributes to system reliability.

Flood Damage Reduction (FDR) System. A flood damage reduction system is made up of one or more flood damage reduction segments that collectively provide flood damage reduction to a defined area. Failure of one segment within a system constitutes failure of the entire system. Failure of one system does not affect another system.

Forb. A forb is an herbaceous (non-woody) annual, biennial, or perennial plant, other than grass, sedges, and rushes (e.g., alfalfa, clover, vetch).

Herbivory. Herbivory is the consumption of vegetation by animals.

Ordinary High Water Mark (OHWM). The Regulatory definition of the OHWM is provided at 33 CFR Part 328.3(e), which states that:

> The term 'ordinary high water mark' means that line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

The OHWM determines the lateral extent of the jurisdiction of the Corps within Waters of the United States (see Figure A-23, [p A-19]).

Overbuild. Beyond the normal engineered cross-section of a levee, dam or appurtenant soil structure, overbuild is additional soil mass, fulfilling flood-damage-reduction design criteria and therefore subject to vegetation-free and root-free requirements.

Variance. A variance is a Corps-approved exemption from compliance with specific standards.

APPENDIX C

Nesting Bird and Burrowing Owl Management Plan

Nesting Bird and Burrowing Owl

Management Plan

Prepared for the San Bernardino County Flood Control District by the Environmental Management Division

2014

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1 Introduction

This Nesting Bird Plan and Burrowing Owl Management Plan (NBP) provides the descriptions of measures that will be taken by the San Bernardino County Flood Control District (District) to ensure the protection of nesting birds, countywide, during maintenance activities of District's facilities. The NBP also provides detailed avoidance and minimization measures, survey protocols, and procedures for establishing buffers and directives for monitoring and reporting.

2 Objectives

The purpose of this NBP is to provide basic protocols and guidelines for the District, which will be implemented to avoid and minimize impacts to nesting birds associated with maintenance activities. In addition, the NBP provides specific minimization measures to avoid impacts to nesting birds, and ensure maintenance activities are in compliance with applicable laws related to nesting birds and birds of prey, including burrowing owl. This NBP, which will identify the State and Federal Regulations, describes methods and protocols for surveying, monitoring and reporting requirements for nesting bird activities and Project-specific avoidance and minimization measures.

3 Applicable Regulations

The following regulations will be adhered to during routine maintenance activities.

3.0 FISH AND GAME CODE

3503. It is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto.

Section 3503.5. It is unlawful to take, possess, or destroy any birds in the *orders* Falconiformes or Strigiformes (birds-of-prey) or to take, possess or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto.

Section 3511. (a) (1) Except as provided in Section 2081.7 or 2835, fully protected birds or parts thereof may not be taken or possessed at any time. No provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected bird, and no permits or licenses heretofore issued shall have any force or effect for that purpose. However, the department may authorize the taking of those species for necessary scientific research, including efforts to recover fully protected, threatened, or endangered species, and may authorize the live capture and relocation of those species pursuant to a permit for the protection of livestock. Prior to authorizing the take of any of those species, the department shall make an effort to

notify all affected and interested parties to solicit information and comments on the proposed authorization. The notification shall be published in the California Regulatory Notice Register and be made available to each person who has notified the department, in writing, of his or her interest in fully protected species and who has provided an e-mail address, if available, or postal address to the department. Affected and interested parties shall have 30 days after notification is published in the California Regulatory Notice Register to provide any relevant information and comments on the proposed authorization.

(2) As used in the subdivision, "scientific research" does not include any actions taken as part of specified mitigation for a project, as defined in Section 21065 of the Public Resources Code.

(3) Legally imported fully protected birds or parts thereof may be possessed under a permit issued by the department.

(b) The following are fully protected birds:

(1) American peregrine falcon (*Falco Peregrinus anatum*).

(2) Brown pelican (*Pelecanus occidentalis*)

(3) California black rail (*Laterallus jamaicensis coturniculus*).

(4) California clapper rail (*Rallus longirostris obsoletus*).

(5) California condor (*Gymnogyps californianus*).

(6) California least tern (*Sterna albifrons browni*).

(7) Golden eagle (*Aquila chrysaetos*).

(8) Greater Sand hill crane (*Grus Canadensis tabida*).

(9) Light-footed clapper rail (*Rallus longirostris levipes*).

(10) Southern bald eagle (*Haliaeetus leucocephalus leucocephalus*).

(11) Trumpeter swan (*Cygnus buccinators*).

(12) White-tailed kite (*Elanus leucurus*).

(13) Yuma clapper rail (*Rallus longirostris yumanensis*).

Section 3513. It is unlawful to take or possess any migratory nongame bird as designated in the Migratory Bird Treaty Act (MBTA) or any part of such migratory

nongame bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Treaty Act.

3.1 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE (CDFW) DEFINITIONS

The definitions of a nest, active nest, and breeding season were provided by CDFW.

> **Nest:** A nest is a structure or site under construction or preparation, having been constructed or prepared, or being used by a bird, for the purposes of laying eggs, incubating eggs, or rearing young, or is otherwise critical to the life history of the individual (e.g., individuals of species that exhibit site fidelity, colonial nesters and raptors).
>
> **Active nest:** A nest as defined above, during the portion of the breeding season as defined below, once birds begin constructing or repairing the nest in readiness for egg-laying. A nest is no longer an "active nest" if abandoned by the adult birds or once nestlings or fledglings are no longer dependent on the nest. Nests which are critical to the life history of the individual (e.g., individuals of species that exhibit site fidelity, colonial nesters and raptors) are considered an active nest year-round.
>
> **Breeding Season:** The breeding season is known as the period of the year during which courting, breeding, or nesting occurs, or when breeding adult birds or their nestlings or fledglings are at or near a nest. The breeding season varies among bird species and geographic locations.

3.2 MIGRATORY BIRD TREATY ACT

The United States Fish and Wildlife Service (USFWS) have statutory authority and responsibility for enforcing the MBTA.

SECTION 703: Unless and except as permitted by regulations made as hereinafter provided in this subchapter, it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess, offer for sale, sell, offer to barter, barter, offer to purchase, purchase, deliver for shipment, ship, export, import, cause to be shipped, exported, or imported, deliver for transportation, transport or cause to be transported, carry or cause to be carried, or receive for shipment, transportation, carriage, or export, any migratory bird, any part, nest, or egg of any such bird, or any product, whether or not manufactured, which consists, or is composed in whole or part, of any such bird or any part, nest, or egg thereof, included in the terms of the conventions between the United States and Great Britain for the protection of migratory birds concluded on August 16, 1916 (39 Stat.

1702), the United States and the United Mexican States for the protection of migratory birds and game mammals concluded February 7, 1936, the United States and the Government of Japan for the protection of migratory birds and bird in danger of extinction, and their environment concluded March 4, 1972, and the convention between the United States and the Union of Soviet Socialist Republics for the conservation of migratory birds and their environments concluded November 19, 1976. This law only applies to migratory bird species that are native to the United States or its territories.

4 Avoidance and Minimization Measures

The avoidance and minimization measures were developed to meet the requirements of State and Federal regulations. This BNP includes specific avoidance and minimization measures to prevent impacts to nesting birds and birds of prey.

4.1 District Biologist:

District Biologists will be sufficiently skilled and have experience with the identification, by both sight and sound, of all species of birds we can expect to find within our facilities, and also be familiar with the variation of type and value of the biological resources found within each facility. Names, resumes and accompanying permits of District Biologists will be submitted to CDFW requesting written approval. All District Biologists will be approved by CDFW prior to conducting nest searches.

The District Biologist will survey the entire facility and within a buffer of 300 to 500 feet surrounding the facility, if possible. As many of our facilities are fenced, often buffers are not possible due to private property restrictions. Surveys will occur at the appropriate time of day for both diurnal and nocturnal nesting birds, no more than 3 days prior to the commencement of the maintenance. Documentation of the survey findings will be provided to CDFW.

During the nesting bird survey, once a nest is detected, the District Biologist will record the details of the nest using a Nest Survey Report, along with avoidance and minimization measures. These records will be entered into the District's maintenance database.

District Biologist will be responsible for the following duties;

- Searches for and identifies bird species and bird behaviors such as nesting behaviors;
- Detecting bird nests;

- Recommending the appropriate buffers;
- Detailed biological resource information and any subsequent observations will be recorded in both the Nest Survey Report and the facility tracking database;
- Installs flagging that establishes buffers around nests;
- Communicates clearly and directly, with District operations staff, concerning information about nests, and applicable avoidance and minimization measures;
- If the needed arises, the District Biologist recommends, and instructs District operations staff to implement, additional methods to reduce disturbance, such as ingress/egress modifications, or establishing no stopping/standing/maintenance zones;
- Makes the determination about when a nest should be closed (nest cycle stage or construction of nest is complete) based on observations;
- Removes flagging around a closed nest;
- Actively monitors maintenance activity to ensure activities are not disturbing nests.

4.2 Survey Protocol

The protocols outlined here are procedures for pre-maintenance nesting bird surveys and help to avoid and minimize impacts to nesting birds. These protocols will streamline communication and understanding between the biologist and District operations staff. In addition, the protocol will facilitate rapid reporting of nest observations and help maintenance operators organize alternate maintenance activities should a nest be found.

- If maintenance activities occur during the nesting bird season, nesting bird surveys will be conducted, by a CDFW-approved District Biologist, within the facility and may include identifying an appropriate buffer.
- Pre-construction nesting bird surveys will be conducted by a District Biologist, no more than 3 days prior to initiation of maintenance activities. If maintenance work is not initiated within 3 days of the pre-construction survey, a new preconstruction survey will be conducted and a new set of data will be added to the existing maintenance database. Nest survey reports will be filled out for pre-construction nesting bird surveys and will be inputted into the facility maintenance tracking database prior to maintenance activities.

- The District Biologist will submit a Nest Survey Report (NSR) to CDFW documenting all nests found and accompanying data.
- The nesting bird survey areas will include locations where maintenance activities will occur including ingress/egress access roads and buffer areas. Facility specific modifications to the survey area may be applicable given landscape and topographic features that naturally buffer avian species from maintenance activities such as adjacent freeways, residential or urban development where existing disturbance levels exceed any maintenance related disturbances.
- No nesting bird surveys will be conducted on private property

4.3 Nest Searching and Processing

Nest searches will be conducted utilizing both visual and auditory methods derived from data compiled over the span of 25 years of collective experience of the District biologists. District's Biologists will rely on behavioral cues and visual evidence to locate nests. Surveys will include searching for all types of nests: ground, cavity, shrub/tree/vegetation, and bridge/structural. The following protocols will be utilized.

- Surveys will be conducted in teams of one or two by walking the site and at times, sitting and observing selected vantage points to document behaviors and interactions between and among bird species.
- Weather conditions must be conducive to bird activity and visual detection. Nest surveys will not be conducted during inclement weather, such as sustain high-wind conditions, or steady to heavy rain events.
- The site surveys will be conducted for an adequate amount of time to determine the nesting status of the site. The amount of time spent surveying the facility will vary depending of vegetation type and density, size of facility and bird behaviors. The bird behaviors also vary and certain behaviors require more time to observe to ascertain whether a nest is being built or a territory is being defended. Often, the biologist may conclude that a nest is present or determine a nest status based solely on bird behavior without ever having actually locating or directly observing a nest. Direct observations will also be used such as observing signs of nest building, such as birds carrying nesting material, will be recorded as well.
- Data related to breeding, which includes nest phenology (e.g. singing, courtship, territorial displays, nest building, mate pairing, egg laying,

incubating, nestling, and fledgling), will be recorded on the Nest Survey Report and will be entered into the facility tracking database.

- The most commonly utilized bird survey techniques are summarized below;
  - ✓ Visually check all trees, shrubs, grasses, bare ground, cliffs, and any man-made structures, such as bridges or culverts for passerines or other non-raptors;
  - ✓ Follow adults defending a nest site or displaying territorial behavior;
  - ✓ For raptors, record and follow pairs perched together;
  - ✓ Follow pairs exhibiting courtship behavior;
  - ✓ Follow adults carrying nesting materials and building a nest;
  - ✓ Follow adults carrying other materials, such as food or fecal sacs;
  - ✓ Follow calling nestlings;
  - ✓ Follow adult birds making repeated flights to the same location;
  - ✓ Check tree cavities for signs of use, such as down feathers or white wash on the rim of the cavity;
  - ✓ Observe tree cavities for use by watching the entrance to decipher if incubating adults are inside. In general, adult birds will leave the nest every 20 to 40 minutes to feed or another adult will arrive to offer food to the incubating parent;
  - ✓ Identify nests, if it can be completed safely, for signs of occupation, such as evidence of fresh building, presence of down, a completed nest bowl, eggs, and/or nestlings.

If a nest is found, the District Biologist will recommend the maintenance activities be delayed until the nest is found to be inactive or the chicks have fledged. If the facility maintenance cannot be delayed then the District Biologist will recommend site-specific avoidance and minimization measures.

If a nest is discovered, the following steps will be taken, should maintenance work be required at that time:

1. Site-specific measures will be included in the NSR prior to any maintenance activities, for each surveyed area.
2. A District Biologist will determine appropriate avoidance and minimization measures. The recommended buffer and any other avoidance and minimization measures will be detailed in the Nest Survey Report.
3. Buffers will be marked using stakes and flagging placed at the edge of the buffer facing the work area and/or access road. Stakes/flagging can increase risk of predation and expose the nest being protected; as such flagging will be used in a limited way while still providing demarcation.
4. The species, location and any additional pertinent information will be recorded and entered into the facility tracking database. If work cannot be postponed, the nest will be monitored throughout the maintenance activity to ensure it is not impacted.

4.4 Buffers

The determination of the buffer widths will be site specific and depend upon the species, topography and the distance between the nest location and the maintenance activities. In general, the buffer widths will take into account the following factors;

- ✓ Geographic location
- ✓ Type and extent of disturbance (e.g. noise levels of machinery versus hand crews)
- ✓ Duration and timing of disturbance
- ✓ Bird behavior

Adaptive management methods will be used to ensure that buffer distances are effective and no nests are disturbed. Recommended buffers will be determined onsite and will use the factors listed above given the maintenance cannot be postponed. Utilization of the buffer is expected to avoid and minimize any disturbance impacts to the nest. If the District Biologist determines that maintenance activities cause or contribute to any form of nest disturbance, the maintenance will cease and a new buffer will be re-evaluated. There may be different types of buffers used such as a no-work buffer, or a drive thru only buffer to allow for access to facilities but not allow sustained

maintenance activities. Once a buffer is established, the frequency of nest monitoring will vary depending on the bird's sensitivity to the disturbance.

4.5 Nest Monitoring

Nests located within proximity to maintenance activities will be monitored to assure that disturbance resulting from maintenance activities do not result in impacts to the nest.

Monitoring will be conducted by a District Biologist as needed, to determine if the recommended buffer is effective during maintenance activities. The nest will be visited during the initial phases of the maintenance and weekly during the maintenance at a minimum, but frequency will vary depending on what type of work is being conducted. For example, daily monitoring would be expected during the initial phases of the maintenance, or when there is a significant change in the type of work activity. Monitoring at these times can establish that the nest is not being disturbed. The nest may be monitored biweekly or weekly after the work has begun to ensure no new nests are found and to determine the status of the nest within the buffer. District Biologist will record all bird behavior and nest status in the facility tracking database. All the information concerning any nests will be given to CDFW at the end of the nesting season. Nest monitoring will end when the final nest determination is made (e.g., fledged or failed) or when maintenance activities are completed, whichever comes first.

If the District Biologist determines that the recommended buffer is not sufficient to avoid disturbance at a level that could cause nest failure, the District Biologist will recommend additional measures, for example increased buffer width, altering or allowing only specific work types that may be implemented on a case-by-case basis to minimize impacts to nesting birds based on site-specific conditions and work requirements. Behavioral cues indicating nest disturbance such as time off the nest, hesitation approaching the nest, incessant chattering, bill swiping, or other unusual behavior, will be used by the District Biologist to determine buffer effectiveness. Details will be recorded in a Nest Monitoring Log (NML) during each visit by the District Biologist to indicate time on/off the nest, behavioral response, activities while off the nest, and any other information that may be helpful in assessing nest disturbance.

4.6 Passive Nesting Bird Deterrents

To minimize harm to birds and the young, passive deterrents may be implemented in advance of known maintenance activities to prevent nests from becoming established in an active work area. All nesting deterrents are intended to prevent nesting attempts and do not include the use of devices that prevent nesting from continuing once a nest is built.

Typically, the District does not engage in nesting bird deterrents. This stems from the open nature of many of our facilities and the infrequent nature of our maintenance resulting in an encouragement of nesting, rather than a deterrent. However, when work must occur under bridges or flood control structures within bird nesting season, we may opt to place deterrents within or upon these structures so that maintenance may occur quickly and without impacts to nesting birds. Once maintenance is completed, nest deterrents will be removed.

Nesting bird deterrents may include the following:

- ✓ Installation and daily monitoring of appropriate-sized mesh netting or tarps on flood control facilities and/or associated structures or bridges and/or its associated structures;
- ✓ Use of wire spikes placed on bridges, or other facilities to dissuade birds from nesting on these structures;
- ✓ Use of visual deterrents (not to be used in raptor nests) in active maintenance areas, or ingress/egress roads where bridges or flood control structures may be repeatedly passed, back and forth, to get to the maintenance area;
- ✓ Wrapping, stuffing, or covering ends of open pipes or other materials where cavity nesters may attempt a nest;

As stated earlier, the District rarely uses nesting deterrents and as such, will only be used in coordination with CDFW and the District Biologist. All nesting deterrents are intended to prevent nesting attempts for a short period of time, and do not prevent nesting birds from continuing once a nest is built.

5 Burrowing Owl Plan

The western burrowing owl (*Athene cunicularia*) (BUOW) is a State of California species of special concern due to their decline in the state of California in the past 30 years. It is a yearlong resident of open, dry annual or perennial grasslands, desert habitats and in grass, forbs and open shrub stages of chaparral, coastal sage scrub, pinyon-juniper and ponderosa pine habitats. The BUOW may also use golf courses, cemeteries, road allowances within cities, airports, and vacant lots in residential areas. The presence of freshly excavated California ground squirrel burrows is the primary habitat requirement for nesting, although they may also use pipes, culverts, and nest boxes where burrows are scarce. One burrow is selected for use as the nest however, satellite burrows are usually found within the immediate vicinity of the nest burrow within the defended territory of the owl. Although open areas with short vegetation are critical for nesting, there is some evidence that BUOWs prefer a vegetation mosaic with nesting habitat interspersed within taller vegetation for hunting. However, a secondary requirement for

suitable BUOW foraging habitat appears to be low vegetation cover that allows visibility and access to prey.

In California the burrowing owl is considered a species of special concern by the CDFW. California Bird Species of Special Concern are defined as those species, subspecies, or distinct populations of native birds that currently satisfy one or more of the following criteria:

- Are extirpated from the state totally or in their primary seasonal or breeding role and were never listed as state threatened or endangered.
- Are listed as federally, but not state, threatened or endangered.
- Meet the state definition of threatened or endangered but have not been formally listed.
- Are experiencing, or formally experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify them for state threatened or endangered status.
- Have naturally small populations exhibiting high susceptibility to risk from any factor(s) that if realized could lead to declines that would qualify them for state threatened or endangered status.

This document was prepared with the goal of providing a comprehensive plan for the management and monitoring of all burrowing owls that occur within our maintained facilities throughout the entire County of San Bernardino. As the facilities maintained within the County of San Bernardino are widely known and have been carefully surveyed by District biologist's for over a decade, the location of burrowing owls is known. In addition, the facilities that are suitable for BUOW however remain lacking them; continue to be monitored each year for presence.

According to the 2012 Staff Report on Burrowing Owl Mitigation published by the State of California Natural Resources Agency Department of Fish and Game, the District will evaluate each maintenance activity to evaluate whether there will be impacts to burrowing owl. ***If maintenance needs to occur within established buffers and burrowing owls are present, the District will consult with CDFW prior to any maintenance. Any agreed upon measures will be implemented and strictly adhered to in order to protect the species.***

Existing Avian Resources

No federal or state listed species are expected to occur within the maintenance areas. If a listed species is observed within or near the maintenance area, work will be halted and consultation with United States Fish and Wildlife and/or CDFW will occur.

6 Reporting

The District's Facility Tracking System will capture nesting information in one place, and contain data relevant to each nest observed within or near a maintenance facility. Annual Reports of nesting bird activity, including pre maintenance surveys, both positive and negative for nesting birds, and any nest monitoring reports will be submitted to CDFW by November 15 of each year, and will contain the following information collected during each bird survey and nest monitoring occurrence.

- Date observed
- Species
- Status (e.g. Nest building, incubation, brooding etc)
- Buffer, expressed in feet
- Maintenance activity type
- Nesting progress and status at each monitoring visit
- behavioral observations
- Nest status when maintenance begins and ends
- Determinations of nesting status and how they were achieved
- new nests found
- Weather conditions
- Names of District Biologists (all pre-authorized by CDFW)

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APPENDIX D

Mitigation Monitoring and Reporting Program
(Pending Certification of EIR)

APPENDIX E

Resource Permits
(Pending Receipt of Permits)

- Clean Water Act Section 404 Permit from USACE
- Water Quality Certification/Water Discharge Requirement from RWQCB
- Streambed Alteration Agreement from CDFW
- Incidental Take Permit or Consistency Determination from CDFW
- Biological Opinion from USFWS